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Evolution of Knowledge Management in Business

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Abstract

While investigating the growth of knowledge management in academic literature and in consultancy firms Wilson (2002) in his article "The nonsense of knowledge management", argues that the fields of information science and information systems, should clearly distinguish between the term "information" and "knowledge" in order to assure their respective importance within organizations.

The purpose of this article is to analyze the evolution of the knowledge management as a field of study that clearly differentiates itself from the information system. It investigates the integration of technology in knowledge creation and identifies progress made in KM on the subject of business using information system with the successful utilization of tacit knowledge concepts.

The study consists of a systemic review of articles on knowledge management from Web of Science and Esearch databases since 2003. The study used three search strings "knowledge management", "knowledge management" and "tacit", and "knowledge management" and "explicit". This study may not have covered all articles and reports in KM. Yet, based on the chosen research methodology, it seems reasonable to assume that the review process covered a large share of the studies available.

The literature concerning the evolution of the Knowledge Management (KM) has highlighted that KM as a strategy and tool is now more in line with the basic definition of knowledge and wisdom. The advancement in Information Technology (IT), has supported knowledge capture process by utilizing the human dimension of KM that emphasize on knowledge context. The main contribution of this study is to confirm the close relationship of dependency of IT and KM.

Keywords: knowledge management, human interaction, explicit & tacit, information technology, information management, business

1. Introduction

Although knowledge and the way knowledge and wisdom are talked about in human history is a commonly known fact, yet, what is exactly meant is by "knowledge" and how one might "manage" it is a frequent topic of discussion (Lengnick-Hall & Lengnick-Hall, 2003). This lead to the issues related to Knowledge Management (KM), what is KM? How is it different from Information Management (IM)? How is knowledge collected? How is it stored, etc.? Since late 80's and throughout the 90s the word KM, along with learning organization and organizational learning was used by consulting firms to sell the importance and re-utilization of knowledge, (Wilson, 2002, 2005). Wilson (2002), argued the fact that knowledge management is truly unattainable and is only a "fad". While he maintained that by his inability to find a definition for knowledge management, which differs completely from IM, that KM is nonsense. This author, however, concurs with Professor Robert M. Grant from Georgetown University on this issue. Grant (Grant, 2000, p. 39) wrote: "What Knowledge Management offers us is an insight into aspects of management that we have failed to understand properly because of our failure to consider the nature and characteristics of knowledge". It is important to understand what knowledge is before one can create systems to extract, store and manage it.

This paper argues that the inability to define KM appropriately, separated from IM, does not mean that KM cannot be defined in a manner that is of use to industry. Once KM is defined properly and placed in the context of the industrial or business setting, it is, in fact, an important part of organizational and business activities. Secondly, it examines how KM literature have evolved since 2003 and analyze this evolution in business and

business activities. Finally, the paper will show how KM creation process has advanced with the integration of IT with the tacit to explicit knowledge conversion.

The remainder of this article is organized as follows. Section 2 offers the research methodology, followed by a discussion and literature review of related work, including defining data, information, and knowledge. Section 4 covers research data analysis and results while conclusions are listed in section 5.

2. Research Methodology

The paper is based on a literature review of theoretical and empirical contributions to KM. To carry out this research, a number of secondary sources were used. For the selection of the sources, an adaptation has been made of the method proposed by Jasimuddin et al. (2005).

1) Reading journals in the subject matter chosen, including Knowledge Management, Information Management, Learning Organization, Learning, skill, explicit, tacit, etc. (e.g., Academy Management Journal, The Academy of Management Review, Organization Science and Management Learning, VINE: The Journal of Information and Knowledge Management Systems and Journal of Knowledge Management).

2) Choosing databases for literature search and bibliographical data collection through web scrapping. Wilson (2002) used one database, Web of Science, while García-Fernández (2015) reviewed in three databases: Elsevier, ABI Inform, and Emerald. This paper used two databases Web of Science and Esearch.

3) Deciding which terms were most suitable for the systematic literature search. Wilson (2002) used only Knowledge management. However, based on the initial literature review, including García-Fernández (2015) and Jashapara (2004) it was decided to use the Keywords: knowledge management, tacit and explicit knowledge.

4) Identifying literature. After a first screening by reading abstract, articles which clearly did not match the purposes of the present study, were discarded. The remaining papers were stored for further review.

5) Using the search strategy, two databases, Esearch and Web of Science were searched to extract data using the web-scraping technique.

6) Data was analyzed using MS Excel and Web of Science's Clarivate Analytics.

2.1 Search Strategy

Two databases, Esearch and Web of Science, were searched with several strings:

1) Search strings—Content types:

1a) Books/ebooks, case study, book chapter, conference proceedings, dissertation/thesis, journal/ejournal, journal articles, paper, patents, publication and publication articles, and report.

2) Search strings—Time

2a) 1/1/2003 through 12/31/2016.

3) Search strings—Search was conducted on titles. While quotation marks were used to ensure the exact phrase was identified

3a) Knowledge Management. "Knowledge Management" and "Tacit", "Knowledge Management" and "Explicit".

3b) Each search was later refined for major subject of research, e.g., Business/Management, Computer Science, Engineering and Information Technology.

2.2 Participant (Subject) Characteristics

Web scraping, data mining, or web harvesting is an automated gathering of data from the Internet. It is the practice of gathering data through any means other than the program using API. This is most commonly accomplished by writing an automated program that queries a web server, requests data (usually in the form of the HTML and other files that comprise web pages), and then parses that data to extract needed information (Mitchell, 2015). This research utilizes the Data Miner for web scraping. Data Miner (2016) is an add-on for Google Chrome browser that helps to extract data from web pages and into an Excel spreadsheet or CSV file. This is obtained by developing executable called "recipes". Data Miner has two types of add-ons, an executable call "recipe" that can be used to extract data from any website or multiple websites and a developer called "recipe creator".

Figure 1. Search process

The search process is presented in Figure 1. For this paper, ten recipes were created and executed. The procedure for selecting the papers is as follows.

1) Create search strings using the search criteria described.

2) Create Data Miner Recipes for the search strings. Data extracted include, discipline, a number of papers in each search criterion, citations, and abstracts.

3) Executed recipes and collect data in MS Excel format.

4) Review papers based on titles, abstracts, conclusions, references, and keywords.

5) Classify papers into three different groups:

5a) Relevant papers that satisfy the inclusion criteria.

5b) Assessment papers that might be related to the topic or criteria.

5c) Excluded papers that are irrelevant to research criteria or are duplicated. When in doubt about the classification of a paper, it is always included in the relevant paper group, so in case it being irrelevant it can be discarded in next phases when papers are studied in detail.

6) Each relevant paper's keywords are downloaded and abstract is read to verify its inclusion or exclusion for further data analysis.

2.3 Web Scraping and Search Process

Most of the literature on KM is still in the area of defining or redefining KM or differentiating between data, information, knowledge, and wisdom. Steyn (2004) offered a reminder that there is a distinction between data, information, and knowledge. Knowledge is action in the process that results in deciding action, thus it is treated as the intangible asset of the workers (Figueiredo, Pais, Monteiro, & Mónico, 2016). Therefore, it is better to define the terms used in the paper. This is especially important when we have several versions available, each defining the terms differently.

3. Discussion

In the Results section, summarize the collected data and the analysis performed on those data relevant to the discourse that is to follow. Report the data in sufficient detail to justify your conclusions. Mention all relevant results, including those that run counter to expectation; be sure to include small effect sizes (or statistically nonsignificant findings) when theory predicts large (or statistically significant) ones. Do not hide uncomfortable results by omission. Do not include individual scores or raw data with the exception, for example, of single-case designs or illustrative examples. In the spirit of data sharing (encouraged by APA and other professional associations and sometimes required by funding agencies), raw data, including study characteristics and individual effect sizes used in a meta-analysis, can be made available on supplemental online archives.

3.1 Data, Information and Knowledge

Lengnick-Hall and Lengnick-Hall (2003), defines data as any signals that are sent by an originator to a recipient (human or otherwise). Similarly, they define information as data that are intelligible to the recipient. Webster's New World Dictionary—Second College Edition identifies information as knowledge acquired through facts, data or learning.

Knowledge, on the other hand, is defined in several ways. According to Webster's New World Dictionary, knowledge is the act, fact, or state of knowing; specifically acquaintance or familiarity (with a fact, place, etc.) or awareness or understanding. It is also defined as acquaintance with facts or range of information, awareness or understanding. Dictionary.com defines knowledge as "the fact or state of knowing; the perception of fact or truth;

clear and certain mental apprehension" while Princeton defines knowledge as "the psychological result of the perception of learning and reasoning"; which validates that knowledge is unique to each person. On the other hand, Wilson (2002) defined knowledge as, "what we know". He argued that knowledge is a mental process that involves.

The other definitions of knowledge are linked with the word "action" or "use". They all define knowledge as something that is actionable. Alan Burton-Jones (1999) defines knowledge as "the cumulative stock of information and skills derived from use of information by the recipient". While Leonard and Sensiper (1998, p. 112) defines knowledge as "information that is relevant, actionable, and at least partially based on experience". Lengnick-Hall and Lengnick-Hall (2003), knowledge definition is of linking information to actions, usable by the individual. Moreover, for Nonaka and Takeuchi (1995): "Knowledge is true and justified belief".

Reviewing the above one may agree with Bhatt (2001) that defining data, information, and knowledge is difficult. Bhatt theorized that the relationship between data, information, and knowledge is recursive. He argued that data and information are differentiated on the way they are organized while information and knowledge are differentiated based on their "interpretation" (Bhatt, 2001).

3.2 Information Management and Knowledge Management

Knowledge Management (KM) has been studied from a number of perspectives, including organizational learning (Crossan et al., 1999), knowledge organization (Spender, 1996) and learning organization (Senge, 1990; García-Fernández, 2015). It is thus apparent that the definition of knowledge management, by businesses and academia is mostly synonymous with information management.

Just as there are several definitions of knowledge and information, there are several versions of KM and IM definitions and some of them are very different from each other (Vodáček & Vodáčkova, 1996). So before, we define KM and IM lets define management. Vodáček (1998) defines the term of management as "the set of proven approaches, methods, experience and recommendations used by executives (managers) for coping with specific activities to achieve the organization's goals". These are core managerial sequential activities, like planning, organizing, staffing, leading and controlling.

Business directory defines Information Management (IM) as "the application of management techniques to collect information, communicate it within and outside the organization, and process it to enable managers to make quicker and better decisions" (Information Management 2017). Knowledge Management, as Business Dictionary states, is "strategies and processes designed to identify, capture, structure, value, leverage, and share an organization's intellectual assets to enhance its performance and competitiveness".

Therefore, Information Management (IM) is the process by which relevant information is provided to decision-makers in a timely manner (Davis, 1993). Although IM is a generic term that includes organizations' systems and processes for the creation and use of corporate information, its major aim is to get the right information to the right person at the right place and at the right time (Robertson, 2005). This is the reason why, traditionally, IM has not taken into account how people learn, create, validate, codify, share knowledge and make decisions (Terra & Angeloni, 2003).

Objectively, Information management concerns itself with the control over how information is created, acquired, organized, stored, distributed, and used as a means of promoting information access, processing, and use by people. IM is thus the management of the processes and systems that acquire, organize, store, distribute, and use the information to help people and organizations access, process and use information efficiently and effectively (Detlor, 2010).

Knowledge Management is also defined in various ways depending upon the discipline it is used. The emphasis of these definitions is either from a human resource perspective, an information systems perspective or a strategy one, Figure 2. From an interdisciplinary perspective, this paper will define knowledge management as: "the effective learning processes associated with exploration, exploitation, and sharing of human knowledge (tacit and explicit) that uses appropriate technology and cultural environments to enhance an organization's intellectual capital and performance" (Jashapara, 2004).

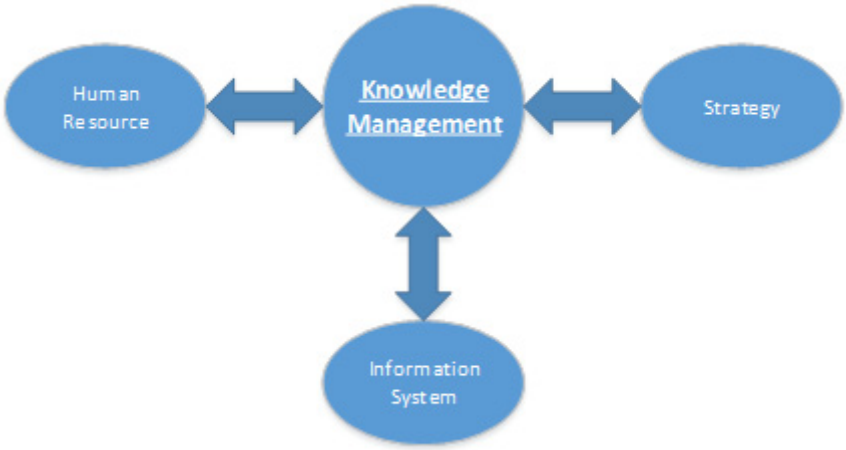

Figure 2. Knowledge management definition perspective

According to Turban (2002), knowledge management helps organizations to identify, select, organize, and publish information. It is part of the organizational memory and often exists in an unstructured form in the organization. Wilson (2002) however, used Frank Miller's definition of knowledge that states KM as a uniquely human capability of making meaning from information, ideally in relationships with other humans.

KM as per business has two critical activities: (1) capture and documentation of individual explicit and tacit knowledge, and (2) its dissemination within the organization. Having things standardized and organized, are very common practices amongst big companies, while on the other hand smaller companies, due to their flexibility, have less of these. This is in line with how Collins (1987) describes knowledge, as two ways of thinking. Firstly, algorithmic model or explicit knowledge and secondly, heuristics. Algorithmic model or explicit knowledge includes drawings, designs, measured data, facts and formal rules. Whereas, heuristics refers to informal rules of thumb that are articulated (Saint-Onge, 2001). Explicit knowledge is passed along in books, communicated through lectures, described in diagrams. For example, the Internet is a conduit for massive amounts of explicit knowledge transfer. Enculturational model or tacit knowledge consists of manual and perceptual skills and cultural skills. Tacit knowledge is an individual's intuitions, beliefs, assumptions, and values formed because of experience, and the inferences the individual draws from that experience (which may be difficult to communicate). Collin (1989) and Saint-Onge (1998) has shown that while explicit knowledge can be completely specified in algorithms and is capable of transferring into a digital computer, tacit knowledge cannot be completely described by algorithms and hence the building of computer-assisted expert systems cannot proceed by the algorithmic model alone. Nonaka and Takeuchi (1995), thus argued that explicit knowledge and tacit knowledge are basic building blocks in a complementary relationship.

Ribeiro (2012) further divided tactic knowledge into three main types: somatic, contingent and collective Somatic tactic knowledge are only developed through physical interaction; contingent tactic knowledge comes from the collection of cases, and collective tactic knowledge is being about to perform something by understanding the social context the action is in. Classifying knowledge has helped researchers in better understanding the transformation process that is needed to create knowledge as discussed later in this paper.

4. Data Analysis and Findings

The research collected 2277 articles from Web of Science and 7410 from Esearch databases. Web of Science also provides an analytics tool called, Clarivate Analytics and it was used to analyze some of the Web of Science data. Collected data, in MS Excel, was then analyzed for descriptive statistics. Starting with knowledge management as title, Table 1 represents a number of articles found in the two databases. Comparing the results with Wilson (2002, 2005), work on Web of Science, WofS, it can be seen that since 2002, the number of articles has been relatively stable. Wilson, 2002, work illustrated a rapid increase in KM literature since 1999 (60 articles) and max out in 2002 (142 articles). From 2003-2016 there were only four years where the number of articles went less than 142. These are colored red in Table 1.

Table 1. Numbers of articles published in Web of Science and Esearch with "Knowledge Management" in the title

Years	**2016**	**2015**	**2014**	**2013**	**2012**	**2011**	**2010**	**2009**	**2008**	**2007**	**2006**	**2005**	**2004**	**2003**
WofS	257	199	109	152	172	189	140	183	154	125	129	169	154	145
Esearch	475	510	605	540	645	648	513	500	513	501	544	635	355	426

A further descriptive statistics analysis for the two databases was also conducted, Table 2, to perform outlier analysis. The outlier analysis, in Table 3, concludes that there are only two outliers (2014 with a very low numbers of articles and 2016 with a very unusual high numbers of articles) in Web of Science and only one outlier (2003, low numbers) in Esearch.

Table 2. Descriptive statistics analysis

	WofS	*Esearch*
Mean	163	529
Standard Error	9.94	22.39
Median	154	513
Mode	154	513
Standard Deviation	37.18	83.79

Table 3. Outliers' identification—IQR analysis

	WofS	*Esearch*
Quartile 1	184	612
Quartile 3	137	493
IQR	47	118
Upper Fence	208	671
Lower Fence	113	434

A further investigation on the areas/subjects, that these KM articles covers, concluded that there is no significant change in the number of articles published with KM in the title in both databases. From Figure 3, it can be observed that in Web of Science, since 2003 KM literature in CS subject area has been decreasing, while KM articles in IS and Business/economy are on the rise with no significant change in KM articles in the engineering area. While in Figure 4, Esearch data is presented that illustrate a very similar trend with CS, IS, Business and Engineering articles. Esearch data also clearly demonstrating the emergence of new subject areas in KM, including higher education, social sciences, medicine etc. Figure 5 illustrate the percentage of articles produce in various subjects with KM in the title from 2003 through 2016.

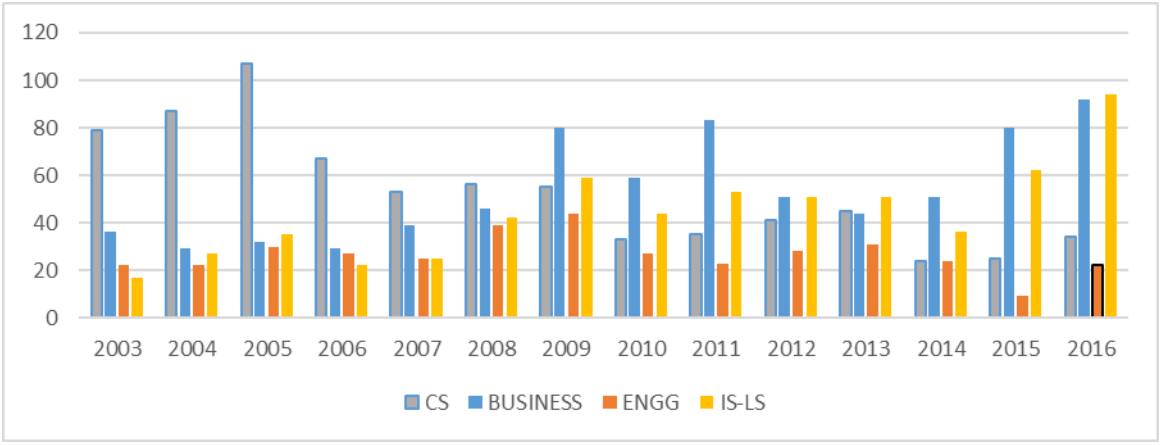

Figure 3. Subjects range of articles in Web of Science with KM in title

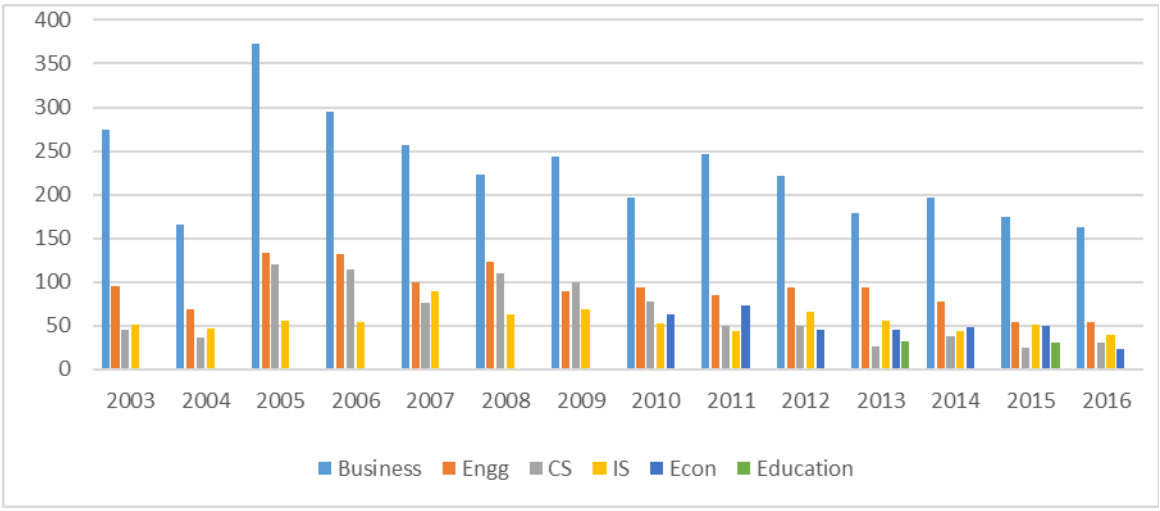

Figure 4. Subjects range of articles in Esearch with KM in title

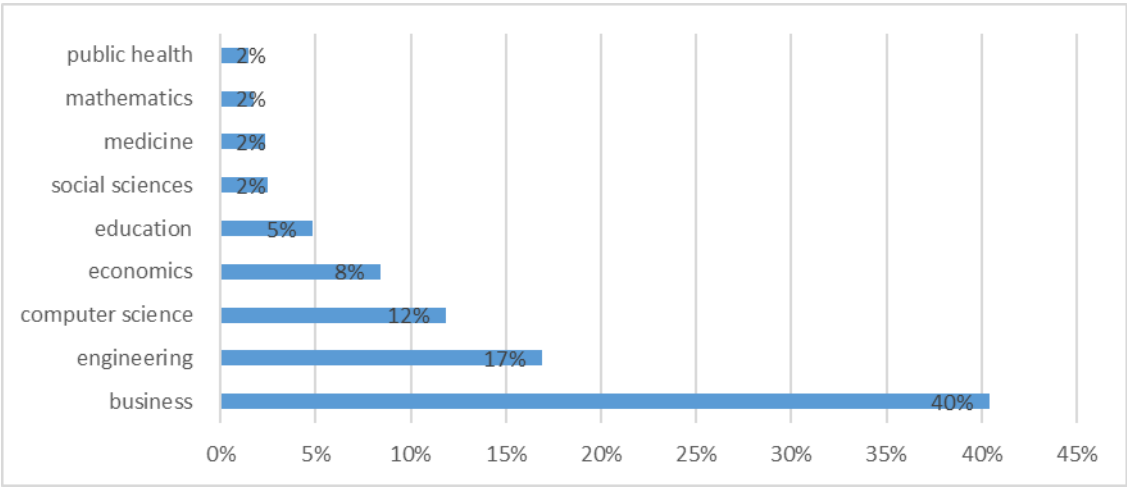

Figure 5. Subjects range of articles in Esearch with KM in title from 2003-2016

4.1 Knowledge Management a Separate Study

Wilson (2002, 2005) argued that most often one would find KM solutions that are actually no more than information or document management systems, i.e., which handle data, information, or perhaps even explicit knowledge. Based on the above discussions knowledge and information are actually quite different, such as is tacit and explicit knowledge. Several authors pointed out that the confusion and misuse of IM and KM are because of the software industry (Terra & Angeloni, 2003), that is influencing to reshape management practices language and theory.

The articles analyzed by this research treats IM as the system that focuses on data and information, which can be unstructured or structured in the form of data. IM mainly concentrate on organizing, analyzing, and retrieving facts that can help to create knowledge, but these facts do not convey a course of action, which is needed to convert information into knowledge. Finally, IM is very much dependent upon technology as it can be copied, codified and easily transferrable nature (Alan, 2014).

In contrast, KM deals with codified and uncodified knowledge, understanding and wisdom. This uncodified knowledge that is tacit knowledge is in the minds of practitioners and is unarticulated, context-based, and experience-based, thus it is very difficult to transfer it alone with technology. Therefore, KM also revolves around human perspective, and concentrate on locating, enabling, encouraging sharing of knowledge. Alan, (2014) maintains that technology in KM is used for creating environments, cultures, processes, etc., to share knowledge.

Tacit knowledge is linked to experience and context, which makes it extremely difficult to copy. In their 2005 article, Grace and Butle (2005) augured that failure of KM approach to learning in organizations is mainly due to its focus on knowledge rather on learning as a people process. According to Terra and Angeloni (2003), KM systems are necessarily much more human-centric than IM systems. This conclusion is in line with the human-centric and context based definition of KM. After 2010, there was a push to separate KM, from effective information management and knowledge resource management. With the decline in manufacturing jobs, the second term, 2004-2008, of President Bush, saw an increase importance for KM and knowledge-based economy, where information became the fuel for responsiveness, innovation, and competition (Bwalya, Mnjama, Sebina, & Mazebe II Mothataesi, 2014). Prior to 2005 a significant amount of journal articles, especially in Web of Science database, Figure 2, are related to CS. The data presented in Figure 2 and 3, also indicates a significant reduction of Computer Science (CS), involvement in KM.

4.2 KM, IT & Business

In 2003, KM Magazine acknowledged IT's value in KM, while also indicating KM as the savior for IT industry (Woods, 2003). The later years has proved this a valid argument. Once KM importance is established, its application in various business fields started in full swing. Linking KM with Business Intelligence and HR created a new arena for KM (Woods, 2003; Hafeez & Abdelmeguid, 2003). Significant work was re-initiated in the development of KM tools following Tiwana's work (Tiwana, 2002; Barth, 2003; Odom & Starns, 2003). The idea, to use KM in various business activities like HR, CRM, ERP, using KM portals, Customer KM, is still continuously growing (Osmarina & Coltre, 2017; Chaabouni & Yahia, 2014; Zhang, Wang, Cao, Wang, & Zhao, 2012; Al-Shammari, 2009; Fjermestad & Romano, 2006; Firestone, 2003; Zipperer, 2003; Callaghan, 2003).

The early part of the KM literature in business was targeted on decision-making (Menne-Haritz, 2004) learning and record keeping (Reger, 2003; Menne-Haritz, 2004), business processes, egovernment (Wimmer, 2004; McNabb, 2006), and trends and challenges in KM (Dwivedi, Venkitachalam, Al-Karaghouli, & Weerakkody, 2011; Burkhard, Hill, & Venkatsubramanyan, 2011).

Currently, KM literature concentrates on the use of KM in business management and organization strategy (Imran, Rehman, Aslam, & Bilal, 2016). A new knowledge-based view of the firm, the Strategic Knowledge Management Technology (SKMT) is defined, that builds on the resource-based theory. Gottschalk (2004), identify the growth model for knowledge management technology, where firms develop from the person-to-tools strategy, via the person-to-person strategy and the person-to-documents strategy, to the person-to-systems strategy for a law firm (Gottschalk, 2004). However, such business management strategy needed modification. A modern organization that is following simple and flat organizational structure have to change when they start following ideas developed out of the traditional point of view or implicit ideas of established KM principles. Using these KM principles, the newer business model started to be more knowledge-centric where organizations goals are to stabilize and synchronize their organizational structures with shared responsibilities to cope with the challenges of finding newer and effective practices of harnessing and retaining knowledge (Chakraborty &

Mandal, 2011). In general, it can be said that knowledge creation thus relates to people and technology dimensions, and the processes that link the people and technology.

Similarly, efforts were made to identify the main knowledge processes associated with organizational knowledge culture. On the task of this process is the creation of a comprehensive list of diverse terms used in describing knowledge processes. Such list, in every organization, would be critical as it helps in eliminating the conceptual ambiguity. Such conceptual ambiguity is the result of the inconsistent use of different terms for the same knowledge process. Intezari, Taskin and Pauleen (2017), identified knowledge sharing, knowledge creation and knowledge implementation as three major and overarching knowledge processes affecting such organizational culture. The employees' knowledge has to be captured and stored using IT. However, such knowledge is not permanent to the organization because of missing context and leave the organization as the employee leaves the company. Businesses are now overreaching in their use of non-competitive agreements to restrict their employee to work for their competitors, however, an employer's ability to enforce a non-compete agreement will be heavily dependent on the facts and circumstances involved (Gardella, 2015). Not only giant knowledge-based IT, or healthcare companies are involved in such practices, lately, fast food companies like Jimmy Jones are requiring their employees to sign such agreements (Quinton, 2017).

The use of KM in business process improvement is not just helping to accommodate customers' changing requirements more effectively but also supporting organization competitiveness (Brajer-Marczak, 2016). During 2003-2009, a significant amount of work was done to decentralized KM approaches while ensuring a gradual inclusion of diverse and distributed context. Creation of ontologies for electronically available information, internet/intranet had improved the quality of knowledge management in large and distributed organizations (Davies, Fensel, & Van Harmelen, 2003; Houhamdi & Athamena, 2015). This can be a way to capture employee's knowledge and retained it with the organization after their departure.

Although there are many research articles addressing KM in Supply Chain (SC) (Patil & Kant, 2014; Dwivedi & Butcher, 2009; Wong, P. & Wong, Y., 2011; Sangari, Hosnavi, & Zahedi, 2015; Bhosale & Kant, 2016), there are still several gaps in the literature. Cerchione and Esposito (2016) highlighted eight main gaps in the SC literature. The first three gaps relate to the factors affecting the adoption, creation, storage, transfer, sharing, and application of KM practices. The next three gaps focus on the systems to support knowledge management while the seventh gap considers the barriers to the adoption of KM practices and the eighth gap examine the impact of adoption of KM practices on performance (Cerchione & Esposito, 2016).

Overall, all these trends indicate the maturity of KM in the business arena, where after laying down the foundation of KM in business fields in the early 2000s, a shift has been made in the application of those concepts in business management.

4.3 KM and Tacit & Explicit Knowledge

The use of tacit and explicit knowledge in KM application has greatly improved the way knowledge is created and used (Osmarina & Coltre, 2017). Researchers have tried to distanced KM from content management and in doing so put forth several method/approaches for the conversion of tacit to explicit knowledge. Some of these approaches are as followed:

• A quantified approach to the management of tacit knowledge through the creation of user profiles that capture the expertise of an employee (Vertommen & Duflou, 2007),

• A new theme that incorporates Tacit Knowledge Management (TKM), and integration it in the traditional understanding of knowledge management (Lehner, 2008), and

• Knowledge transfer flow models (Stevens, Millage, & Clark, 2010).

It is now a well-known argument that for making the right decision at the right time, organizations should use internal or external sources, to convert tacit to explicit knowledge using data and information, and applying the output knowledge/wisdom to achieve their business goals (Westcott, 2016).

Although there were several indications on how KM is linked with knowledge, information, data, wisdom, etc. (Davenport, 1998). Ackerman, Wulf and Pipek (2003) addresses the concerns of researchers and practitioners on offering information as implementation systems. These concerns dealt with the actual knowledge of the organization, what they called "Why Organizations Don't 'Know What They Know'", the cognitive and motivational factors affecting the transfer of expertise knowledge and knowledge mapping. The use of specific tools, to aid in the creation of knowledge maps like Wisdom Builder are also gaining momentum (Lescher, 2003). It provided a useful discussion of the human element, especially Information Manager/Librarian, in knowledge management systems. Although some have argued that Knowledge Mapping and Management is actually

repackaging old information with a catchy title, the Lescher's idea can be treated as the first step of automating the knowledge mapping process and knowledge capture using human interactions.

The tacit to explicit conversion models or context driven models rely heavily, on human interaction and SME knowledge base. It is already proven that in government departments and other public sector organizations, developing socio-technical capabilities, like significant human and systems-based capabilities, will help to support a more effective description of information resources, collections and their context in online environments (Jones & Vines, 2016). Researchers have started to link KM with connection and context (Srikantaiah & Koenig, 2008; Dong, Hung, & Cheng, 2016), by assuming that an enhancement in the knowledge sharing intentions can be achieved by a continual enhancement of Knowledge Management Systems (KMSs) (Dong, Hung, & Cheng, 2016). Such conclusions directly link to the broader definition of knowledge as present earlier in the paper, while emphasizing the role of Subject Matter Expert (SME), or worker or an actor to define that link and context.

Based on the importance of this human dimension, the use of knowledge to understand and manage social networks, in general, and in complex organizations is fast growing. There are always speculations on what was known, when it was known, and who knew it. From politics to security to business, social media is playing an important role in predicting winners in general elections, or identifying the terrorist or identifying single rogue trader making a series of bogus transactions (Tait & Richardson, 2010). This further elaborated the use of human element and human interactions in the creation of knowledge, while illustrating a new way to use social networks in organizations. Several organizations have tested the use of social networks, both public and private for such human interactions (Davies, Grobelnik, & Mladenić, 2009; Razmerita, Kirchner, & Sudzina, 2009; Fitsilis, Gerogiannis, & Anthopoulos, 2014).

Finally, the big question would be the use of this knowledge. Will the learning and teaching will continue in such social networks? McMillan (2016) work on attention scarcity identifies lack of research in the area of docility, which is the desire to teach and learn in knowledge firms. As millenniums, with very low attention span (Hooton, 2016), heads to job markets, especially in knowledge firms with the abundance of information, these workers will demand tools of docility. Such tools will be needed to align human resource strategies for both strategic management and operational functions to enhance teaching and learning (McMillan, 2016). This will be the upcoming challenge for KM.

5. Conclusions

This paper started by differentiating IM and KM. It concludes that although using the wrong phrase, like IM or KM, reflects poorly on those who use it but it still gets the intended message across. Various groups define KM differently, and while it can be an interesting study to see, what knowledge management means to them, it does not have any serious impact on business strategy that uses the term knowledge management because its intended meaning is understood and that is definitely not IM.

The literature review from 2003 to 2016 on knowledge management reveals that some important aspects of KM are related to information and people who utilize that information. Some of these aspects are context to information, validation of information and interaction with people who possess the knowledge and information. When knowledge is conveyed as information, it has to be interpreted by people. These people generate their own knowledge from that information. Thus, even if everyone is presented with the same information, they all can extract different knowledge.

The number of knowledge management's content produced, during the period 2003-2015, have leveled off. Such content has centralized around business management and technology topics/subjects. Once the KM concept is better understood, it appears that its audience and interest groups widened. The subject matter, within KM, that once had a wide interest amongst CS, is now rooted in other subject areas like business, information, engineering, etc. This may be an indication on how these particular subjects have embraced the KM concept.

In business, KM literature emphasizes on its utilization on managing the business, while using the person-to-person strategy to enhance knowledge creation. Management has realized that employees or people' are the organization's most valuable asset and the technologies focused on knowledge management need to be structured around them. They also understand that knowledge follows the employee once they leave the business, especially if their new employees are their competitors. Businesses are reducing this risk by using non-compete agreements. Which sometimes include the clues where employees cannot use the knowledge gained from their current business to their future business.

Creation of electronic decentralized KM ontologies has significantly enhanced KM quality of large companies. KM has seen a significant growth in SC, however, several gaps, including the impact of such KM practices on SC, have not yet been covered in the literature.

Application of tacit knowledge conversion into explicit knowledge has helped in separating KM and content management. It also helped in understanding the cognitive and motivational factors affecting the transfer of expertise knowledge and knowledge mapping. The majority of authors agrees that such context driven models, continuingly evolving KMS and automating knowledge mapping will help in the enrichment of knowledge sharing intensions. In the age of internal and external social media, organizations still need to find ways to enable docility within workers. This challenge might require KM to further move in subjects that it has not yet explored.

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References

Ackerman, M. S., Wulf, V., Pipek, V., & Books24x7, I. (2003, 2014, 2002). *Sharing expertise: Beyond knowledge management* (1st ed.). Cambridge: MIT Press.

Alan, F. (2014). *Information Management vs Knowledge Management*. Retrieved June 27, 2017, from http://www.knowledge-management-tools.net/

Al-Shammari, M. (2009). *Customer knowledge management: People, processes, and technology*. Hershey, PA: Information Science Reference. https://doi.org/10.4018/978-1-60566-258-9

Barth, S. (2003, January 1). *Personal toolkit: A framework for personal knowledge management tools*. Retrieved June 27, 2017, from http://www.kmworld.com/Articles/Editorial/Features/Personal-toolkit-A-framework-for-personal-knowledge-management-tools-9416.aspx

Bhatt, G. D. (2001). Knowledge management in organizations: Examining the interaction between technologies, techniques, and people. *Journal of Knowledge Management*, *5*(1), 68-75. https://doi.org/10.1108/13673270110384419

Bhosale, V. A., & Kant, R. (2016). Metadata analysis of knowledge management in supply chain: Investigating the past and predicting the future. *Business Process Management Journal*, *22*(1), 140-172. https://doi.org/10.1108/BPMJ-02-2015-0014

Brajer-Marczak, R. (2016). Elements of knowledge management in the improvement of business processes. *Management*, *20*(2), 242-260. https://doi.org/10.1515/manment-2015-0063

Burkhard, R. J., Hill, T. R., & Venkatsubramanyan, S. (2011). The emerging challenge of knowledge management ecosystems: A silicon valley high tech company signals the future. *Information Systems Management*, *28*(1), 5-18. https://doi.org/10.1080/10580530.2011.536105

Burton-Jones, A. (2004). *Knowledge capitalism: Business, work and learning in the new economy*. Oxford: Oxford University Press.

Business Dictionary. (n.d.). *Definition of Knowledge Management*. Retrieved from http://www.businessdictionary.com/definition/knowledge-management.html

Bwalya, K. J., Mnjama, N. M., Sebina, P. M. M., & ProQuest (Firm). (2014). *Concepts and advances in information knowledge management: Studies from developing and emerging economies*. Oxford: Chandos Publishing.

Callaghan, J. (2003). Knowledge management and the struggle for power. *International Small Business Journal*, *21*(3), 349.

Cerchione, R., & Esposito, E. (2016). A systematic review of supply chain knowledge management research: State of the art and research opportunities. *International Journal of Production Economics*, *182*, 276-292. https://doi.org/10.1016/j.ijpe.2016.09.006

Chaabouni, A., & Yahia, I. B. (2014). Contribution of ERP to the decision-making process through knowledge management. *Journal of Decision Systems*, *23*(3), 303-317. https://doi.org/10.1080/12460125.2014.886498

Chakraborty, S., & Mandal, S. (2011). Dynamic knowledge management: A breakthrough in the traditional watch-glass perspective in the Indian IT sector context. *Review of Knowledge Management*, *1*(1), 38-53. Retrieved from http://ezproxy.emich.edu/login?url=http://search.proquest.com/docview/1665179939?accountid=10650

Charles, J. M. (2016). Old wine in new bottles: Docility, attention scarcity, and knowledge management. *Journal of Knowledge Management*, *20*(6), 1353-1372. https://doi.org/10.1108/JKM-03-2016-0124

Collins, H. M. (1987). Expert systems and the science of knowledge. In *The social construction of technological systems: New directions in the sociology and history of technology* (pp. 329-348).

Crossan, M., Lane, H., & White, R. (1999). An organizational learning framework: From intuition to institution. *Academy of Management Review*, *24*(3), 522-537.

Data-Miner. (2016). *Extract data from any websites into a spreadsheet*. Retrieved June 5, 2017, from https://data-miner.io/

Davenport, T. H., & Prusak, L. (1998). *Working Knowledge: How Organizations Manage What They Know*. Harvard Business School Press, Boston, MA.

Davies, J., Fensel, D., Van Harmelen, F., NetLibrary, I., & Books24x7, I. (2003). *Towards the semantic web: Ontology-driven Knowledge management* (1st ed.). Hoboken, NJ, Chichester, England: J. Wiley.

Davies, J., Grobelnik, M., & Mladenić, D. (2009). *Semantic knowledge management: Integrating Ontology management, knowledge discovery, and human language technologies*. Berlin: Springer.

Davis, G. B., & Hamilton, S. (1993). *Managing information: How information systems impact organizational strategy*. Homewood, IL: Business One Irwin.

Detlor, B. (2010). Information management. *International Journal of Information Management*, *30*(2), 103-108. https://doi.org/10.1016/j.ijinfomgt.2009.12.001

Dong, T., Hung, C., & Cheng, N. (2016). Enhancing knowledge sharing intention through the satisfactory context of continual service of knowledge management systems. *Information Technology & People*, *29*(4), 807-829. https://doi.org/10.1108/ITP-09-2014-0195

Dwivedi, A., & Butcher, T. (2009). *Supply chain management and knowledge management: Integrating critical perspectives in theory and practice*. New York, Basingstoke England, Palgrave Macmillan. https://doi.org/10.1057/9780230234956

Dwivedi, Y. K., Venkitachalam, K., Sharif, A. M., Al-Karaghouli, W., & Weerakkody, V. (2011). Research trends in knowledge management: Analyzing the past and predicting the future. *Information Systems Management*, *28*(1), 43-56. https://doi.org/10.1080/10580530.2011.536112

Figueiredo, E., Pais, L., Monteiro, S., & Mónico, L. (2016). Human resource management impact on knowledge management. *Journal of Service Theory and Practice*, *26*(4), 497-528. https://doi.org/10.1108/JSTP-12-2014-0269

Firestone, J. (2003). *Portal progress and knowledge management: Hummingbird Enterprise*. Camden: Information Today, Inc.

Fitsilis, P., Gerogiannis, V., & Anthopoulos, L. (2014). Project knowledge management based on social networks. *International Proceedings of Economics Development and Research*, *70*, 48.

Fjermestad, J., & Romano, N. C. (2006). *Electronic customer relationship management*. Armonk, N.Y, London, M.E. Sharpe.

García-Fernández, M. (2015). How to measure knowledge management: Dimensions and model. *Vine*, *45*(1), 107-125. https://doi.org/10.1108/VINE-10-2013-0063

Gardella, A. (2015, July 25). *The limits of non-compete agreements*. Retrieved June 10, 2017, from https://www.forbes.com/sites/adrianagardella/2015/07/25/the-limits-of-non-compete-agreements/#8a135cd170ae

Gottschalk, P., & Books24x7, I. (2004, 2005). *Strategic knowledge management technology*. Hershey, PA, USA: IGI Global.

Grace, A., & Butler, T. (2005). *Beyond knowledge management: Introducing learning management systems*. Hershey, PA: IGI Global.

Hafeez, K., & Abdelmeguid, H. (2003). Dynamics of human resource and knowledge management. *The Journal of the Operational Research Society*, *54*(2), 153-164. https://doi.org/10.1057/palgrave.jors.2601513

Hooton, C. (n.d.). *Our attention span is now less than that of a goldfish, Microsoft-ytudy finds*. Retrieved May 13, 2015, from http://www.independent.co.uk/news/science/our-attention-span-is-now-less-than-that-of-a-goldfish-microsoft-study-finds-10247553.html

Houhamdi, Z., & Athamena, B. (2015). Ontology-based knowledge management. *International Journal of Engineering and Technology*, *7*(1), 51-62.

Imran, M. K., Rehman, C. A., Aslam, U., & Bilal, A. R. (2016). What's organization knowledge management strategy for successful change implementation? *Journal of Organizational Change Management*, *29*(7), 1097-1117. https://doi.org/10.1108/JOCM-07-2015-0130

Information Management, definition. (May 20, 2017). Retrieved from http://www.businessdictionary.com/definition/information-management.html

Interim, A., Taskin, N., & Pauleen, D. J. (2017). Looking beyond knowledge sharing: An integrative approach to knowledge management culture. *Journal of Knowledge Management*, *21*(2), 492. https://doi.org/10.1108/JKM-06-2016-0216

Jashapara, A. (2004). *Knowledge Management: An Integrated Approach*. Prentice Hall, Harlow, Essex.

Jashapara, A. (2011). *Knowledge Management: An Integrated Approach*. Prentice Hall, Harlow, Essex.

Jones, M., & Vines, R. (2016). Cultivating capability: The socio-technical challenges of integrating approaches to records and knowledge management. *Records Management Journal*, *26*(3), 242-258. https://doi.org/10.1108/RMJ-11-2015-0035

Lehner, F. (2008). *Tacit knowledge management: Do we need a re-orientation of traditional KM approaches?* (pp. 225-231). Berlin, Heidelberg: Springer Berlin Heidelberg.

Lengnick-Hall, M. L., Lengnick-Hall, C. A., & Books24x7, I. (2003). *Human resource management in the knowledge economy: New challenges, new roles, new capabilities* (1st ed.). San Francisco: Berrett-Koehler. Oxford, New York, Oxford University Press.

Leonard, D., & Sensiper, S. (1998). The role of tacit knowledge in-group innovation. *California Management Review*, *40*(3), 112. https://doi.org/10.2307/41165946

Lescher, J. (2003). *Knowledge mapping and management* (Knowledge management). Alert Publications, Inc.

Menne-Haritz, A. (2004). *Business processes: An archival science approach to collaborative decision making, records, and knowledge management*. Dordrecht; Boston; Kluwer Academic Publishers.

Mitchell, R. (2015). *Web Scraping with Python*. O'Reilly Media, Inc.

Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company: How Japanese companies create the dynamics of innovation*. New York, NY, Oxford University Press.

Odom, C., & Starns, J. (2003). *Developing a knowledge management blueprint*. Camden: Information Today, Inc.

Osmarina, P. G. G., & Coltre, S. M. (2017). Knowledge management as a determining factor in the retention of professionals in the industry: A case study in an organization in the furniture industry. *Brazilian Business Review*, *14*(2), 182-203.

Peng Wong, W., & Yew Wong, K. (2011). Supply chain management, knowledge management capability, and their linkages towards firm performance. *Business Process Management Journal*, *17*(6), 940-964. https://doi.org/10.1108/14637151111182701

Princeton's Dictionary. (n.d.). Retrieved June 27, 2017, from http://wordnetweb.princeton.edu/perl/webwn?s=knowledge

Quinton, P. S. (2017, May 27). *These days, even janitors are being required to sign non-compete clauses*. Retrieved June 10, 2017, from https://www.usatoday.com/story/money/2017/05/27/noncompete-clauses-jobs-workplace/348384001/

Razmerita, L., Kirchner, K., & Sudzina, F. (2009). Personal knowledge management: The role of web 2.0 tools for managing knowledge at individual and organizational levels. *Online Information Review*, *33*(6), 1021-1039. https://doi.org/10.1108/14684520911010981

Reger, G. (2003). *Learning and knowledge management in the firm*. *Amsterdam*. Elsevier B.V. https://doi.org/10.1016/s0048-7333(02)00015-x

Ribeiro, R. (2012, April 3). *Levels of immersion, tacit knowledge and expertise*. Retrieved June 6, 2017, from https://link.springer.com/article/10.1007/s11097-012-9257-z

Robertson, J. (2005). *Ten principles of effective information management*. KM Column.

Sachin, K. P., & Kant, R. (2014). Knowledge management adoption in the supply chain. *Journal of Modelling in Management*, *9*(2), 160-178. https://doi.org/10.1108/jm2-08-2012-0025

Saint-Onge, H. (1998). *The Antidote* (Issue 11). Retrieved from http://www.knowinc.com/saint-onge/articles.htm

Saint-Onge, H. (2001). *What Is Knowledge Management?* Retrieved from http://www.knowinc.com/saint-onge/library/strategic.htm. 5/28/01

Sangari, M. S., Hosnavi, R., & Zahedi, M. R. (2015). The impact of knowledge management processes on supply chain performance. *The International Journal of Logistics Management*, *26*(3), 603-626. https://doi.org/10.1108/IJLM-09-2012-0100

Senge, P. M. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organization*. Doubleday/Currency, New York, NY.

Spender, J. C. (1996). Making knowledge the basis of a dynamic theory of the firm. *Strategic Management Journal*, *17*(1), 45-62. https://doi.org/10.1002/smj.4250171106

Srikantaiah, T., Koenig, M. E. D., & American Society for Information Science and Technology. (2008). *Knowledge management in practice: Connections and Context*. Medford, N.J: Information Today.

Stevens, R. H., Millage, J., & Clark, S. (2010). Waves of knowledge management: The flow between explicit and tacit knowledge. *American Journal of Economics and Business Administration*, *2*(1), 129-135. https://doi.org/10.3844/ajebasp.2010.129.135

Steyn, G. M. (2004). How do professionals develop? Lessons for the effective implementation of the South African skills development act. *South African Journal of Education*, *24*(3), 217-224.

Tait, A., & Richardson, K. A. (2010). *Complexity and knowledge management: Understanding the role of knowledge in the management of social networks*. Charlotte, NC: Information Age Pub.

Terra, J. C., & Angeloni, T. (2003). *Understanding the difference between Information Management and Knowledge Management*. IAMOT Conference, Nancy, France. Retrieved May 20, 2017, from http://www.providersedge.com/docs/km_articles/Understanding_the_Difference_Between_IM_and_KM.pdf

Tiwana, A. (2002). *The knowledge management toolkit: Orchestrating IT, Strategy, and knowledge platforms*. Upper Saddle River, N.J: Prentice Hall.

Turban, E. (2002). *Information technology for management: Transforming business in the digital economy* (3rd ed.). Hoboken, NJ: John Wiley.

Vertommen, J., & Duflou, J. (2007). *A quantified approach to tacit knowledge management in R&D-environments through the use of document-based user profiles* (pp. 409-416). Boston, MA: Springer, US. https://doi.org/10.1007/978-0-387-49864-5_48

Vodáček, L. K. (1998). Knowledge Management und Kommunikationssysteme, Workflow Management, Multimedia, Knowledge Transfer. In *Proceedings des 6. Internationalen Symposiums für Informationswissenschaft* (pp. 3-7). Retrieved May 29, 2017, from http://www.steptwo.com.au/papers/kmceffectiveim/index.html

Vodáček, L., & Vodáčková, O. (1996). *Management-Theory and Practices for the 1990s*. Management Press, Praha 1996 (in Czech).

Westcott, R. T. (2016). *The strategic knowledge management handbook: Driving business results by making tacit knowledge explicit*. Milwaukee: American Society for Quality.

Wilson, T. D. (2002). The Nonsense of Knowledge Management. *Information Research*, *8*(1), 144. Retrieved from http://informationr.net/ir/8-1/paper144.html

Wilson, T. D. (2005). "The nonsense of knowledge management" revisited. In M. Elena, & T. D. Wilson (Eds.), *Introducing information management: An Information Research Reader* (pp. 151-164). London: Facet Publishing.

Wimmer, M. A., NetLibrary, I., & Springer Link (Online service). (2004, 1900). *Knowledge management in electronic government* (1st ed.). 5th IFIP international working conference, KMGov 2004, creams, Austria, May 17-19, 2004: Proceedings. New York, Berlin, Springer.

Woods, E. (2003). *Knowledge Management 2002-2003: The end of the beginning*. Camden: Information Today, Inc.

Zhang, L., Wang, H., Cao, X., Wang, X., & Zhao, K. (2012). Knowledge management component in managing human resources for enterprises. *Information Technology and Management*, *13*(4), 341-349. https://doi.org/10.1007/s10799-012-0127-8