Leadership and Knowledge Management: Mapping Intersections with Keywords Analysis

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Purpose: The aim of the paper is to identify and map the research output on intersections between leadership and knowledge management.

Design/methodology/approach: Keywords analysis of bibliometric data indexed in Scopus is the main research method applied to conduct the study. The method of systematic literature review is used to outline the theoretical background of the study.

Findings: The publications included in the research samples concerned the topics related to leadership and knowledge management. As for the title sample, the most numerous keywords clusters focused on 'knowledge and knowledge management' and 'leadership and leadership styles', while in the topic sample the most numerous categories were 'knowledge and knowledge management' and 'human resources and HRM'. Other topics within the area of interest of publications combining the study of leadership and knowledge management include: general and strategic management, organisational learning and innovation, IT and technology. When it comes to studies relating to particular sectoral contexts, education and health care should be mentioned.

Research and practical limitations/implications: In order to mitigate the limitations associated with the study process and increase its objectivity, the following actions are recommended for further research: mapping the research field with other methods (triangulation), replicating the study with the use of IT tools for data analysis and the use of other databases.
Originality/value: The value of the paper is its contribution to the research field through mapping intersections between leadership and knowledge management, which has not been completed before.
Paper type: research paper.

Keywords: leadership, knowledge management, keywords analysis.

1. Introduction

The concepts of knowledge management and leadership are well established constructs in the theory of management studies but they all the time attract the attention of new ranks of researchers. In general, knowledge management is defined as "the effective learning processes associated with exploration, exploitation and sharing of human knowledge (tacit and explicit) that use appropriate technology and cultural environments to enhance an organisation's intellectual capital and performance" (Jashapara, 2004, p. 12). Leadership is known as "interpersonal influence, exercised in a situation, and directed, through the communication process, toward the attainment of a specified goal or goals" (Tannenbaum, Weschler and Massarik, 1961, p. 24, quoted after Birasnav, Rangnekar and Dalpati, 2011, p. 108). Both knowledge management and leadership are the issues of paramount importance for organisation success and unequivocally they are linked together. Knowledge is believed to have a great influence on the level of the competitiveness of the company hence it is important to manage it efficiently. Also, leadership associated with employees' general job satisfaction (Politis, 2001) plays a crucial role for achieving organisational goals in an efficient and effective manner. Leadership is identified among intra-organisational antecedents of knowledge management (Glińka-Neweś, 2007). It is necessary to know how to work with knowledge and how to encourage people to share experiences. Leaders

should teach their followers that it is beneficial to share knowledge and experiences as they can profit more from sharing rather than from retaining.

It is essential to mention the influence of organisational behaviours on knowledge management. According to Glińska-Neweś, there are four the most important cultural behaviours for knowledge management i.e.: teamwork, internal communication, attitude to changes and innovation, and leadership (Glińska-Neweś, 2007). Each behaviour is identified and characterised. Starting with teamwork, its main characteristics are: interpersonal and team-working competencies, rivalry, sharing knowledge with each other, loyalty, common aims and following rules. Another cultural determinants are about internal communication and they are as follow: the feeling of mutual trust, positive and negative conflicts, error acceptance, importance of the mission and vision of the company. The third behaviour concerns attitude to changes and in order to be open to new and unknown situations, it is important to create experimentation-friendly working environment as well as the thirst for development and success. As regards leadership itself, the following characteristics should be mentioned: the strive for power, considering knowledge as a way to gain power, and centralisation of management (Glińska-Neweś, 2007).

As mentioned above, the concepts of knowledge management and leadership attract the attention of new ranks of researchers. As of 16 of July 2018, the number of publications with 'leadership' included in their titles was 42,438, while for 'knowledge management' such a search retrieved 12,104 records. Nevertheless, while these two phrases intersected together there are only 78 publications found in Scopus database (for a title search). Extending the query to papers' keywords and abstracts (topic search) brings 1,263 items. This shows that the issue of intersections between leadership and knowledge management makes up an interesting and expanding research area. However, this area has not been mapped and profiled thoroughly, yet. Therefore, the aim of the paper is to identify and map the research output on intersections between leadership and knowledge management. The method of keywords analysis is applied to achieve the aforementioned aim. The paper responds to the identified gap in the body of knowledge. As of 10 June 2018, there are no records found for the following query 'leadership' AND 'knowledge management' AND 'keyword analysis' in titles, abstracts and keywords of publications indexed in Scopus database.

In the process of designing and structuring the paper, the publications by Lis, Czerniachowicz and Wieczorek-Szymańska (2017) as well as Sudolska and Lis (2017) were used as benchmarks. The paper structure follows the classical model consisting of theoretical introduction, methodology section, results presentation and discussion (IMRD).

2. Theoretical grounding

The question of how leadership can influence knowledge management (and vice versa) is the most key matter of the article. In a few studies it was noticed that knowledge management is important for companies in order to gain competitive advantage and to develop their core values. It is also agreed that both leadership and organisational culture influence knowledge management. In their investigation, Hai Nam Nguyen and Sherif Mohamed point out that leadership and organisational culture are connected, hence one cannot exist on its own. It is said that culture sets what company's rules and beliefs are so that the leaders have to follow it (Nguyen and Mohamed, 2010).

Another matter which should be mentioned is the variety of approaches to knowledge management. The document-centred approach focuses on transferring knowledge into a written form, in other words it focuses on "extracting knowledge from individuals, analysing it, synthesizing it, and developing it into documents that make it easier for others to understand and apply" (Wick, 2000, p. 516). The role of the technological approach is to make sharing and applying knowledge as easy and convenient as possible. In the technological environment, knowledge management is believed to depend on technology so employees are focusing on technological resources. The socio-organisational approach emphasises that knowledge is shared by people and it is created by social interactions and culture. It is important to encourage employees to share with others as by doing so, the feeling of trust and integration is built. In this approach it is all about tacit knowledge. Another mentioned perspective is the knowledge organisation approach. In this case, knowledge itself bears a great value and is perceived as a source of competitive advantage. Knowledge organisations usually focus on the intangible asset of their workers which is knowledge (Wick, 2000).

The role of knowledge management system is to help "organisations to capture, store, retrieve and distribute knowledge" (Kuo and

Lee, 2011, p. 114). Although a great amount of literature exists, there is not much information about how to implement it in practice. In the research, authors examined the compatibility, task-technology, and empowering leadership. It is crucial to focus on empowering leadership which is, in fact, to some extend empowering employees. By doing so, employees have more freedom in being successful in doing their tasks and more willing to use all tools and information offered by managing knowledge activities (Kuo and Lee, 2011).

Tacit knowledge in considered as the most useful kind of knowledge. It is defined as "unarticulated knowledge that is in a person's head that is often difficult to describe and transfer. It includes lessons learned, know-how, judgement, rules of thumb, and intuition" (Bollinger and Smith, 2001, p. 9, quoted after Crawford, 2005, p. 7). In other words, all necessary information, experiences and skills are in a person's head that is why companies should pay attention to the 'quality' of workers, not quantity.

It should be also taken into consideration how leadership and knowledge management may influence human capital and human resource management. First of all, it is crucial to establish to which extent leadership can influence knowledge management. In the research conducted in the software company, Singh came to conclusions that directive leadership has negative influence on knowledge management while delegating leadership influences knowledge management practices positively. In order to be effective at knowledge management, companies should follow the delegating style in which employees are encouraged to think independently, as well as they have the feeling of responsibility and equality (Singh, 2008). Another study of a manufacturing company indicates that with the use of organisational learning, transformational leadership and management of knowledge, the performance of the enterprise will be improved. The researchers discovered that both innovativeness and performance of the company depend mostly on transformational leadership. Moreover, they attracted attention to the fact that organisational learning, knowledge management, organisational performance and innovation, transformational learning are influencing each other either in direct or indirect ways (Noruzy, Dalfard, Azhdari, Nazari-Shirkouhi and Rezazadeh, 2013).

At the beginning, two kinds of leadership styles should be mentioned: transactional and transformational leadership. In most cases, transformational leadership is perceived positively while transactional

leadership is neutral. According to the research, transformational leadership can be presented as the one which stimulates employees' development and independence by providing them with trainings, giving them appropriate tools, encouraging them to make decisions and solve problems on their own. On the other hand, transactional leadership focuses only on final products, employees working according to schemes and rules, managers usually stick to old solutions (as long as they are working well) and they avoid innovative ideas (Politis, 2001). It is important to bear in mind that transformational learning can, and should, be taught during trainings of leaders as it is beneficial for developing human capital. Transformational leaders let their employees to be independent, hence, the employees can either be successful or they can fail. As a result, leaders have a good opportunity to create learning culture within an organisation by documenting all failures and successes (Birasnav et al., 2011). Moreover, transformational leaders are supposed to be successful within an organisation and they are considered to deal with any problem which may occur at work. In order to develop effective management, managers and leaders should apply the transformational approach (Crawford, 2005). In their investigation, Nguyen and Mohamed noticed that both transformational and transactional leadership styles influence management of knowledge in a positive way. What is more, they discovered that the employees are more willing to complete their duties when they know that they will be rewarded so contingent reward leadership style influences their motivation to work and to exchange knowledge. Moreover, their results show that transformational leadership style influences the culture within the organisation, hence there is no influence on managing knowledge (Nguyen and Mohamed, 2010). Another leadership style which should be mentioned is organisational knowledge leadership. It was noticed that effective knowledge management is crucial in order to complete organisational tasks. Also, leaders are responsible for organisational success by managing information systems (Lakshman, 2009). Another researchers suggest that transformational leaders "play such an important role in applying and controlling knowledge management (…), present the same prospect and create effective solutions to encourage the followers to get more involved in knowledge management activities" (Noruzi et al., 2013, pp. 1073–1085 in Gelard, Boroumand and Mohammadi, 2014, p. 75). What is more, the authors discovered that transformational leadership style has positive influence on knowledge

storing, applying, creating and sharing as well as there is higher tolerance for making errors (Gelard et al., 2014).

Nowadays, most companies are knowledge based, which means that they are using knowledge to achieve efficient productivity and to provide services (Sadeghi and Rad, 2018). To be competitive in the market, the company needs to be innovative. Moreover, having knowledge on a specific matter facilitates decision-making. It is claimed that knowledge-oriented leadership is responsible for effective management of knowledge, so it means that without any support from leaders, it is easy to fail (Sadeghi and Rad, 2018). Merat and Bo (2013) examined the following mixes of leadership and knowledge management, which are: personalization-distribution and codification-centralization approaches. The personalization-distribution strategy is characterised by "emphasis of managers on learning-by-doing, assigning of mentors to newcomers, use of two-man teams for carrying out critical task in order to protect the firm against knowledge drain due to loss of an employee, and encouraging social interactions and gatherings ultimately aimed at increasing efficiency of team work among employees" (Merat and Bo, 2013, p. 9). Codification assumes that knowledge should be extracted and stored in the explicit form. Hence, according to the codification-centralisation strategy, when the level of knowledge codification is high, "knowledge in explicit or codified form is highly mobile through vertical structures and can easily be integrated in the hands of a single individual allowing him to carry out leadership functions without a need to rely on other members" (Merat and Bo, 2013, p. 11). The authors concluded that "if the firm is able to enforce an effective codification strategy, it is possible that a centralised leadership system will become feasible" (Merat and Bo, 2013, p. 13).

Knowledge management is challenging as it is not only about managing knowledge but also people. In his study, Taylor claims "it is considered important that an exploration into knowledge management teams and the principles of shared leadership be together considered with an objective of developing a conceptual model that can prove useful in developing an organizational framework to help facilitate knowledge management implementation efforts and support sustaining those efforts" (Taylor, 2013, p. 70). He believes that "knowledge management teams […] have positive impact in creating and maintaining an organisational knowledge sharing culture via the integration of organisational teams and shared leadership principles" (Taylor, 2013,

p. 70). However, he points out the possible challenges for the teams such as: identification of knowledge gap, identification of organisation-al structure misalignment, recognition and removal of learning barriers and realisation of the fact that they are able and have power to change something behaviour as change leaders (Tylor, 2013).

Having outlined the relationships between leadership and knowledge management, intersections between these two constructs will be studied in detail through keywords analysis. In order to point out leading issues, first of all the most frequently used keywords will be identified in papers dealing with leadership and knowledge management. Secondly keywords will be matched into categories and analysed as clusters.

3. Research sampling

Scopus was used as a source of data for the sampling process. The research sampling process was conducted on 10 June 2018. Two research sub-samples were selected. The first one, labelled as 'Title Sample' consists of the publications indexed in Scopus including the conjunction of phrases 'leadership' and 'knowledge management' in their titles. This sub-sample numbers 78 papers published between 2000 and 2018, which have received in total 876 citations. The h-index of the Title Sample is 14. The majority of publications (41) are indexed within the Business, Management and Accounting research area. Other highly represented research areas are: Social Sciences (21), Computer Science (15), Decision Sciences (15), Economics, Econometrics and Finance (10). The sample comprises mainly articles (51) and conference papers (17). Other types of documents are very seldom.

The second research sub-sample, labelled as 'Topic Sample', is made by the publications indexed in Scopus and including the conjunction of phrases 'leadership' and 'knowledge management' in their titles, abstracts and keywords. Within the sample, the are 1,263 publications issued between 1985 and 2018, which have been cited 10,853 times. The value of h-index is 48. The majority of publications is distributed among the following research areas: Business, Management and Accounting (531), Social Sciences (326), Computer Science (309), Decision Sciences (223), and Engineering (219). Similarly to the Title Sample, the most numerous types of documents are: articles (676) and conference papers (388).

The analysis was conducted in two steps for each of sub-samples. First of all, the top 10 most often cited keywords were identified. Secondly, all the keywords included into the publications comprising the sub-sample were clustered with the affinity diagram technique. The bottom-up approach was applied i.e. similar keywords were grouped together and labelled with headers. In order to mitigate the risk of subjectivity associated with this operation, the 'devil's advocate' technique was applied i.e. while the author clustered keywords, the another person critically assessed and questioned the outcomes of the clustering process.

4. Results presentation

4.1. Title Sample
Top keywords in research on intersections between leadership and knowledge management mentionned 4 or more times in the papers included in the research sample are presented in Table 1.

Table 1. Top keywords in research on intersections between leadership and KM (Title Sample)

No.	Keyword	N
1.	Knowledge Management	56
2.	Leadership	25
3.	Transformational Leadership	16
4–5.	Human Resource Management	6
4–5.	Knowledge Acquisition	6
6–9.	Information Management	5
6–9.	Knowledge Management System	5
6–9.	Management	5
6–9.	Organizational Performance	5
10–15.	Knowledge Based Systems	4
10–15.	Knowledge Management Practices	4
10–15.	Knowledge Management Strategy	4
10–15.	Knowledge-Oriented Leadership	4
10–15.	Management Science	4
10–15.	Transactional Leadership	4

Source: Own study based on data retrieved from Scopus as of 10 June 2018.

Among the top expressions, the most frequently used keywords are: 'knowledge management', 'leadership', and 'transformational leadership'. They emphasise the main field of interests of researchers. They are followed by such expressions as: 'human resource management', 'knowledge acquisition', 'information management', 'knowledge management system', 'management', 'organizational performance', 'knowledge based systems', 'knowledge management practices', 'knowledge management strategy', 'knowledge-oriented leadership', 'management science', and 'transactional leadership'.

In order to examine the keywords more deeply, they were grouped into clusters. The following categories of keywords were excluded from analysis: geographical names[1], names of companies and organisations (e.g. Alvan Sabet Company), names of awards and prizes (e.g. Baldrige National Quality Award, Malcolm Baldrige National Quality Award), expressions related to research methodology[2] and other expressions which did not fit to any category (e.g. adhesion, middle aged, private institutions, rural areas, strongly connected).

Table 2. Keywords clusters in research on intersections between leadership and KM (Title Sample)

No.	Keywords clusters	Keywords	[N]
1.	Knowledge and knowledge management	chief information officer (1), chief knowledge officer (1), chief knowledge officers (1), information management (5), KM propensity (1), KM strategy (1), knowledge (2), knowledge acquisition (6), knowledge based organizations (1),	124

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[1] E.g. Australia, India, Indonesia, Iran, Jordan, Malaysia, Malaysians, New Zealand, Nigeria, Portugal, United States, Western China.

[2] E.g. academic fields, academic research, action research, article, behavioral research, blogs, convergent validity, Cronbach Alpha, cultural studies, data acquisition, data analysis, design/methodology/approach, editorial, empirical test, group theory, health care surveys, health services research, in-depth interviews, interaction effect, least squares approximations, linear connections, little research, mathematical models, moderating effect, multi-method approach, multiple regression analysis, multiple regressions, partial least square(s) (PLS), positive correlations, priority journal, qualitative analysis, questionnaire surveys, regression analysis, research, research approach, research models, statistical methodologies, statistical techniques, surveys, structural equation modelling, structural equations, theoretical framework, theoretical models.

No.	Keywords clusters	Keywords	[N]
		knowledge based systems (4), knowledge content (1), knowledge generation (1), knowledge learning (1), knowledge management (56), knowledge management (KM) (3), knowledge management capability (2), knowledge management implementation (1), knowledge management implementations (2), knowledge management measures (1), knowledge management model (1), knowledge management practices (4), knowledge management process (2), knowledge management strategy (4), knowledge management system (5), knowledge map (1), knowledge mapping (1), knowledge maps (1), knowledge networks (1), knowledge resource (1), knowledge satisfaction (1), knowledge vision (1), knowledge-based view (1), knowledge-based views (1), knowledge-sharing (2), knowledging (1), medical knowledge (1), organisational knowledge (1), organizational knowledge (1), personal knowledge management (1), quality knowledge (1), specific information (1), wisdom (1)	
2.	Leadership and leadership styles	authentic leadership (1), corporate leadership (1), differentiated leadership (1), distributed leadership (1), empowering leadership (2), empowering leaderships (1), executive knowledge leadership (1), group-focused leadership (1), individual focused leadership (1), knowledge based leadership (1), knowledge leadership (1), knowledge oriented leadership (KOL) (1), knowledge-based leadership (1), knowledge-oriented leadership (4), leadership (25), leadership 2.0 (1), leadership behavior (1), leadership behaviour (1), leadership capability (1), leadership development (1), leadership style (3), leadership style (path goal theory) (1), leadership styles (2), leadership training (1), management leadership (1), opinion leaders (1), situational leadership theory (1), situational leaderships (1), strategic leadership (1), transactional leadership (4), transformational leadership (16)	80
3.	Human resources and HRM	affective commitment (1), adult (1), authenticity (1), behaviour (1), communication (3), creative self-efficacy (1), cross-cultural (1), culture (2), effect on employees (1), emotional intelligence (1), employee work attitudes (1), epistemic culture (1), female (1), human (1), human capital (1), human networks (1), human resource management (6), human resource management practices (1), humans (2), intellectual capital (1), job satisfaction (2), knowledge sharing culture (2), knowledge workers (2), knowledge-based society (1), male (1),	61

	No.	Keywords clusters	Keywords	[N]
Table 2. continued			motivation (1), organisational citizenship behaviour (1), organisational culture (1), organisational factors (1), organizational culture (3), organizational cultures (1), organizational teams (1), perceived organizational support (1), perceived organizational supports (1), personnel (2), personnel training (1), relationship between employees (1), shared principles (1), social capital (1), social capitals (1), teams (1), trust (1), work engagement (1), work experience (1), work team (1), work team processes (1)	
	4.	General management	commerce (1), conflict management (1), economic and social effects (1), financial results (1), globalisation (1), industry (1), institutional management teams (1), investments (2), integrated frameworks (1), management (5), management implications (1), management practice (1), management science (4), manufacture (1), manufacturing firms (1), mediation (1), mergers and acquisitions (1), multinational companies (1), network management (1), organization and management (1), organizational philosophy (1), organisational structure (1), organizational structure (1), performance (1), process (1), process management (1), product and process management (1), product design (1), quality management (1), regional development (1), regional planning (1), research and development management (1), returns on investment (1), rural regional development (1), SMEs (2), senior management (1), societies and institutions (3), system factors (1), system science (1), total quality management (1)	51
	5.	Organisational learning, improvement and innovation	communities of practice (1), continuous support (1), diffusion of innovation (1), good practices (1), innovation (2), innovation performance (2), innovative performance (1), knowledge sharing (2), knowledge sharing intensity (1), knowledge transfer (1), learning (1), learning process (1), open innovation (1), organisational development (1), organizational effectiveness (1), organisational innovation (1), organization innovation (1), organizational innovation (2), organizational learning (1), organizational performance (6), organisational performance (2), organizational practices (1), personal development (1), product innovation performance (1), professional practices (1)	35

Table 2.
continued

No.	Keywords clusters	Keywords	[N]
6.	Strategy and strategic management	agile organizations (1), autonomy (1), business performance (1), cohesion (1), compatibility (1), competition (1), competitive advantage (2), competitive environment (1), core skills (1), corporate strategies (1), corporate strategy (1), dynamic capability (1), effectiveness (1), external problems (1), firm performance (1), job performance (2), key success factors (1), market products (1), operational effectiveness (1), organizational agility (1), resource-based view of the firm (1), strategic direction (1), strategic management (1), strategic planning (1), strategic planning and execution (1), strategic positioning (1), strategic vision (1), strategy (1), strategy design and implementation (1), sustainable development (1)	32
7.	IT and technology	decision support systems (1), ease-of-use (1), e-Government (1), e-government (1), engineering (1), government data processing (1), industrial engineering (1), information age (1), information technology investment (1), information technology investments (1), information systems (1), information systems success (1), information technology (2), information technology infrastructure (1), IT investments (1), nocv2 (1), perceived ease of use (1), perceived usefulness (1), personal digital assistant (1), R&D teams (1), social sciences computing (1), social software (1), software development (1), task-technology fit (1), technological companies (1), technology (1), technology acceptance model (1), technology firms (1), web2.0 (1)	31
8.	Health care	delivery of health care (1), delivery of health care integrated (1), health care (2), health care delivery (1), health care institutions (1), health care management (2), health care organization (2), health care quality (1), health care system (1), health organizations (1), healthcare organisations (1), healthcare sectors (1), hospital information systems (1), medical error (1), medical industry (1), medical information system (2), medical profession (1), physician (1), physicians (1), poverty alleviation (1), prescription (1), public sector (1), quality of health care (1)	27
9.	Education	education (1), education reform (1), engineering education (1), higher education (2), higher learning (1), school districts (1), students (1), university libraries (1), university of medical sciences (1), university students (1)	11

The findings in Table 2 enable to distinguish nine main topics (keyword clusters) within the research output on intersections between leadership and knowledge management. The most numerous keyword cluster is labelled as 'Knowledge and knowledge management' with 124 keywords and it refers to seven main expressions presented in Table 1, which are: 'information management', 'knowledge management', 'knowledge acquisition', 'knowledge management system', 'knowledge based systems', 'knowledge management practices', 'knowledge management strategy'. The second most numerous cluster covers the issues of 'Leadership and leadership styles' (80). This cluster matches to four keywords from Table 1, which are: 'leadership', 'transformational leadership', 'knowledge-oriented leadership' and 'transactional leadership'. It can be noticed that the number of words relating to 'Knowledge and knowledge management' is almost twice bigger than the number of words relating to 'Leadership and leadership styles'. The third keyword cluster is labelled as 'Human resources and HRM' and comprises 61 items. However, only one keyword from Table 1 (i.e. 'human resource management') matches with this cluster. The next cluster is 'General management' including 51 keywords. There are only two links to the Table 1 i.e. 'management' and 'management science'. The rest of keywords clusters collected less than 40 keywords and they are as follow: 'Organisational learning, improvement and innovation' (35 items), 'Strategy and strategic management' (32), 'IT and technology' (31), 'Health care' (27), 'Education' (11).

4.2. Topic Sample

Top 10 keywords relating to intersections between leadership and knowledge management found in the papers included in the Topic Sample are presented in Table 3.

Table 3. Top keywords in research on intersections between leadership and KM (Topic Sample)

No.	Keyword	N
1.	Knowledge Management	929
2.	Leadership	317
3.	Information Management	134
4.	Societies and Institutions	109
5.	Knowledge Sharing	102

No.	Keyword	N
6.	Human	95
7.	Knowledge-sharing	90
8.	Human Resource Management	76
9.	Innovation	75
10.	Management	69

Source: Own study based on data retrieved from Scopus as of 10 June 2018.

Among the leading topics, those most often mentioned are: 'knowledge management', 'leadership', and 'information management'. They are followed by expressions such as: 'societies and institutions', 'knowledge sharing', 'human', 'knowledge-sharing', 'human resource management', 'innovation', and 'management'.

The keywords clusters analysis of intersections between leadership and knowledge management encompassed all the keywords from the Topic Sample listed more than 10 times. The following categories of keywords were excluded from analysis: geographical names (e.g. Australia, Canada, India, Malaysia, United Kingdom, United States), expressions related to research methodology (e.g. article, behavioural research, case study, design/methodology/approach, empirical studies, interview, methodology, literature reviews, qualitative research, priority journal, regression analysis, research, review, standard, structural equation modelling, surveys) and other words which did not fit to any category (e.g. developing countries, female, male, professional aspects). The results of keywords clustering are presented in Table 4.

Table 4. Keywords clusters in research on intersections between leadership and KM (Topic Sample)

No.	Keywords clusters	Keywords	[N]
1.	Knowledge and knowledge management	information dissemination (22), information management (134), knowledge (67), knowledge acquisition (61), knowledge based systems (59), knowledge creation (21), knowledge creations (18), knowledge engineering (23), knowledge exchange (12), knowledge management	1,741

	No.	Key-words clusters	Keywords	[N]
Table 4. continued			(929), knowledge management (KM) (19), knowledge management activities (11), knowledge management practices (13), knowledge management process (14), knowledge management strategy (15), knowledge management system (24), knowledge management systems (13), knowledge sharing (102), knowledge-sharing (90), knowledge transfer (53), organizational knowledge (17), tacit knowledge (24)	
	2.	Human resources and HRM	communication (28), collaboration (15), cooperation (16), cooperative behaviour (11), culture (26), employment (15), human (95), humans (67), human resource management (76), intellectual capital (34), knowledge workers (21), motivation (21), organization (28), organisational culture (13), organizational culture (48), organizational cultures (38), organizational factors (11), organizational structure (15), organizational structures (19), personnel (25), personnel training (31), social capital (12), social network (13), social networking (online) (22), social networks (11), trust (18)	709
	3.	General management	commerce (23), customer satisfaction (12), construction industry (12), economic and social effects (17), economics (11), governance (11), industrial management (26), industry (48), management (69), management science (68), managers (36), manufacture (13), organization and management (33), planning (17), product development (14), project management (54), research and development management (11), quality management (16), risk management (17), societies and institutions (109), total quality management (32)	649
	4.	Leadership and leadership styles	leadership (317), leadership development (15), leadership style (17), transactional leadership (11), transformational leadership (53)	413
	5.	Organisational learning, improvement and innovation	communities of practice (23), creativity (12), innovation (75), learning organizations (24), organizational development (13), organisational learning (20), organizational innovation (22), organizational learning (51), organizational performance (37), performance (13), problem solving (15)	305

No.	Key-words clusters	Keywords	[N]
6.	Strategy and strategy management	change management (13), competitive advantage (33), critical success factor (13), critical success factors (17), competition (58), decision making (49), strategic planning (43), strategy (18), sustainable development (35)	279
7.	Education	education (60), e-learning (17), engineering education (22), higher education (20), learning (48), students (22), teaching (27), universities (11)	227
8.	IT and technology	administrative data processing (11), information and communication technologies (13), government data processing (15), information system (11), information systems (46), information technology (52), management information systems (20), software engineering (12), technology (20), virtual reality (12)	212
9.	Health care	health care (19), health care delivery (13), health care management (12), health care organization (21), health care policy (16), health care quality (20), hospitals (15), patient care (13), public health (13), public sector (12)	154

Source: Own study based on data retrieved from Scopus as of 10 June 2018.

The results presented in Table 4 show nine keywords clusters identified according to the topic in studies combining the issues of leadership and knowledge management. Similarly like in Table 2, the most numerous keywords cluster is 'Knowledge and knowledge management' (1,741 items). The second most numerous category is 'Human resources' (709). In comparison, in the Table 2 this category is on the third place. The next cluster is 'General management' with 649 items. The fourth position belongs to the category labelled as 'Leadership and leadership styles' (413). In comparison, in Title Sample this category was ranked as the second top one. The following clusters are: and 'Organisational learning, improvement and innovation' (305 items), 'Strategy and strategy management' (279), 'Education' (227), IT and technology' (212), 'Health care' (154).

5. Discussion

The aim of the study was to analyse the interfaces between leadership and knowledge management. According to the literature, it is not likely to be a good leader without appropriate knowledge and knowledge managerial skills as well as it is not likely to manage knowledge wisely without leadership skills. Hence, it is understood that these two issues attract attention of researchers who are looking for effective ways to combine leadership and knowledge management. Considering the influence which leaders have on people, human resources management seems to play an extraordinary role in this field, as companies can create the organisational culture based on communication, teamwork, and mutual trust which can lead to effective knowledge sharing. The most important observation is that neither leadership nor knowledge management could be effectively practiced without efficient human resources management which is responsible for combining all elements necessary for efficient and effective company operations. That is the reason why human resources management is closely linked to leadership and knowledge management.

Analysing the literature, it is observed that there are publications which present the role of various leadership styles in knowledge management (Merat and Bo, 2013; Lakshman, 2009; Kuo and Lee, 2011; Nguyen and Mohamed, 2011; Politis, 2001; Sadeghi and Rad, 2018; Singh, 2008; Tannenbaum et al., 1961; Tylor, 2013; Wick, 2000). However, there some of them which focus on transformational leadership specifically (Birasnav et. al. 2011; Crawford, 2005; Gelard et al., 2014; Noruzy et al. 2013). It should be noticed that transformational leadership took the third position among the most often used keywords in Title Sample (cf. Table 1), right after 'knowledge management' and 'leadership'. Within Topic Sample (cf. Table 4), it was the second most numerous item (53 citations), just following 'leadership' (317) in the keywords cluster labelled as 'leadership and leadership styles'. Bearing in mind a variety of leadership styles, it is noticed that transformational leadership is considered as the most required leadership approach from the point of view of knowledge management. Transformational leadership encourages employees to be more independent by providing them with appropriate tools and it is necessary for managing knowledge and leading people in a positive way. Therefore, transformational leadership should be introduced in the companies which are looking for

empowerment of employees and putting more responsibilities on them. This kind of leadership encourages cooperation between employees and facilitates to make knowledge management and sharing more common within a company.

6. Conclusions

To sum up the analysis, it is possible to point out the similarities and differences between the findings from analysing Title and Topic Samples. In both cases, the most numerous keywords cluster is 'Knowledge and knowledge management'. In the Topic Sample, the second position is occupied by 'Human resources and HRM', while in the Title Sample it is 'Leadership and leadership styles'. When it comes to the third place, in the Title Sample it is 'Human resources and HRM' and in the Topic Sample it belongs to 'General management'. Other topics within the area of interest of publications combining the study of leadership and knowledge management include: strategic management, organisational learning and innovation, IT and technology. When it comes to studies relating to particular sectoral contexts, education and health care should be mentioned.

Whenever discussing research findings the limitations of the study process and implications and recommendations for further research should be taken into account. As regards this study project, first of all, keywords analysis was the only method applied to achieve the aim of the study. Therefore, the lack of research method triangulation should be considered as a limitation and it is recommended to map the field with other research methods. Secondly, the manual version of keywords analysis used in this paper is flawed with subjectivity and it suggested to analyse keywords with IT data analysis tools e.g. VOSviewer (Van Eck and Waltman, 2010). Thirdly, recognising the high quality of Scopus the replication of research with the use of other databases, including those less biased towards English language publications, is proposed.

The analysis of issues of knowledge management and leadership shows that these two constructs are overlapping and they are dependent on each other. Each of them can exist on its own, nevertheless, in order to make a company and its employees develop, it is beneficial to take into consideration both leadership styles and knowledge management and to learn how to match them together.

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