Leadership Styles and Organizational Knowledge Management Activities: A Systematic Review

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Abstract: Leaders play a critical role in the success or failure of their organizations. Leaders can be effective in implementing changes, building their organization's capabilities, and improving its performance, or the opposite, they could be ineffective. In this systematic review, the authors aim to summarize the findings of previous quantitative research, published between the period from 2000 to 2018, to identify the effect of various leadership styles on organizational Knowledge management (KM) capabilities and activities. The authors reviewed 50 articles found in well-known databases included Emerald, ScienceDirect, Taylor and Francis, Ebsco, Google Scholar, and others, concerning the impact of leadership when implementing KM in business organizations. The review revealed that transformational, transactional, knowledge-oriented leadership, top executives, and strategic leadership have evidence of their constant and positive effect on the KM process. The authors encourage organizations to use a combination of those styles to maximize the effect of leadership on KM. The authors also recommend conducting further studies on the effect of the remaining leadership styles, such as the ethical and servant leadership styles on KM and the other specific KM activities.

Introduction

According to the literature, KM has a significant impact on organizational performance and innovation. Researchers have found a strong link between KM and different aspects of management innovation that provide an organization with a competitive advantage. KM's implementation in business organizations could be affected by several factors, such as the organization culture, budget, infrastructure, technology, and leadership.

The impact of leadership on business and organizational management has been recognized as a significant factor that could make a difference in organizational performance. The academic gurus proposed several theories, such as the great man theory, various behavioral theories, Lewin's theory, the contingency theory, the situational leadership theory, the transformational theory, the transactional theory (or managerial leadership), and many others.

Based on the existing literature, the outcome of implementing KM projects and processes in organizations varies according to the style of leadership. The evidence reveals a positive impact of leadership styles on KM, while other studies affirm a contradictory result. Therefore, this paper, as per the existing literature, is the first systematic review that aims to identify the leadership styles and roles recognized as facilitators or inhibitors of building KM capabilities in organizations and the contribution of those styles and roles to the successful implementation of KM activities. Also, it aims to summarize the evidence and come up with recommendations to guide researchers in their future projects.

To achieve the study goal, the authors conducted a systematic literature review of the quantitative studies published between the period from 2000 to 2018 concerning leadership and KM. Hence, we surveyed some well-known databases, including Emerald, ScienceDirect, Taylor and Francis, Ebsco, Google Scholar, and others.

Literature Review

Leadership is one of the important topics that are studied extensively by researchers. They have come up with several different theories and definitions of the concept. To help readers understand the history of the evolution of leadership theories, we have summarized the most common theories in Table 1.

As can be noticed above, there is a problem with the various definitions of leadership, as they are based on one isolated variable. Therefore, Winston and Patterson (2006) came up with a solution by reviewing over 90 variables that were used by previous researchers and academic gurus to define leadership, and then they proposed an integrated definition of leadership that is "A leader is one or more people who select, equips, trains, and influences one or more follower(s) who have diverse gifts, abilities, and skills and focuses the follower(s) on the organization's mission and objectives, causing the follower(s) to willingly and enthusiastically expend their spiritual, emotional, and physical energy in a concerted coordinated effort to achieve the organization's mission and objectives."

Ribie`re1 and Sitar (2003) addressed the critical role of leadership in organizations that were willing to evolve their culture into a knowledge supporting culture and implement successful KM activities. According to Bolden (2010), leadership, management, and organizational development are all parts of

Table 1: The most common leadership theories

Theory	Description
Great man theories or hero	Great man (hero) is a wise, gifted, noble-hearted man who stands behind an accomplishment in the world as an outcome of thoughts that dwelt in him (Carlyle, 1840).
Lewin's leadership theory and styles	It includes three popular leadership behavioral styles that are autocratic, democratic, and laissez-faire (Lewin, Lippitt, and White, 1939).
Leadership behavior and theories	Those theories focus on how leaders behave toward a task, people, and participation, rather than leadership traits (Vroom and Jago, 2007).
Fiedler's contingency theory	It proposes an interaction of three variables that are leader-member relations, task structure, and leader's positional power, as determinants for the extent of the situational control that the leader has (Fiedler, 1964).
Situational leadership theory	The style to be used by leaders, such as telling, selling, participating, or delegating depends upon factors, such as the situation, the people, and the task (Blanchard and Hersey, 1969).
Transformational leadership	The theory is about the leadership that transforms people and organizations, and raises people to higher levels of motivation and morality. Vision, culture, values, development, teamwork all have meaning in transformational leadership (Fairholm, 2001).
Transactional leadership	The theory is about persons who exercise the authority of their office under formal legality; they obey only the law, obligate others, and follow the principle of hierarchy (Weber, 1968, p. 238).
Servant leadership	According to Robert Greenleaf (as cited in Essays, UK, 2018), the servant-leadership starts with the leader's feeling to serve and, then, his role is changed to lead.
Authentic leadership	According to Walumbwa et al., (2008), authentic leadership is positively related to ethical leadership and transformational leadership. It includes self-awareness of one's strengths and weaknesses, self-moral perspective, balanced processing, and being true.
Ethical leadership	According to Brown, Trevino, and Harrison (2005), ethical leadership is the demonstration of appropriate conduct through communication, reinforcement, and decision-making.

one process for enhancing the capacity of organizations, and people, to improve their performance. According to the Center for Creative Leadership, leadership has several roles in developing an organization's capabilities and implementing strategic changes. Leadership enables executive teams to collaborate effectively to drive change and execute strategy, develop processes, skills, mindsets, and tools to navigate change together, ignite innovation across the organization, manage talent, and create the right culture.

On the other hand, the knowledge-based theory (Curado, 2006) of a firm, which is an extension of the resource-based theory (Barney, 1991), argued that knowledge is a unique strategic resource that does not depreciate the way traditional resources do. According to Polanyi (1966), knowledge, which is classified as explicit knowledge is transmitted formally between people, while tacit knowledge is transmitted informally. Nonaka (1994) developed the dynamic theory of organizational knowledge's creation, which proposed that organizational knowledge is created through a continuous exchange between tacit and explicit knowledge via four mechanisms for interactions: socialization, combination, internalization, and externalization.

Hansen, Nohria, and Tierney (1999) proposed two main KM strategies; firstly, the personalization strategy which theorized that tacit knowledge is shared through conversations and direct contact between people, and secondly, the codification strategy which described the process of conversion of knowledge into a resource that can be used later by people.

The evolution of KM in the last 20 years encouraged many authors to find an appropriate definition that explains the concept. Alavi and Leidner (2001, p. 114) defined KM as a process that involves various activities; minimally it includes the processes of creating, storing and retrieving, transferring, and applying knowledge. In his study, Heisig (2009) summarized the six most frequently used KM activities that are knowledge transfer, creation, application, storage, identification, and acquisition. Also, he listed the critical success factors of KM including: 1) human-oriented factors that are culture, people, and leadership, 2) organizational processes and structure, 3) technology's infrastructure and application, and 4) management processes, including strategies, goals, and outcome measurements.

Young (2010) highlighted four levels of successful KM; firstly, the individual (or personal) level includes personal knowledge, capabilities, experiences, competence, and development that is managed by the individuals themselves, by using tools, e.g., mobiles, wireless and web-based applications; secondly, team KM is recognized as the collaboration between team members to produce new knowledge and transfer knowledge based on "share" or "pull" models of knowledge transfer; thirdly, the organizational KM that includes the introduction of a KM strategy and providing the infrastructure to imple-ment the KM process across the entire organization through the "top-down approach"; and fourthly the inter-organizational KM that adopts knowledge from outside resources, e.g., co-partners, customers, suppliers, and competitors.

Based on the above review, we will identify the various leadership styles and roles that facilitate or inhibit an organization's implementation of its KM activities.

Methods

The authors used the systematic review method to answer the research question and achieve their objectives. The systematic review has a high academic value as it is a collaboration of experts who synthesize strong evidence by reviewing and summarizing secondary data that is relevant to the question under review. This systematic review was undertaken from November 2018 to April 2019.

Inclusion criteria of studies

In this study, the authors have included all the papers that met the following criteria:

1. The title of the article includes the word "leadership or leader" or an alternative word, e.g., "manager or supervisor."
2. The title of the article includes the word "knowledge" or any of the KM activities, e.g., KM, creation, acquisition, identification, transfer, storage, or application.
3. Leadership is the independent variable or a moderating variable in the study, while KM is a dependent or a mediating variable.
4. Quantitative research.
5. Published in peer-review journals between the period 2000 and 2018.

Exclusion criteria of studies

In this study, the authors excluded all the papers that met the following criteria:

1. Research studied the effect of leadership on information systems and technology rather than KM activities.
2. Qualitative or mixed methodology research.
3. Non-English papers.
4. Papers published before 2000.

Search Strategy

The authors used "leadership," "leadership styles," "KM," and "KM activities" as the key search words to search well-known databases included Emerald, ScienceDirect, Taylor and Francis, Ebsco, Google Scholar, and others.

The authors used "AND & OR" as the main basic Boolean operators to combine keywords in a search. Thus, the main search strategy for this review was "leadership AND (knowledge AND/OR (knowledge management OR knowledge creation OR knowledge acquisition OR knowledge identification OR knowledge transfer OR knowledge storage OR knowledge application). Additionally, the authors used the filters recommended by some databases to search for the relevant papers.

Primary Research Methods

The review process started by reviewing the titles and abstracts of the selected articles against the inclusion and exclusion criteria. Then, the included articles were reviewed for the research question, method, sample, tools, and findings. In this study, the included articles are classified in appendixes 1 and 2.

The Study Flow

For this systematic review, the preferred reporting items on systematic reviews and meta-analyses (PRISMA) flow diagram was used to map out the flow of information through the different phases of the systematic review. PRISMA (Figure 1) maps out the number of records identified, screened for eligibility, included, and excluded as justified by the inclusion and exclusion criteria (Mo-
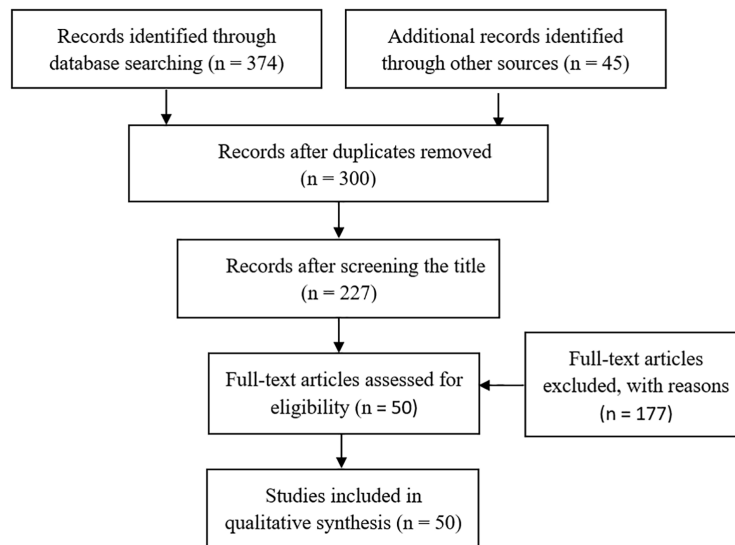

Figure 1: PRISMA study flow

her, Liberati, Tetzlaff, and Altman, 2009). As a result, we ended up with 50 research papers.

The Study Coding Categories

The authors organized the information into tables, including several sub-sections. Those sub-sections included the author, the year of publication, the design, the sector, the country, the sample size, and the findings. The first author of the study analyzed all the articles and organized the data in the tables. The second and third authors double-checked the results and validated the conclusion and the recommendations.

Results

Paper's Characteristics

Appendix 1 presents the authors of the included research papers, their year of publication, journals' names, databases, research design, countries, industries, and samples. An analysis of the contents of Table 1 shows that the number of published papers that are relevant to the systematic review's question has significantly increased with time. According to the review, 7 (14%) of the research papers were published between 2001 and 2009, 16 (32%) between 2010 and 2014, and 27 (54%) between 2015 and 2019. The authors found 26 (52%) of those papers in Google Scholar, Emerald had 11 (22%), DirectScience contained 3 (6%), Taylor and Francis had 2 (4%), and others held 8 (16%).

Those studies were conducted in numerous countries; 12 (24%) in Iran, 7 (14%) in Pakistan, 3 (6%) in Spain, 2 (4%) in Iraq, Taiwan, China, Indonesia, India, Nigeria, and Australia, and 1(2%) in the USA, Thailand, Korea, Croatia, Bangladesh, Singapore, UAE, Bahrain, Mongolia, the UK, the Netherlands, Malaysia, and 2 (4%) in multiple countries.

The studies also covered various industrial sectors: education 9 (18%), manufacturing 7 (14%), various-sized organizations 6 (12%), ICT 5 (10%), banking 3 (6%), government 3 (6%), oil, gas, and thermopower 2 (4%), service 2 (4%), healthcare 2 (4%), research institutes 2 (4%), food industry 2 (4%), hotels 1 (2%), construction 1 (2%), consulting 1 (2%), technology 1 (2%), export processing zones 1 (2%), multimedia super corridor status firms 1 (2%), and a port company 1 (2%). Concerning the methodology, all the papers were cross-sectional researches.

Regarding the size of the research's samples, 2 (4%) included 1 to 50 participants, 4 (8%) 51 to 100, 6 (12%) 101 to 150, 4 (8%) 151 to 200, 12 (24%) 201 to 250, 11 (22%) 251 to 300, 3 (6%) 301 to 350, 2 (4%) 351 to 400, and 6 (12%) more than 400. Regarding the respondents' positions, 27 (54%) of the sample were employees, 12 (24%) were at various levels, 5 (10%) were managers and supervisors, 4 (8%) senior managers, 1 (2%) experts, and 1 (2%) students.

Appendix 2 presents a summary of the research papers' contents, including the leadership styles and roles, the KM activities, and the outcomes of the research. The analysis of the contents of Table 2 shows that 14 (28%) of the included papers studied transformational leadership style, 2 (4%) transactional style, 7 (14%) both transformational and transactional styles, 4 (8%) transformational, transactional, and laissez-faire styles, 4 (8%) knowledge leadership, 3 (6%) leadership in general, 2 (4%) senior and strategic leadership, 1 (2%) leader-member exchange (LMX), 1 (2%) communicative and non-communicative styles, 1 (2%) task-oriented and human-oriented styles and 11 (24%) studied multiple leadership styles, including rewarding, directive, innovator, monitor, autocratic, democratic, consulting, counseling, telling,

selling, referent power, cognitive style, trust, empowering, authority, leadership traits, coercive power, legitimate power, encouraging, self-management, initiating structure, and consideration styles. See Figure 2 for the distribution of studies according to the style.

Gohar, Nazish and Ahmad, 2017; Uddin, Fan and Das, 2017; Nouri, Mousavi and Soltan, 2016; Hayat, Maleki Hasanvand, Nikakhlag and Dehghani, 2015; Birasnav, 2014; Gelard, Boroumand and Mohammadi, 2014; Noruzy, Dalfard, Azhdar, Nazari-Shirkouhi and Re-
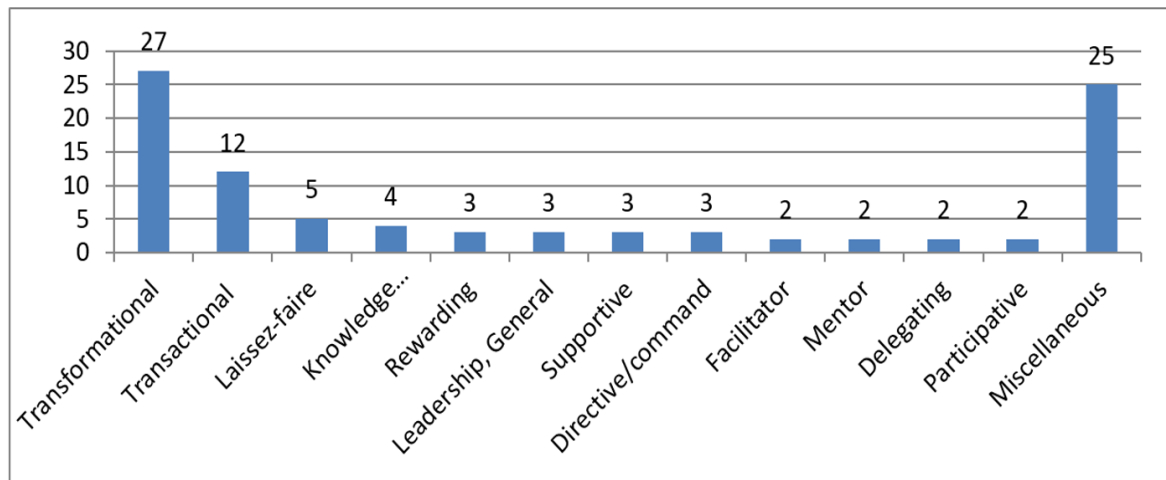
Some studies have included more than one leadership styles
Figure 2: Relevant papers' distribution according to leadership roles and styles*

Concerning the KM activities, Figure 3 also shows that 27 (54%) of the included papers studied the KM activities in general, 19 (38%) knowledge sharing, 1 (2%) knowledge creation and application, 1 (2%) knowledge transfer, 1 (2%) knowledge acquisition, and 1 (2%) looked at knowledge slack, absorptive capacity, and tacitness.

Paper's Contents Summary
Transformational leadership

Regarding the systemic review's question concerning the influence of leadership styles and roles on KM, the authors found in 12 studies that transformational leadership had a positive, significant correlation with the entire KM capability and its various activities, such as knowledge creation, transfer, utilization, retention, integration, and others (Aung and Vinitwatanakhun, 2018; Farooqi,

zazadeh, 2013; Allameh, Babaei, Chitsaz and Gharibpoor, 2012; Analoui, Doloriert and Sambrook, 2012; Nguyen and Mohamed, 2011; Crawford, 2005). Another study found that transformational leadership had a positive moderating effect on the relationship between KM and organizational effectiveness (Chi, Lan, and Dorjgotov, 2012).

On the other hand, the effects of transformational leadership were studied on particular KM activities. Eight studies into the effect of transformational leadership on knowledge sharing found that transformational leadership had a direct, significant, and positive impact on knowledge sharing (Al-Husseini and Elbeltagi, 2018; Park and Kim, 2018; Le and Lei, 2017; Mahmood and Khattak, 2017; Imdad Ullah, Bin Ab Hamid and Shahzad, 2016; Al-Husseini and Dosa, 2016; Akpotu and Jasmine, 2013; Mushtaq
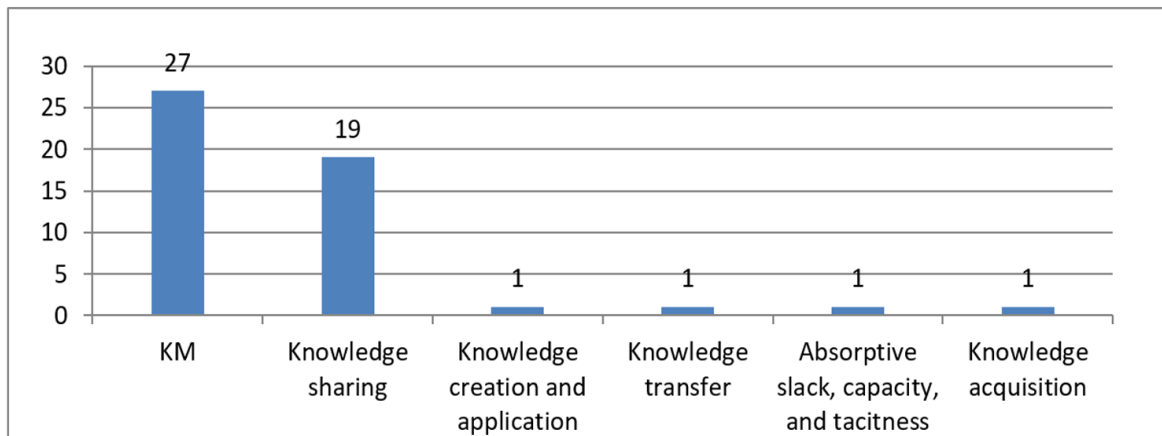
Figure 3: Relevant papers' distribution according to the KM's activities and capabilities

and Bokhari, 2011). Another study found a significant relationship of transformational leadership with the internal component of knowledge sharing (Chen and Barry, 2006).

Some components of transformational leadership, particularly individual's consideration and individual's inspirational impact positively on knowledge sharing activities, while the intellectual stimulation and inspirational motivation do not significantly encourage activities related to knowledge sharing (Rawung, Wuryaningrat, and Elvinita, 2015). Furthermore, the idealized influence is significant only when considered with socialization, the intellectual stimulation leadership is significantly correlated with all the dimensions of knowledge sharing (socialization, externalization, combination, and internalization), and the individualized consideration is significant for knowledge externalization (Bradshaw, Chebbi, and Oztel, 2015).

Furthermore, a few studies revealed that transformational leadership had a positive effect on negotiation, which is a component of knowledge acquisition (Politis, 2001), while leadership constructs including emotional intelligence, leadership traits, and transformation team (i.e. a team of experts who lead a project) significantly influence the transfer of

knowledge (İdris, Ali, and Godwin, 2015) and transformational leadership positively affects all the strategic variables, including knowledge slack, absorptive capacity, and tacitness directly and indirectly (Garcı´a-Morales, Llore´ns-Montes, and Verdu´-Jover, 2008).

Transactional leadership

Transactional leadership, another common leadership style, was found in four studies has a significant, positive relationship with KM's capabilities and activities (Farooqi, Gohar, Nazish, and Ahmad, 2017; Ghanbari and Abedzadeh, 2016; Hayat, Maleki Hasanvand, Nikakhlag and Dehghani, 2015; Analoui, Doloriert, and Sambrook, 2012; Nguyen and Mohamed, 2011). Furthermore, transactional leadership has a significant positive relationship with particular components of KM, which are knowledge's externalization and internalization (Allameh, Babaei, Chitsaz, and Gharibpoor, 2012), and knowledge sharing (Hussain, Abbas, Lei, Haider, and Akram, 2017).

On the other hand, particular components of transactional leadership were found to positively affect knowledge management activities. Contingent rewards, one of the transactional dimensions, was found to have

a positive correlation with knowledge sharing (Farooq, Hanif, and Khan, 2018), with socialization, and combination (Bradshaw, Chebbi, and Oztel, 2015), and with both internal and external knowledge sharing with customers (Chen and Barry, 2006). Also, the initiating structure, one of the transactional dimensions, was found to be positively correlated with communication and the problem of understanding the components of knowledge acquisition, and negatively correlated with the personal traits, organization, and negotiation (Politis, 2001).

A few studies found no significant relationship between transactional leadership and KM (Aung and Vinitwatanakhun 2018; Crawford, 2005), transactional leadership with conversion and socialization (Allameh, Babaei, Chitsaz, and Gharibpoor, 2012), and the dimensions of the contingent reward with knowledge sharing (Rawung, Wuryaningrat, and Elvinita, 2015).

Other Leadership Styles

Regarding knowledge leadership, evidence was found that knowledge-oriented leadership had a positive effect on KM (Jad et al., 2017; Sadeghi and Rad, 2018; Donate and De Pablo, 2015), and it also had positive effects on knowledge creation and application (Safari and Azadehdel, 2015).

About the other leadership styles, some papers revealed that leadership, in general, correlated with KM (Kafashpoor, Shakoori, and Sadeghian, 2013) and had a positive moderating effect on the relationship between knowledge sharing and organizational learning (Khalid and Ahmed, 2015), while leadership behavior (i.e. leadership style, professional authority, and counseling skills) had a positive relation with KM (Tang, 2017). Furthermore, one study inferred that senior

managers' attitudes, subjective norms, and perceived behavioral control all had a positive influence on the intention to encourage knowledge-sharing, which in turn is the main determinant of corporate knowledge-sharing behavior (Lin and Lee, 2004). Additionally, the strategic dimension of leadership had a positive relationship with the success of KM practices (Mas -Machuca, 2014).

Regarding the directive, participative, and supportive leadership styles, they had minor positive influences on KM (Aldulaimi, 2015). One prior study revealed that the directive and supportive styles had negative associations with KM practices, while the consulting and delegating styles had significant positive relationships with KM practices (Singh, 2008).

Regarding leadership powers, the expert power had positive effects on both knowledge's acquisition and dissemination, the reward power had a positive effect on knowledge dissemination in small firms, the legitimate power had a negative effect on knowledge acquisition, the coercive power had only a detrimental effect in small organizations, whereas the referent power did not affect anything in the knowledge-based context (Jayasingam, Ansari, and Jantan, 2010).

The remaining papers studied a variety of individual leadership styles, the mentor leadership style was positively related to knowledge sharing behavior, whereas the facilitator leadership style was not found to be related to knowledge sharing behavior (Jahani, Ramayah, and Effendi, 2011), the cognitive styles (i.e. radical and innovative-collaborator styles) had a negative impact on KM practices; while the cognitive adaptor style had a positive impact on KM practices (Jain and Jeppesen, 2013), the leader-member exchange (LMX) affected knowledge sharing

and performance positively and meaningfully (Sharifkhani, Pool, and Asian, 2016), the telling, selling, participating, and delegating styles had a significant influence on KM (Pringgabayu and Ramdlany, 2017), the democratic style affected KM activities more successfully in small enterprises and enterprises oriented toward international markets, whereas the autocratic style affected KM more in large enterprises (Miloloža, 2018), the command leadership style had a great effect on the KM process, while the supportive leadership style positively and significantly affected three aspects of KM, which are knowledge generation, sharing, and utilization (Akhavan, Zahedi, Dastyari, and Abasaltian, 2014), and the charismatic and human-oriented leadership (communicative styles) had a significant relationship with knowledge sharing, while the task-oriented (non-communicative) style had no relation with knowledge sharing (De Vries, Bakker-Pieper, and Oostenveld, 2010).

Discussion

This study reviewed prior quantitative research to identify the effect of various leadership styles and roles on KM's capabilities in business organizations, summarize the findings, and come up with recommendations that could guide researchers in the future. The review found that the role and influence of the transformational, transactional, knowledge-based leadership, and top executives that were studied influenced KM's activities in several contexts. Other leadership styles were also studied to a limited extent in a certain context.

However, the transformational leadership style was studied in more than half of the included research papers. One-fifth of the included papers pointed out strong evi-

dence for a positive effect of transformational leadership on knowledge management's capabilities in all contexts, as well as having a strong significant, positive effect on a particular knowledge management activity, namely knowledge sharing. Besides, transformational leadership was also found to have a positive effect on knowledge acquisition, knowledge transfer, and strategic knowledge variables, such as knowledge slack, absorptive capacity, and tacitness in a limited number of studies.

Regarding transactional leadership, four studies provided a significant, positive relationship of transactional leadership with the entire capability and activities of KM. Also, particular components of transactional leadership were found to affect knowledge management activities positively, mainly the contingent rewards, which had a positive correlation with KM and knowledge sharing. On the other hand, a few studies revealed contradicting evidence that transactional leadership had no effect on KM and knowledge sharing.

Regarding the general leadership styles, three studies revealed a positive correlation between leadership and leadership behavior with KM and knowledge sharing. Three studies revealed a positive effect of knowledge leadership on KM, as well as knowledge creation and application, while another two studies provided positive evidence for the relationship between senior managers and strategic leadership on KM and knowledge sharing. Furthermore, the effects of many other leadership styles on KM had been studied, but by an insufficient number of studies. The findings of those studies vary and, in our opinion, do not provide solid evidence for the effects of those styles on KM.

Lastly, the authors conclude that the transformational, transactional, knowledge-

based, top executives and strategic leadership were all found to have constant positive effects on KM activities, although in different contexts.

Conclusion

Based on the above discussion, this review found that the transformational, transactional, knowledge-based, top executives and strategic leaderships have positive effects on KM activities. Thus, the authors argue that organizations should use a combination of all those leadership styles to maximize the effect of leadership on KM. In other words, organizations should involve their top executives and strategic leadership, as well as transformational and transactional leadership styles at all organizational levels, as independent variables to build an efficient KM capability and implement KM activities. Furthermore, the authors suggest that knowledge-orientation could enhance the above-discussed relationship if used as a moderating variable.

Recommendations

The authors encourage researchers to direct their future studies to fill the gaps in the literature and concentrate on the inadequately examined leadership styles and KM activities. Furthermore, they should consider conducting longitudinal studies and using representative samples.

On the other hand, the authors encourage interested researchers to conduct quantitative studies to examine the above-suggested model in various contexts. This will provide evidence of the effectiveness of the model, or suggest new modifications, as well as confirming, or not, the generalizability of the model.

Limitations

All those papers used a cross-sectional design, some of those studies used small samples, and the papers did not consider several well-known leadership styles, such as the ethical and servant leadership style

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Appendices

Appendix 1: Characteristics of articles included in the review

Author/s	Study Design	Country	Industry	Sample Size
Politis, 2001	Cross sectional	Australia	Manufacturing	216 employees
Lin & Lee, 2004	Cross sectional	Taiwan	Large companies	154 senior managers
Crawford, 2005	Cross sectional	USA	Education	1,046 non-traditional students and others
Chen & Barry, 2006	Cross sectional	Taiwan & USA	Professional service firms	165 employees
Yang, 2007	Cross sectional	Taiwan	Hotel	499 employees
García-Morales., Lloréns-Montes, & Verdú-Jover, 2008	Cross sectional	Spain	Organizations	408 CEOs
Singh, 2008	Cross sectional	India	Software firm	331 knowledge workers
Jayasingam, Ansari, & Jantan, 2010	Cross sectional	Malaysia	Multimedia super corridor status firms	402 knowledge workers
De Vries, Bakker-Pieper, & Oostenveld, 2010	Cross sectional	Netherlands	Governmental organization.	279 employees
Mushtaq & Bokhari, 2011	Cross sectional	Pakistan	Banking	116 employees
Nguyen & Mohamed, 2011	Cross sectional	Australia	Small-to-medium sized enterprises (SMEs)	157 middle managers
Jahani, Ramayah, & Effendi, 2011	Cross sectional	Iran	University	126 lecturers
Allameh, Babaei, Chitsaz, & Gharibpoor, 2012	Cross sectional	Iran	University	90 faculty members
Analoui, Doloriert, & Sambrook, 2012	Cross sectional	UK	Information and communications technology (ICT)	111 knowledge managers
Chi, Lan, & Dorjgotov, 2012	Cross sectional	Mongolia	Research institutes	524 research and development professional
Kafashpoor, Shakoori, & Sadeghian, 2013	Cross sectional	Iran	Municipality	224 employees
Akpotu & Jasmine, 2013	Cross sectional	Nigeria	ICT	221 managers & employees
Jain & Jeppesen, 2013	Cross sectional	India	Thermal power generation	210 middle and senior managers
Noruzy, Dalfard, Azhdari, Nazari-Shirkouhi, & Rezazadeh, 2013	Cross sectional	Iran	Manufacturing companies	280 managers
Gelard, Boroumand, & Mohammadi, 2014	Cross sectional	Iran	Colors, chemicals, textile and leather industries	47 experts

Akhavan, Zahedi, Dastyari, & Abasaltian, 2014	Cross sectional	Iran	Research	224 experts, researchers, and managers
Mas-Machuca, 2014	Cross sectional	Spain	Consulting	100 knowledge workers and KM project managers
Birasnav, 2014	Cross sectional	Bahrain	Service firms	238 managers
Aldulaimi, 2015	Cross sectional	GCC countries	Telecommunications companies	384 human resources professionals
Khalid & Ahmed, 2015	Cross sectional	Pakistan	Banking	103 employees
İdris, Ali, & Godwin, 2015	Cross sectional	Nigeria	Construction	220 knowledge workers
Bradshaw, Chebbi, & Oztel, 2015	Cross sectional	UAE	Schools	223 employees
Rawung, Wuryaningra, & Elvinita, 2015	Cross sectional	Indonesia	Small- and medium-scale production companies	176 owners & managers
Safari & Azadehdel (2015)	Cross sectional	Iran	Manufacturing and commercial companies	282 employees
Hayat, Maleki Hasanvand, Nikakhlag, & Dehghani, 2015	Cross sectional	Iran	University	214 employees
Donate & De Pablo, 2015	Cross sectional	Spain	Technology	111 CEOs and directors
Nouri, Mousavi, & Soltan , 2016	Cross sectional	Iran	University	277 managers, employees, and faculty members
Imdad Ullah, Bin Ab Hamid, & Shahzad, 2016	Cross sectional	Pakistan	Dairy sector	254 managers and owners
Ghanbari & Abedzadeh, 2016	Cross sectional	Iran	Plastic industry	253 of managers, experts, and employees
Al-Husseini & Dosa, 2016	Cross sectional	Iraq	Public higher education	254 employees
Sharifkhani, Pool & Asian, 2016	Cross sectional	Singapore	Oil and gas	116 employees
Pringgabayu & Ramdlany, 2017	Cross sectional	Indonesia	State Owned-Port Company	412 employees
Tang, 2017	Cross sectional	China	Medical industry	288 managers, physicians, and employees
Farooqi, Gohar, Nazish, & Ahmad, 2017	Cross sectional	Pakistan	SME sector	302 employees
Jad et al., 2017	Cross sectional	Iran	Food industry	316 employees
Uddin, Fan & Das, 2017	Cross sectional	Bangladesh	Export processing zones	273 managers
Mahmood & Khattak, 2017	Cross sectional	Pakistan	Public sector hospitals	100 nurses, doctors, and paramedics

Hussain, Abbas, Lei, Haider, & Akram, 2017	Cross sectional	Pakistan	Telecom	300 supervisors
Le & Lei, 2017	Cross sectional	China	Large manufacturing and service firms	353 managers
Miloloža, 2018	Cross sectional	Croatia	Various-size enterprises	60 presidents or executive board members
Farooq, Hanif & Khan , 2018	Cross sectional	Pakistan	Banking	300 top and middle level managers
Sadeghi & Rad, 2018	Cross sectional	Iran	Governorate	207 employees
Aung & Vinitwatanakhun, 2018	Cross sectional	Thailand	Schools	35 teachers
Park & Kim, 2018	Cross sectional	Korea	Manufacturing	209 employees
Al-Husseini & Elbeltagi, 2018	Cross sectional	Iraq	Higher education	250 employees

Appendix 2: Information extracted from the articles included in the review

	Leadership Style/ Role	KM Activity	Findings
Politis, 2001	Self-management Transformational Transactional Initiating structure Consideration	Knowledge acquisition: Communication / problem understanding Personal traits Control Organization Negotiation	A positive effect of self-management on communication and problem understanding, personal traits, and organization. A positive effect of transformational style in negotiations. A positive effect of transactional style on personal traits and organization. A positive effect of initiating structure on communication/problem understanding A negative effect of initiating structure on personal traits, organization, and negotiation. Consideration has no effect on knowledge acquisition.
Lin & Lee, 2004	Senior managers intentions to encourage knowledge sharing	Knowledge sharing	A positive correlation of senior managers intentions to encourage knowledge sharing
Crawford, 2005	Transformational Transactional Laissez-faire	KM	A positive correlation of transformational leadership with KM. A positive correlation of the combination of organizational position and transformational leadership with KM. A negative correlation of laissez-faire leadership with KM. No correlation between transactional leadership and KM.

Chen & Barry, 2006	Transformational Contingent reward Laissez-faire	Knowledge sharing: Internal External	A positive correlation of transformational leadership behavior with internal knowledge sharing. A positive correlation of contingent reward leadership behavior with both internal and external knowledge sharing with customers. A negative correlation of laissez-faire leadership with external knowledge sharing.
Yang, 2007	Facilitator Mentor Innovator Monitor role	Knowledge sharing	A positive correlation of leader's facilitator, mentor, and innovator roles with knowledge sharing effectiveness. A negative correlation of leader's monitor role with knowledge sharing.
Garcı́a-Morales., Llore´ns-Montes & Verdu´-Jover, 2008	Transformational	Knowledge slack Absorptive capacity Tacitness	A positive direct effect of transformational leadership on all variables. Note: knowledge slack, absorptive capacity and tacitness mediate the relationship between transformational leadership and organization learning and innovation.
Singh, 2008	Directive Supportive Consulting Delegating	KM	A positive relationship between consulting and delegating styles with KM. A negative association of directive and supportive styles with KM.
Jayasingam, Ansari & Jantan, 2010	Legitimate power Coercive power Reward power Referent power Expert power	KM	A positive effect of expert power on knowledge acquisition and dissemination. A negative effect of legitimate power on knowledge acquisition. A positive effect of reward power on knowledge dissemination in small firms. A positive effect of coercive power has a detrimental effect on KM in small organizations only. No effect of referent power on KM.
De Vries, Bakker-Pieper & Oostenveld, 2010	Communicative: Charismatic Human-oriented Non- communicative (Task-oriented leadership)	Knowledge sharing	A positive relationship between communicative and knowledge sharing. No relation between non-communicative style and knowledge sharing.
Mushtaq & Bokhari, 2011	Transformational	Knowledge sharing	A positive effect of transformational leadership on knowledge sharing and promoting knowledge sharing.
Nguyen & Mohamed, 2011	Transformational Transactional	KM	A positive relationship between both transformational and transactional leadership and KM.

Jahani, Ramayah & Effendi, 2011	Facilitator Mentor	Knowledge sharing	A positive relationship between the mentor leadership style and knowledge sharing. No relation between facilitator leadership and knowledge sharing.
Allameh, Babaei, Chitsaz & Gharibpoor, 2012	Transformational Transactional	KM: Knowledge conversion Socialization Externalization Combination Internalization.	A positive correlation between transformational leadership and all variables. A positive correlation between transactional leadership and knowledge externalization, and internalization. No correlation between transactional leadership and knowledge conversion and socialization.
Analoui, Dolori-ert & Sambrook, 2012	Transformational Transactional Passive-Avoidance leadership	KM	A positive correlation between transformational and transactional leadership styles and KM. No relation exists between passive avoidance leadership and KM.
Chi, Lan & Dor-jgotov, 2012	Transformational leadership (Moderator)	KM	A positive moderating effect of transformational leadership on the relation of KM and organizational effectiveness. Note: transformational leadership and KM have a reinforcement interaction effect on organizational effectiveness.
Kafashpoor, Shakoori & Sade-ghian, 2013	Leadership style	KM	A positive relationship between leadership style and KM. Note: KM has a mediating role in the relationship between leadership style and effectiveness.
Akpotu & Jas-mine, 2013	Transformational	Knowledge sharing	A positive relationship between transformational leadership and knowledge sharing.
Jain &Jeppesen, 2013	Cognitive styles: Radical style Innovative-collabora-tive or adaptive style	KM	A positive effect of the adaptive style on KM practices. A negative effect of the radical and innovative-collaborator style on KM.
Noruzy, Dal-fard, Azhdari, Nazari-Shirkouhi & Rezazadeh, 2013	Transformational	KM	A positive effect of transformational leadership on organizational learning and KM. Note: transformational leadership influences organizational innovation through organizational learning and KM.
Gelard, Borou-mand & Moham-madi, 2014	Transformational	KM	A positive correlation between transformational leadership and KM.

Akhavan, Zahedi, Dastyari &Aba-saltian, 2014	Supportive Command leadership	KM: Generation Sharing Organization Utilization	A positive effect of command leadership on the KM process. A positive effect of the supportive leadership on three aspects of KM (i.e. knowledge generation, sharing, and utilization) No association between supportive leadership and knowledge organization.
Mas-Machuca, 2014	Strategic Leadership	KM	A positive relationship between the strategic dimension of leadership on KM practices.
Birasnav, 2014	Transformational	KM	A positive effect of transformational leadership on KM. Note: KM partially mediates the relationship between transformational leadership and organizational performance after controlling for the effects of transactional leadership.
Aldulaimi, 2015	Organizational leadership: Directive Participative Supportive	KM	A positive effect on organizational leadership on KM Note: KM partially mediates the impact of organizational leadership on organizational effectiveness
Khalid & Ahmed, 2015	Leadership (Moderating)	Knowledge sharing	A positive moderating effect of leadership on the relationship between knowledge sharing and organizational learning.
İdris, Ali & Godwin, 2015	Leadership: Emotional intelligence Leadership traits Transformation team	Knowledge transfer	A positive effect of leadership constructs on the transfer of knowledge among organizational leadership.
Bradshaw, Chebbi & Oztel, 2015	Transformation: Idealized influence attributes Idealized influence behavior Intellectual stimulation Individualized consideration Inspirational motivation Transactional Contingent reward Active management by exception Passive management by exception Laissez-faire	Knowledge sharing: Socialization Externalization Combination Internalization	A positive correlation of the idealized influence behavior with socialization. A positive correlation of intellectual stimulation with all dimensions of knowledge sharing. A positive correlation of individualized consideration with externalization. A positive correlation of the contingent reward with socialization and combination.

Rawung, Wuryaningra & Elvinita, 2015	Transformational Transactional	Knowledge sharing: Collecting Donating	A positive effect of individual consideration and individual inspiration on knowledge sharing. No effect of intellectual stimulation and inspirational motivation on knowledge sharing. No effect of the contingent reward dimension on knowledge sharing.
Safari & Azadehdel (2015)	Knowledge oriented leadership	Knowledge creation Knowledge application	A positive effect of the knowledge-oriented leadership on knowledge creation and application. Note: knowledge creation and application mediate the relationship between knowledge-oriented leadership and innovation performance.
Hayat, Maleki Hasanvand, Nikakhlag & Dehghani, 2015	Transformational Inspirational motivation Idealized influence Transactional Laissez-faire	KM	A positive correlation of transformational leadership with KM. A positive correlation of transactional leadership with KM. No relationship between the laissez-faire style and KM.
Donate & De Pablo, 2015	Knowledge-oriented leadership	KM	A positive relationship between knowledge leadership and KM. Note: knowledge leadership has an indirect effect on a company's innovation results through its KM initiatives.
Nouri, Mousavi & Soltan , 2016	Transformational	KM	A positive effect of transformational leadership on KM Note: KM has a positive mediating role between transformational leadership and organizational innovation.
Imdad Ullah, Bin Ab Hamid & Shahzad, 2016	Transformational	Knowledge sharing	A positive effect of transformational leadership on knowledge sharing. Note: knowledge sharing mediates the relationship between transformational leadership and innovative capability.
Ghanbari & Abedzadeh, 2016	Transactional leadership	KM	A positive relationship between transactional leadership and KM.
Al-Husseini & Dosa, 2016	Transformational	Knowledge sharing	A positive relationship between transformational leadership and knowledge sharing. Note: knowledge sharing mediates the relationship between transformational leadership and innovation.
Sharifkhani, Pool & Asian, 2016	Leader-member exchange (LMX)	Knowledge sharing	A positive effect of the LMX on knowledge sharing. Note: knowledge sharing mediates the relationship between the LMX and performance.

Pringgabayu & Ramdlany, 2017	The leadership styles Telling Selling Participating Delegating	KM	A positive effect of the four constructs on KM. Note: the combination of leadership and organizational culture has a strong influence on knowledge management. Also, leadership has a significant positive influence in shaping the organizational culture that in turn has a significant influence on KM.
Tang, 2017	Leadership behaviors: Leadership style Professional authority Counselling skills	KM	A positive relationship between leadership behavior and KM, Note: KM mediates the relation of leadership behavior and organizational innovation.
Farooqi, Gohar, Nazish & Ahmad, 2017	Transformational Transactional	KM: Socialization Externalization Combination Internalization	A positive relationship between transformational and transactional leadership with KM. Note: the transformational leadership style has a stronger effect than the transactional style.
Jad et al., 2017	Knowledge leadership	KM	A positive effect of the knowledge-oriented leadership on KM activities. Note: KM activities have a mediating effect on the relationship between knowledge leadership and product innovation.
Uddin, Fan & Das, 2017	Transformational	KM	A positive effect of transformational leadership on organizational KM and learning.
Mahmood & Khattak, 2017	Transformational	Knowledge sharing	A positive direct relationship between transformational leadership and knowledge sharing. Notes: trust and organizational culture play a mediating role in the relationship between transformational leadership and knowledge sharing.
Hussain, Abbas, Lei, Haider & Akram, 2017	Transactional	Knowledge sharing	A positive relationship of transactional leadership with knowledge sharing. Note; knowledge sharing mediates the relationship between transactional leadership and creativity.
Le & Lei, 2017	Transformational	Knowledge sharing: Collecting Donating	A positive direct effect of transformational leadership on knowledge sharing. Note: justice and trust in leadership play mediating roles in the relationship between transformational leadership and knowledge sharing behavior.

Miloloža, 2018	Autocratic Democratic Laissez-faire	KM	A positive effect of autocratic styles on KM in large enterprises and enterprises in the stagnation phase. A neutral effect of autocratic styles on KM in enterprises oriented toward international and domestic markets. A negative effect of autocratic style on KM in small enterprises and enterprises in the growth and maturity phase. A positive effect of democratic styles on KM in small and medium-sized enterprises, enterprises in the stagnation phase, and enterprises oriented toward international markets. A neutral effect of autocratic styles on KM in enterprises oriented toward international and domestic markets. A negative effect of democratic style on KM in enterprises in the growth and maturity phase. A positive effect of laissez-faire style on KM in large enterprises, enterprises in the maturity and growth phase, as well as in enterprises in the stagnation phase A neutral effect of laissez-faire style on KM in all enterprise groups.
Farooq, Hanif & Khan, 2018	Leadership: Empowering Trust Reward	Knowledge sharing	A positive effect of the three leadership styles on knowledge sharing.
Sadeghi & Rad, 2018	Knowledge based leadership	KM	A positive relationship between knowledge-based leadership with KM. Note: a direct positive and meaningful relationship exists between KM and innovation performance and between knowledge-based leadership and innovation performance.
Aung & Vinitwatanakhun, 2018	Transformational Transactional	KM	A positive relationship between transformational leadership and KM. No relationship between transactional leadership and KM.

| Park & Kim, 2018 | Transformational | Knowledge sharing climate | A positive direct effect of transformational leadership on both the knowledge sharing climate and knowledge sharing behavior. Note: transformational leadership also indirectly affects organizational learning's knowledge sharing behavior, and interpersonal trust through knowledge-sharing climate. |
| Al-Husseini & Elbeltagi, 2018 | Transformational | Knowledge sharing | A positive effect of transformational leadership on knowledge sharing. |