The impact of knowledge management processes on information systems: A systematic review

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ABSTRACT

Knowledge Management (KM) processes play a significant role in the implementation of various Information Systems (IS). Several review studies were carried out to afford a better understanding of the current research trend of KM processes. However, this issue still needs to be examined from other perspectives. It is observed that previous research neglects the examination of KM processes studies with regard to ISs. The current study systematically reviews and sheds the light on KM processes studies related to ISs aiming to provide a comprehensive analysis of 41 research articles published in peer-reviewed journals from 2001 to 2018. The main findings of this study indicate that knowledge sharing is the most frequent KM process studied, followed by knowledge acquisition and knowledge application. Besides, questionnaire surveys were found to be the primarily relied research methods for data collection in the context of KM processes. In addition, 78% of the analyzed studies registered positive research outcomes. In terms of IS type, most of the analyzed studies focused on investigating the impact of KM processes on E-business systems, knowledge management systems, and IS outsourcing, respectively. Additionally, in terms of data collection, the majority of the analyzed studies were primarily focused on the participants who are IS executives/managers. Furthermore, most of the analyzed studies that achieved positive outcomes were carried out in China. To that end, this review study attempts to demonstrate and detail the recent increase in the interest and the advancement made in KM processes research considering ISs studies, which form an essential reference for scholars in KM field.

1. Introduction

Information Systems (IS) offer a wide range of opportunities for institutions to automate, produce, and share their knowledge effectively (Rahimi, Møller, & Hvam, 2016). The successful implementation of a particular IS can only be accomplished when knowledge and resources are managed sufficiently (Kwon & Zmud, 1987). Within this scenario, ISs play a key role in the development of KM (Cerchione & Esposito, 2017). It is claimed that KM processes are the fundamental processes for improving the capabilities of a particular technology, and the successful adoption and implementation of such technology increasingly depends on the efficient use of these processes (Colomo-Palacios, Fernandes, Soto-Acosta, & Larrucea, 2018; Lee, Lee, & Lin, 2007). Researchers have introduced different KM processes, each of which, contributes to the efficient use of ISs. Knowledge acquisition is defined as the institution processes that utilize the current knowledge and capture a new knowledge (Lee et al., 2007). Institutions that have the capability to acquire valuable knowledge are more likely to use and implement an information system (Migdadi, Abu Zaid, Al-Hujran, & Aloudat, 2016). It is argued that knowledge sharing is the central process of KM and the successful implementation of KM highly depends on this type of knowledge (Assegaff, Hussin, & Dahlan, 2011). Knowledge sharing is defined as the institution processes that disseminate knowledge among all individuals taking a part in the activities of a particular process (Lee et al., 2007; Migdadi et al., 2016). Kim (2012) pointed out that individuals who share knowledge frequently are more likely to use an IS. Besides, Lin and Lee (2005) indicated that the institutional willingness of knowledge sharing would facilitate the process of technology adoption. Lee et al. (2007) defined knowledge application as the institution processes that enable the institution to access the knowledge smoothly via its efficient storage and retrieval techniques. Institutions that stimulate the knowledge application are highly qualified to the successful adoption and implementation of an IS (Lin & Lee, 2005; Migdadi et al., 2016).

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According to the literature, KM in general and KM processes in specific play an essential role in facilitating the implementation of many ISs. The existing literature has focused on several perspectives with respect to KM processes. Various KM processes review studies were carried out. It is believed that each of which reviews provides a valuable synthesis of KM processes, yet further examination is required depending on other research perspectives. It has been noticed that the extant review studies neglected the examination of KM processes studies with regard to ISs. Accordingly, the present study systematically reviews and synthesizes the KM processes studies related to ISs in order to afford a comprehensive analysis of the collected studies. More specifically, this review study poses the following five research questions:

RQ1. What are the main KM processes studied considering their relationship with information systems?

RQ2. What are the main research methods and research outcomes addressed in the collected studies?

RQ3. What types of information systems are mainly studied involving KM processes, and what are the types of participants in the collected studies?

RQ4. How are the KM processes studies considering information systems are distributed across the countries of implementation and the years of publication?

RQ5. What are the active databases in the context of KM processes?

2. Literature review

During the last decade, an enormous number of IS studies has proved the importance of knowledge in organizations (Blumenberg, Wagner, & Beimborn, 2009). This knowledge was far more important than any other assets in the organization; thereby, it needs to be managed efficiently. Knowledge Management (KM) has become a prevalent research trend in academia and business sector (Al-Emran, Mezhuyev, & Kamaludin, 2018b; Jasimuddin, 2006; McAdam & McCreedy, 1999). KM is defined as "the process of capturing, storing, sharing, and using knowledge" (Lee, 2001). With the existence of KM, organizations will be capable to achieve these processes (Hwang, Lin, & Shin, 2018). KM is an emerging mechanism that can find particular information more efficiently and organize that information for quick retrieval and reuse (Lee et al., 2007). It is argued that KM is the essential asset in the modern institutions as it sustains the institutional learning, growth, success, and innovation (Lee, Shiue, & Chen, 2016).

According to the literature, different researchers have introduced different KM processes. Spender (1996) stated that KM processes include: knowledge creation, knowledge transfer, and knowledge application. DeLong (1997) pointed out that KM processes consist of knowledge capture, knowledge transfer, and knowledge application. More broadly, Probst, Romhardt, and Raub (2000) claimed that KM processes include: knowledge identification, knowledge capture, knowledge development, knowledge sharing, knowledge dissemination, knowledge application, and knowledge storage. In addition, Soto-Acosta, Popa, and Palacios-Marqués (2017) and Tiwana (2000) pointed out that KM processes include: knowledge acquisition/creation, knowledge sharing/dissemination, and knowledge utilization. Tiwana (2000) specified that KM processes are working in a continuous cycle, in which, it enables the IS users to achieve their goals, add a new knowledge and share that knowledge accordingly.

From the technological viewpoints, Watjatrakul (2013) stated that existing knowledge of individuals about a particular technology enhances their capabilities to comprehend the IS usage and features, identify the system difficulties, and to reinforce their attitudes toward the system usage. Moreover, it is indicated that KM processes are the essential elements for improving the capabilities of a particular technology, and the successful implementation of such technology

increasingly depends on the efficient use of these processes (Lee et al., 2007). KM processes are considered as the fundamental processes for the successful adoption and implementation of a new IS (Chong, Chan, Goh, & Tiwari, 2013; Lin & Lee, 2005; Migdadi et al., 2016). Information systems can be employed to leverage the KM processes of acquiring, storing, sharing, and applying a particular knowledge (Turban, Sharda, & Delen, 2011). Similarly, Mitchell (2003) demonstrated that information technologies could serve as a facilitator of KM. Additionally, it is believed that KM is mainly related to support IS processes.

With regard to KM processes review studies, Edvardsson and Durst (2014) carried out a systematic review to analyze studies related to KM processes outsourcing attempting to build a comprehensive source for scholars and to identify the gaps in the existing literature. Costa and Monteiro (2016) conducted a systematic review to analyze KM processes studies taking into account their relationship with innovation. Meese and McMahon (2012) carried out a study to systematically review and analyze knowledge sharing studies related to sustainable development aiming to understand the main knowledge sharing concepts and research strategies that were used in the civil engineering discipline. Yiu and Law (2014) conducted a systematic review to analyze KM and knowledge sharing studies aiming to address the main concepts of knowledge, KM, and knowledge sharing in the tourism sector. Charband and Navimipour (2016) conducted a systematic review to analyze studies related to the main knowledge sharing techniques applied in online environments. Asrar-ul-Haq and Anwar (2016) carried out a systematic review to analyze studies related to KM and knowledge sharing aiming to highlight and analyze the factors that hinder or facilitate KM in organizations. Zahedi, Shahin, and Babar (2016) carried out a systematic review to analyze knowledge sharing studies considering their relationship with global software development aiming to determine and synthesize the main practices and challenges of knowledge sharing.

Based on the existing literature, none of the above review studies have considered the relationship between KM processes and ISs. Nevertheless, different studies were carried out in the past years, each of which affording substantial information for scholars to well comprehend the impact of KM processes on ISs. It has been noticed that research has neglected the review of studies related to KM processes impact on ISs acceptance, adoption, and implementation. That is the purpose that encouraged us to carry out this systematic review. The present review study tries to add value to the extant body of literature by covering an up-to-date synthesis of KM processes research studies that were mainly focused on the impact of these processes on ISs acceptance, adoption, and implementation.

3. Method

A critical literature review is an important stage before conducting any research study (Al-Emran, Mezhuyev, & Kamaludin, 2018c). It establishes the groundwork for knowledge accumulation, which in turn enables the theories' extensions and developments, closes the gaps existing in research, and uncovers areas where previous research has missed (Marangunić & Granić, 2015). A literature review can be viewed as a systematic literature review only when the review is based on explicit research questions, determines and analyzes relevant research studies, and evaluates their quality based on specified criteria (Khan, Kunz, Kleijnen, & Antes, 2003). In this review study, Kitchenham and Charters's guidelines (Kitchenham & Charters, 2007) for conducting a systematic review were followed in addition to the procedures of other systematic reviews that were carried out in the KM context (Costa & Monteiro, 2016; Zahedi et al., 2016). In that, the review was conducted in four distinct phases: the identification of inclusion and exclusion criteria, data sources and search strategies, quality assessment, and data coding and analysis. The details of these phases are demonstrated in the following sub-sections.

Table 1
Inclusion and exclusion criteria.

Inclusion Criteria	Exclusion Criteria
Should involve knowledge management processes or factors.	Knowledge management processes or factors that are not used with information systems or technologies.
Should involve an information system or technology.	Knowledge management processes or factors that are used in contexts other than information systems or technologies.
Should be written in English.	Articles that use languages other than English.

3.1. Inclusion/exclusion criteria

The articles that will be critically analyzed in this review study should meet the inclusion and exclusion criteria described in Table 1.

3.2. Data sources and search strategies

The research articles involved in this systematic review were collected through an extensive search of existing studies via the subsequent databases: Emerald, IEEE, ScienceDirect, Springer, Taylor & Francis, Wiley, ACM Digital Library, and Google Scholar. The search of these studies was undertaken in May 2018. The search terms include the keywords (("knowledge management processes" OR "knowledge management factors") AND ("acceptance" OR "adoption" OR "information systems")). The selection of the keywords is an essential step in any systematic review as it determines which articles are to be retrieved (Costa & Monteiro, 2016). The search results retrieved 1165 articles using the above mentioned keywords. 97 articles were found as duplicates, and thereby, they were filtered out. Hence, the overall number of remaining articles becomes 1068. The authors confirmed the inclusion and exclusion criteria for each study. Accordingly, 41 research articles were found to meet the inclusion criteria, and thereby, were included in the analysis process. The search and refinement stages in this review study were carried out according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) (Moher et al., 2009). Fig. 1 shows the PRISMA flowchart.

3.3. Quality assessment

One of the crucial factors that needs to be examined along with the inclusion and exclusion criteria is the quality assessment (Al-Emran et al., 2018c). A quality assessment checklist with 8 criteria was prepared and used to afford a means for appraising the quality of the research articles that were retained for further analysis (N = 41). The quality assessment checklist is illustrated in Table 2. The checklist was not intended to be a form of criticism of any scholars' work (Kitchenham & Charters, 2007). The checklist was adapted from those suggested by (Kitchenham & Charters, 2007). Each question was scored according to the three-point scale, with a "Yes" being worth 1 point, "No" being worth 0 point, and "Partially" being worth 0.5 point. Hence, each study could score between 0 and 8, with the higher the total score a study attains, the higher the degree to which this study addresses the research questions. Table 3 demonstrates the quality assessment results for all the 41 studies. In that, it is clear that all the studies have passed the quality assessment, which in turn, reveals that all the studies are qualified to be used for further analysis.

3.4. Data coding and analysis

The characteristics correlated to the research methodology quality were coded including (a) the main KM processes, (b) research methods (e.g., survey, interviews, experiment, etc.), (c) research outcomes (e.g., positive, neutral, and negative), (d) types of information systems, (e)

participants, (f) database, and (g) country. Throughout the data analysis phase, the articles which didn't clearly describe the KM processes impact on ISs were excluded from the synthesis. The analysis of the collected studies was carried out by the first author of this study by analyzing each article manually.

4. Results

With respect to the published 41 research studies about KM processes influence on ISs from 2001 to 2018, the findings of this systematic review are reported based on the five research questions.

4.1. RQ1: what are the main KM processes studied considering their relationship with information systems?

Several research studies were carried out to examine the effect of KM processes on the adoption, acceptance, and implementation of ISs. In Table 4, the authors classify the KM processes across the analyzed studied in order to determine what are the most frequent KM processes studied in the analyzed studies. We can notice that knowledge sharing is the most frequent KM process studied (N = 36), followed by knowledge acquisition and knowledge application (N = 13), IS knowledge (N = 7), knowledge storage (N = 2), knowledge protection and knowledge creation (N = 1), respectively in the analyzed studies.

With reference to Table 5, it seems that knowledge sharing was positively affecting the adoption, acceptance, and implementation of E-business systems (Lee et al., 2007; Maditinos, Chatzoudes, & Sarigiannidis, 2014; Migdadi et al., 2016), Knowledge Management Systems (El Said, 2015; Shrafat, 2017), IS outsourcing (Lee, 2001; Lee, Huynh, & Hirschheim, 2008), Enterprise Resource Planning (ERP) systems (Maditinos, Chatzoudes, & Tsairidis, 2011; Shao, Feng, & Liu, 2012), blogs (Hsu & Lin, 2008), wikis (Iglesias-Pradas, Hernández-García, & Fernández-Cardador, 2015), cloud-based Virtual Learning Environment (VLE) (Hew & Kadir, 2016), E-Government services (Park, Dulambazar, & Rho, 2013), cloud computing (Arpaci, 2017), social web (Soto-Acosta et al., 2017), Google applications (Cheung & Vogel, 2013), social software (Kim, 2012), Software Process Improvement (Lee et al., 2016), Customer Relationship Management (CRM) (Garrido-Moreno, Lockett, & García-Morales, 2014), social media (Aboelmaged, 2018; Moghavvemi, Sharabati, Klobas, & Sulaiman, 2018), Enterprise crowdsourcing systems (Vel, Park, & Liu, 2018), and Collaborative Commerce (Chong et al., 2013). Furthermore, knowledge acquisition is significantly influencing the adoption, acceptance, and implementation of E-business systems (Lee et al., 2007; Lin & Lee, 2005; Lin, 2013; Migdadi et al., 2016; Yee-Loong Chong, Ooi, Bao, & Lin, 2014), IS outsourcing (Qian & Guo-Jie, 2015), CRM (Garrido-Moreno et al., 2014), teachers' network community (Qin, Li, Zha, & He, 2017), and Collaborative Commerce (Chong et al., 2013). In addition, knowledge application is positively affecting the adoption, acceptance, and implementation of E-business systems (Lee et al., 2007; Lin & Lee, 2005; Migdadi et al., 2016; Yee-Loong Chong et al., 2014), CRM (Garrido-Moreno et al., 2014), and Collaborative Commerce (Chong et al., 2013).

On the other side, it has been noticed that knowledge storage, knowledge protection, and knowledge creation were less studied considering their relationship with ISs. For instance, knowledge storage was positively affecting the implementation of E-business systems (Lin, 2013) and the attitudes towards the acceptance of cloud computing services (Arpaci, 2017). Additionally, knowledge protection was shown to have a positive impact on E-business systems (Lin, 2013). Besides, knowledge creation was positively affecting the acceptance of cloud computing services (Arpaci, 2017). Therefore, further research should focus on investigating the impact of these KM processes on other types of ISs.
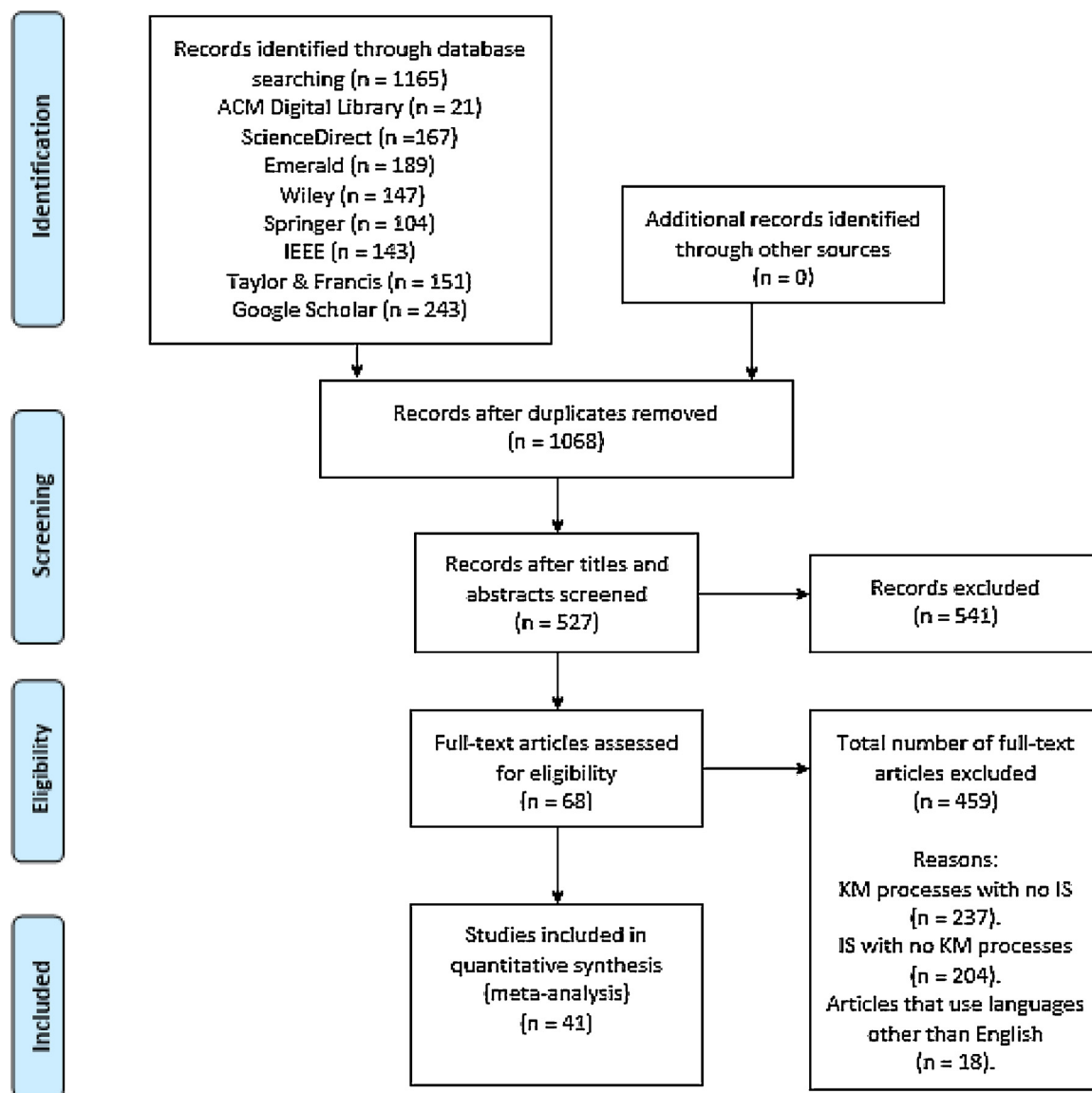
Fig. 1. PRISMA flowchart for the selected studies.

Table 2
Quality assessment checklist.

#	Question
1	Are the research aims clearly specified?
2	Are the KM processes considered by the study clearly specified?
3	Is the IS/technology considered by the study clearly specified?
4	Are the data collection methods adequately detailed?
5	Does the study explain the reliability/validity of the measures?
6	Are the statistical techniques used to analyze the data adequately described?
7	Do the results add to the literature?
8	Does the study add to your knowledge or understanding?

4.2. RQ2: what are the main research methods and research outcomes addressed in the collected studies?

4.2.1. Distribution of research methods

Fig. 2 indicates that 71% of the analyzed studies were mainly depended on questionnaire surveys (N = 29) for data collection, this is followed by both (interviews & surveys) (N = 10), respectively. This is regarded as a new finding in the KM processes literature which involves the impact of these processes on ISs.

4.2.2. Distribution of research outcomes

Fig. 3 reveals that 78% of the analyzed studies (N = 32) registered positive research outcomes, followed by 12% (N = 5) as neutral outcomes. With regard to research methods, Fig. 4 indicates that 56% of the analyzed studies (N = 23) that achieved positive outcomes mainly relied on questionnaire surveys as a method for data collection.

4.3. RQ3: what types of information systems are mainly studied involving KM processes, and what are the types of participants in the collected studies?

4.3.1. Types of information systems

Fig. 5 shows the distribution of the analyzed studies with regard to the types of information systems. We can observe that KM processes studies considering ISs were mainly focused on investigating the impact of KM processes on E-business systems implementation (N = 6). This is followed by the studies that examined the effect of KM processes on knowledge management systems (N = 4), IS outsourcing (N = 3), and social media, ERP systems, and E-government services with 2 studies each, respectively.

4.3.2. Types of participants

Fig. 6 shows the distribution of the analyzed studies in terms of

Table 3
Quality assessment results.

Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Total	Percentage
S1	1	1	1	1	1	1	1	1	8	100%
S2	1	1	1	1	1	1	1	0.5	7.5	93.75%
S3	1	1	1	1	1	1	0.5	0.5	7	87.5%
S4	1	1	1	1	1	1	0.5	0.5	7	87.5%
S5	1	1	1	1	1	1	0.5	0.5	7	87.5%
S6	1	1	1	1	1	1	0.5	0.5	7	87.5%
S7	1	1	1	1	1	1	1	1	8	100%
S8	1	1	1	1	1	0.5	0.5	0.5	6.5	81.25%
S9	1	1	1	1	1	1	1	0.5	7.5	93.75%
S10	1	1	1	1	0.5	1	0.5	0.5	6.5	81.25%
S11	1	1	1	1	1	1	0.5	0.5	7	87.5%
S12	1	1	1	1	1	1	0.5	0.5	7	87.5%
S13	1	1	1	0	0	0	0.5	0.5	4	50%
S14	1	1	1	1	1	1	0.5	0.5	7	87.5%
S15	1	1	1	1	1	1	1	0.5	7.5	93.75%
S16	1	1	1	1	1	1	0.5	0.5	7	87.5%
S17	1	1	1	1	0.5	1	0.5	0.5	6.5	81.25%
S18	1	1	1	1	0	0	0.5	0.5	5	62.5%
S19	1	1	1	1	1	1	0.5	0.5	7	87.5%
S20	1	1	1	1	1	1	0.5	0.5	7	87.5%
S21	1	1	1	1	0.5	1	0.5	0.5	6.5	81.25%
S22	1	1	1	1	1	1	0.5	0.5	7	87.5%
S23	1	1	1	1	1	1	1	0.5	7.5	93.75%
S24	1	1	1	1	1	1	0.5	0.5	7	87.5%
S25	1	1	1	1	1	1	1	0.5	7.5	93.75%
S26	1	1	1	1	1	1	1	0.5	7.5	93.75%
S27	1	1	1	1	1	1	0.5	0.5	7	87.5%
S28	1	1	1	1	1	1	0.5	0.5	7	87.5%
S29	1	1	1	1	1	1	0.5	0.5	7	87.5%
S30	1	1	1	1	1	1	1	0.5	7.5	93.75%
S31	1	1	1	1	1	1	1	0.5	7.5	93.75%
S32	1	1	1	1	1	1	1	0.5	7.5	93.75%
S33	1	1	1	1	1	1	1	1	8	100%
S34	1	1	1	1	1	1	1	0.5	7.5	93.75%
S35	1	1	1	1	1	1	1	1	8	100%
S36	1	1	1	1	1	1	0.5	0.5	7	87.5%
S37	1	1	1	1	1	1	0.5	0.5	7	87.5%
S38	1	1	1	0	0	0	0.5	0.5	4	50%
S39	1	1	1	1	1	1	0.5	0.5	7	87.5%
S40	1	1	1	1	1	0.5	0.5	0.5	6.5	81.25%
S41	1	1	1	1	1	1	0.5	0.5	7	87.5%

participants' types. We can observe that KM processes studies involving ISs were primarily focused on IS executives/managers in terms of data collection (N = 15). This is followed by studies that focused on IT employees (N = 8), students and mixed participants (i.e., studies that collected data from different types of participants) with 5 studies each, respectively. We can notice that 56% of the studies (N = 23) focused on IS executives/managers and IT employees in collecting their data.

4.4. RQ4: how are the KM processes studies considering information systems are distributed across the countries of implementation and the years of publication?

4.4.1. Distribution of studies with regard to their country of implementation
Fig. 7 describes the distribution of all the analyzed articles over the countries in which these research studies were carried out. It is obvious that the majority of these studies were undertaken in Taiwan, Malaysia, and China with 6 studies each. This is followed by Spain and Korea with 4 studies each, and Greek with 2 studies, respectively among the other countries. With regard to research outcomes, Fig. 8 indicates that most of the analyzed studies (N = 6) that achieved positive outcomes were carried out in China. This is followed by Taiwan, Spain, and Korea with a similar number of studies (N = 4).

4.4.2. Distribution of studies with regard to their years of publication
With respect to publication year, Fig. 9 describes the distribution of the analyzed articles over the years in which these articles were

published. In that, these studies are ranged from 2001 to 2018. The number of published articles was increased from one study in 2001 to an average of five studies in the past four years. Furthermore, there is a remarkable increase of published articles in 2013 and 2017. It is worthwhile that the number of published articles in 2018 is 3 and this could refer to the reason that the articles' collection was undertaken in May 2018 and there are other articles that still in progress and not yet published.

4.5. RQ5: what are the active databases in the context of KM processes?

This section is dedicated to determine the most active databases that publish studies related to KM processes and their relationships with ISs. Fig. 10 shows the distribution of the collected studies in terms of databases. It is evident that ScienceDirect is considered the most productive database among others with 15 published articles. This is followed by Emerald (N = 12), Google Scholar, IEEE, Springer, Taylor & Francis with 3 studies each, and ACM Digital Library and Sage with 1 study each.

5. Discussion

The integration of KM with ISs enables the institutions to access their information for better and effective decision-making (Kebede, 2010). KM processes play a key role in affecting the acceptance and implementation of various ISs. The main aim of this review study is to systematically review and synthesize the studies published on this topic in an attempt to enhance the understanding of the contextual aspects of KM processes and their relationships with ISs acceptance and success.

Table 4 shows the classification of KM processes across the analyzed studies. We can observe that knowledge sharing is the most frequent KM process studied, followed by knowledge acquisition and knowledge application, knowledge storage, knowledge protection and knowledge creation, respectively. These results are almost similar to (Costa & Monteiro, 2016) who pointed out that knowledge sharing and knowledge acquisition are the most frequent KM processes studied considering their relationship with innovation. Besides, Fig. 11 shows a Mind Map of the KM processes and the IS affected by each process along with the research methods used in each study. This technique was inspired by (Busalim & Hussin, 2016) who attempted to categorize the social commerce studies into different themes.

Based on Fig. 11, knowledge sharing was found to have a positive effect on the adoption, acceptance, and implementation of E-business systems, ERP systems, blogs, wikis, cloud-based VLE, E-Government services, cloud computing, Google applications, social software, ICT, ECS, and Collaborative Commerce through the usage of surveys. In addition, knowledge sharing was also found to have a positive impact on the adoption, acceptance, and implementation of KMS, IS outsourcing, CRM, social media, and web technologies through the usage of interviews and surveys. Moreover, knowledge acquisition was found to have a significant influence on the adoption, acceptance, and implementation of E-business systems, teachers' network community, ICT, and Collaborative Commerce through the usage of surveys. Besides, knowledge acquisition was also found to have a significant influence on the adoption, acceptance, and implementation of IS outsourcing and CRM through the usage of interviews and surveys. Furthermore, knowledge application was found to have a positive effect on the adoption, acceptance, and implementation of Collaborative Commerce, E-business systems, cloud computing, ICT, and ECS through the usage of surveys in addition to CRM through the usage of interviews and surveys. Additionally, knowledge creation was found to have a positive effect on the adoption of cloud computing through the usage of surveys. Besides, knowledge storage was found to have a positive impact on the adoption of cloud computing and E-business systems through the usage of surveys. Moreover, knowledge protection was found to have a positive effect on the adoption of E-business systems through the usage of

Table 4
Classification of KM processes across the analyzed studies.

Source	Knowledge Acquisition	Knowledge Sharing	Knowledge Application	Knowledge Protection	Knowledge Storage	IS Knowledge	Knowledge Creation
Lin and Lee (2005)	×	×	×			×	
Lee et al. (2007)	×	×	×			×	
Migdadi et al. (2016)	×	×	×				
Maditinos et al. (2014)	×	×	×				
Lin (2013)	×	×		×	×		
Yee-Loong Chong et al. (2014)	×	×	×				
Tsai and Hung (2016)		×				×	
El Said (2015)		×					
Assegaff et al. (2011)		×				×	
Lee (2001)		×					
Qian and Guo-Jie (2015)	×		×				
Lee et al. (2008)		×					
Maditinos et al. (2011)		×					
Shao et al. (2012)		×					
Hsu and Lin (2008)		×					
Iglesias-Pradas et al. (2015)		×					
Hew and Kadir (2016)		×					
Koh and Kim (2004)		×					
Cegarra-Navarro, Garcia-Perez, and Moreno-Cegarra, (2014)						×	
Park et al. (2013)		×					
Arpaci (2017)		×	×		×		×
Alotaibi, Crowder, and Wills, (2013)		×					
Soto-Acosta et al. (2017)		×					
Cheung and Vogel (2013)		×					
Kim (2012)		×					
Lee et al. (2016)		×					
Garrido-Moreno et al. (2014)	×	×	×				
Chong et al. (2013)	×	×	×				
García-Sánchez, García-Morales, and Bolívar-Ramos, (2017)	×	×	×				
Rao, Guo, and Chen, (2015)		×					
Du, Liu, Straub, and Knight, (2017)		×					
Ming-ming, Tie-nan, and Xuan, (2010)	×	×	×				
Tamjidyamcholo, Bin Baba, Shuib, and Rohani, (2014)		×					
Ooi, Sim, Yew, and Lin, (2011)						×	
Watjatrakul (2013)						×	
Shrafat (2017)		×					
Aboelmaged (2018)		×					
Adam and Mahadi (2017)	×	×	×				
Moghavvemi et al. (2018)		×					
Vel et al. (2018)		×	×				
Qin et al. (2017)	×						

surveys. Although KM processes like sharing, acquisition, and application were found to have a significant effect on various ISs, further research should be carried out to consider other ISs that were missed from the extant literature. Additionally, it has been noticed that knowledge storage, knowledge protection, and knowledge creation were still in early stage by considering their relationship with ISs. Therefore, further research should focus on investigating the impact of these KM processes on other types of ISs.

Fig. 2 indicates that 71% of the analyzed studies were primarily relied on questionnaire surveys for data collection, followed by both (interviews & surveys). This is a new finding in the KM processes studies that involves the impact of these processes on ISs. Moreover, this result could be referred to the reason that quantitative methods like surveys are considered as the suitable methods to identify the relationship among the constructs in the conceptual model (Malhotra & Grover, 1998), and to analyze the respondents' perceptions effectively (Al-Emran, Mezhuyev, & Kamaludin, 2018a). In addition, Fig. 3 reveals that 78% of the analyzed studies registered positive research outcomes, followed by 12% as neutral outcomes. This is an indicator that KM processes play a significant role in affecting the adoption, acceptance, and implementation of ISs. With regard to research methods, Fig. 4 indicates that 56% of the analyzed studies that achieved positive

outcomes mainly relied on questionnaire surveys as a method for data collection. These findings point out that questionnaire surveys are considered as powerful methods for data collection that could achieve positive outcomes depending on the context, participants, and sample instrument.

With respect to the types of information systems, Fig. 5 shows that KM processes studies considering ISs were mainly focused on investigating the impact of KM processes on E-business systems implementation, followed by knowledge management systems, IS outsourcing, and social media, ERP systems, and E-government services, respectively. These findings indicate that IS scholars focused on examining the impact of KM processes on adopting, accepting, and implementing E-business systems, knowledge management systems, IS outsourcing, social media, ERP systems, and E-government services rather than other types of ISs. Further research is required to investigate the impact of KM processes on other types of ISs. In terms of participants, Fig. 6 shows that 56% of the studies focused on IS executives/managers and IT employees in collecting their data. This could refer to the reason that those participants have the enough capability to evaluate ISs in terms of their adoption, acceptance, and implementation. By referring to Table 5, we can notice that studies that relied on those types of participants achieved either positive or neutral research

Table 5
Analysis of KM processes studies related to various ISs.

Source	Study Purpose and KM Processes	Information System Type	Methods	Country	Participants	Database	Findings
Lin and Lee (2005)	The impact of "knowledge acquisition", "knowledge application", and "knowledge level" on e-business systems adoption.	E-Business systems	Survey	Taiwan	IS executives	Emerald	Results showed that knowledge level, knowledge acquisition, and knowledge application significantly affect the level of e-business systems adoption. However, knowledge sharing doesn't support this relationship.
Lee et al. (2007)	The influence of "knowledge acquisition", "knowledge application", "knowledge sharing", and "knowledge level" on the E-business implementation success.					Emerald	Results indicated that knowledge acquisition, knowledge application, knowledge sharing, and knowledge level have a positive impact on the e-business implementation success.
Migdadi et al. (2016)	The effect of "knowledge acquisition", "knowledge application", and "knowledge sharing" on e-business implementation.			Saudi Arabia		Emerald	Results revealed that knowledge acquisition, knowledge application, and knowledge sharing have a positive impact on e-business implementation.
Maditinos et al. (2014)	The influence of "knowledge accumulation", "knowledge application", and "knowledge sharing" on e-business implementation.			Greek		Emerald	Results showed that knowledge sharing positively affects the e-business implementation. However, knowledge accumulation and knowledge application don't support this relationship.
Lin (2013)	The impact of "knowledge acquisition", "knowledge storage", "knowledge dissemination", and "knowledge protection" on E-business initiation, E-business implementation, and E-business assimilation.			Taiwan	IS managers	Emerald	Results revealed that the three e-business diffusion stages are positively affected by knowledge dissemination. Moreover, knowledge acquisition and knowledge protection positively affect the e-business assimilation stage while it doesn't have an impact on the other two stages. Furthermore, knowledge storage significantly influences the e-business initiation and e-business implementation while it doesn't influence the e-business assimilation.
Yee-Loong Chong et al. (2014)	The impact of "knowledge acquisition", "knowledge dissemination", and "knowledge application" on e-business supply chain technology adoption.	E-Business systems	Survey	Malaysia	Firms' top management	Emerald	Results showed that knowledge acquisition and knowledge application were found to have a significant effect on e-business supply chain technology adoption. However, knowledge dissemination doesn't support this relationship.
Tsai and Hung (2016)	The effect of "collaborative knowledge" and "employees' IS knowledge" on KMS adoption.	Knowledge Management System	Interviews + Survey	Taiwan	Chief officer of the IS department	Taylor & Francis	Results indicated that KMS adoption is significantly influenced by both collaborative knowledge and employees' IS knowledge.
El Said (2015)	The influence of "knowledge sharing intention" on task-technology fit (TTF), utilization, and performance impact.			Not Specified	Administration and technical staff	ScienceDirect	Results revealed that knowledge sharing intention positively affects the task-technology fit (TTF), utilization, and performance impact.
Assegaff et al. (2011)	The impact of "perceived benefit of knowledge sharing" and "beliefs of knowledge ownership" on the behavioral intention to use.		Not Specified		Not Specified	IEEE	Not Specified.
Lee (2001)	The effect of "knowledge sharing" on IS outsourcing success.	IS outsourcing	Interviews + Survey	Korea	IS managers	ScienceDirect	Results revealed that knowledge sharing significantly affect the IS outsourcing success.
Qian and Guo-Jie (2015)	The effect of "knowledge acquisition" and "knowledge integration" on the project quality of IT outsourcing success.			China	Participating companies of the 5th China International Service Outsourcing Cooperation Conference + MBA participants	IEEE	Results indicated that both knowledge acquisition and knowledge integration have a positive impact on the project quality of IT outsourcing success.
Lee et al. (2008)	The impact of "knowledge sharing" on the IT outsourcing success.			Korea	Service receivers + Service providers	Springer	Results revealed that IT outsourcing success is positively affected by knowledge sharing.

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Table 5 (*continued*)

Source	Study Purpose and KM Processes	Information System Type	Methods	Country	Participants	Database	Findings
Maditinos et al. (2011)	The effect of "knowledge transfer" on the ERP system implementation.	ERP system	Survey	Greek	IT managers	Emerald	Results indicated that ERP system implementation is positively affected by knowledge transfer.
Shao et al. (2012)	The influence of "ERP knowledge sharing" on ERP success.			China	IS executives + ERP end users	ScienceDirect	Results revealed that ERP success is significantly influenced by ERP knowledge sharing.
Hsu and Lin (2008)	The influence of "knowledge sharing factors" on the attitude towards utilizing blogs.	Blog		Taiwan	Blog users	ScienceDirect	Results indicated that knowledge sharing factors positively affect the attitude towards using blogs.
Iglesias-Pradas et al. (2015)	The effect of the "attitude towards collaborative knowledge sharing" on the intention to use corporate wikis.	Wiki		Spain	IS Employees	ScienceDirect	Results showed that the attitude towards collaborative knowledge sharing significantly affects the intention to use corporate wikis.
Hew and Kadir (2016)	The influence of the "attitude toward knowledge sharing" on the VLE behavioral intention.	Cloud-based Virtual Learning Environment (VLE)		Malaysia	Primary and Secondary School Teachers	ScienceDirect	Results showed that the VLE behavioral intention is significantly affected by the attitude toward knowledge sharing.
Koh and Kim (2004)	The influence of "knowledge sharing activity" on the community participation and community promotion.	Virtual Communities and e-business	Interviews + Survey	Korea	Members from 691 virtual communities	ScienceDirect	Results indicated that knowledge sharing activity positively influences the community participation and community promotion.
Cegarra-Navarro et al. (2014)	The effect of "technology knowledge" on citizen engagement.	E-government Services	Survey	Spain	Citizens	ScienceDirect	Results revealed that citizen engagement is positively influenced by technology knowledge.
Park et al. (2013)	The effect of "knowledge sharing" on performance.			Mongolia	Government Employees	Sage	Results indicated that knowledge sharing is a strong factor that affects the employees' performance.
Arpaci (2017)	The impact of "knowledge creation & discovery", "knowledge storage", "knowledge sharing", and "knowledge application" on perceived usefulness which in turn affect the attitude toward cloud computing services.	Cloud Computing		Turkey	Undergraduate students	ScienceDirect	Results indicated that knowledge creation & discovery, knowledge storage, and knowledge sharing have a positive impact on perceived usefulness which in turn affects the attitude toward cloud computing services. However, knowledge application doesn't support this relationship.
Alotaibi et al. (2013)	The effect of the "attitude toward knowledge share technology" on the behavioral intention to share knowledge technology.	Web Technologies	Interviews + Survey	Not Specified	Academics	ACM Digital Library	Not Specified.
Soto-Acosta et al. (2017)	The influence of "Social web knowledge sharing" on the innovation performance.	Social web knowledge sharing	Interviews + Survey	Spain	CEOs	Springer	Results showed that Social web knowledge sharing significantly affects the innovation performance.
Cheung and Vogel (2013)	The impact of "knowledge sharing" on perceived usefulness, attitude, behavioral intention, and system usage.	Google Applications	Survey	China	University Students	ScienceDirect	Results indicated that knowledge sharing has a positive effect on perceived usefulness, attitude, behavioral intention, and system usage.
Kim (2012)	The impact of "knowledge sharing" on perceived usefulness and perceived ease of use which are both, in turn, affect the intention to use social software.	Social Software		Korea	Employees in government agencies	Emerald	Results indicated that knowledge sharing positively affects the perceived usefulness and perceived ease of use.
Lee et al. (2016)	The influence of "Software Process Improvement (SPI) knowledge sharing" on the SPI success.	Software Process Improvement		Taiwan	Managers and Practitioners	ScienceDirect	Results revealed that SPI success is significantly affected by the SPI knowledge sharing.
Garrido-Moreno et al. (2014)	The influence of "knowledge management processes (acquisition, sharing, and utilization)" on CRM success.	Customer Relationship Management (CRM)	Interviews + Survey	Spain + UK	General Managers	ScienceDirect	Results showed that CRM success is positively influenced by KM processes (acquisition, sharing, and utilization).

(continued on next page)

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Table 5 (*continued*)

Source	Study Purpose and KM Processes	Information System Type	Methods	Country	Participants	Database	Findings
Chong et al. (2013)	The effect of "knowledge acquisition", "knowledge dissemination", and "knowledge application" on C-commerce adoption.	Collaborative Commerce	Survey	Malaysia	IT or logistics head of the company	Taylor & Francis	Results indicated that C-commerce adoption is influenced by KM processes (acquisition, dissemination, and application).
García-Sánchez et al. (2017)	The impact of "knowledge acquisition", "knowledge transfer", and "knowledge utilization" on organizational performance. Moreover, the effect of "knowledge acquisition" on "knowledge transfer" and the effect of "knowledge transfer" on "knowledge utilization".	ICT		Spain	CEOs	Springer	Results revealed that knowledge acquisition, knowledge transfer, and knowledge utilization positively affects the organizational performance. Moreover, knowledge acquisition positively affects knowledge transfer and knowledge transfer significantly affects knowledge utilization. Furthermore, knowledge acquisition indirectly influences knowledge utilization through knowledge transfer.
Rao et al. (2015)	The impact of "knowledge sharing" on firm performance.	IS maturity		China	Business Managers	Emerald	Results indicated that the firm performance is significantly affected by knowledge sharing.
Du et al. (2017)	The influence of "knowledge sharing" on innovative behavior and exploitive learning.	IT-enabled global service	Interviews + Survey	PRC	IT Employees	Taylor & Francis	Results revealed that knowledge sharing significantly influences the innovative behavior and exploitive learning.
Ming-ming et al. (2010)	The impact of "knowledge acquisition", "knowledge sharing", and "knowledge utilization & integration" on inter-organizational information systems (IOS).	Inter-organizational information systems (IOS)	Survey	China	Customers of IT consulting companies and software vendors + MBA students	IEEE	Results showed that knowledge acquisition, knowledge sharing, and knowledge utilization & integration have a significant impact on inter-organizational information systems (IOS).
Tamjidyamcholo et al. (2014)	The impact of "knowledge sharing behavior" on information security risk reduction expectation.	Information Security Professional Virtual Community (LinkedIn)		Not Specified	Information Security Groups in LinkedIn	ScienceDirect	Results showed that knowledge sharing positively affects the information security risk reduction expectation.
Ooi et al. (2011)	The impact of "perceived knowledge" on the behavioral intention to adopt broadband.	Broadband		Malaysia	University students	ScienceDirect	Results showed that perceived knowledge doesn't affect the behavioral intention to adopt broadband.
Watjatrakul (2013)	The influence of "existing knowledge" on the attitude towards using the technology.	Free voluntary service		Not Specified	Undergraduate and graduate students	Emerald	Results revealed that existing knowledge positively affect the attitude towards using the technology.
Shrafat (2017)	The impact of "knowledge sharing" on KMS adoption.	Knowledge Management System	Survey	Jordan	IT managers	Emerald	Results indicated that knowledge sharing has a significant positive effect on KMS adoption.
Aboelmaged (2018)	The impact of "internal knowledge sharing" and "external knowledge sharing" on productivity.	Enterprise social network (ESN) systems		United Arab of Emirates	ESN users	Emerald	Results revealed that both internal and external knowledge sharing have a significant positive effect on productivity.
Adam and Mahadi (2017)	The impact of "knowledge acquisition", "knowledge sharing", and "knowledge application" on organizational performance.	Internet	Not Specified	Malaysia	Not Specified	Google Scholar	Not Specified.
Moghavvemi et al. (2018)	The effect of "knowledge sharing" on academic performance and recognition.	Facebook	Survey		Undergraduate students	Google Scholar	Results pointed out that knowledge sharing has a significant positive influence on both academic performance and recognition.
Vel et al. (2018)	The impact of "knowledge sharing" on "knowledge application". Moreover, the effect of "knowledge application" on satisfaction and innovative behavior.	Enterprise crowdsourcing systems (ECS)		USA	IT employees	Google Scholar	Results indicated that knowledge sharing has a significant positive effect on knowledge application. Additionally, knowledge application is found to have a significant positive effect on both satisfaction and innovative behavior.
Qin et al. (2017)	The influence of "knowledge acquisition" on perceived usefulness.	Teachers' network community		China	Primary and middle school teachers	ScienceDirect	Results indicated that knowledge acquisition has a significant positive effect on perceived usefulness of teachers' network community.

outcomes as those participants have enough experience in the researched fields and could respond to the questionnaire surveys precisely. Based on the assumption that the institutions of higher education are regarded as one of the main generators of knowledge (Howell & Annansingh, 2013), it has been noticed that there is a less number of research conducted considering these institutions. Hence, further research should consider this gap and attempt to study the impact of KM processes on the acceptance of the educational technologies used by these institutions.

With respect to country, Fig. 7 clearly shows that the majority of KM processes studies were carried out in Taiwan, Malaysia, and China, followed by Spain, Korea, and Greek, respectively among the other countries. With regard to research outcomes, Fig. 8 indicates that most of the analyzed studies that achieved positive outcomes were undertaken in China, followed by Taiwan, Spain, and Korea, respectively. These findings could be attributed to the reason that scholars in these countries are highly motivated to conduct research studies related to KM processes involving ISs rather than other research fields. This could probably elucidate the preponderance of KM processes studies conducted in these countries as compared with the others.

With respect to publication year, Fig. 9 indicates that the number of research articles was increased from one study in 2001 to an average of five studies in the past four years. This increase may contribute to the improvement of KM processes in studying the influence of these processes on ISs. In addition, it has been observed that there is a remarkable increase of published articles in 2013 and 2017. With respect to Table 5, this increase could refer to the reason that the studied ISs (e.g., E-business systems, knowledge management systems, E-government services, web technologies, cloud computing, Google applications, and social web) in these years have received more attention from IS scholars due to the popularity of these technologies, which was not the case in the past years. On the contrary, (Charband & Navimipour, 2016) found that knowledge sharing studies related to online environments were highly published in 2012 and 2014. In addition, (Zahedi et al., 2016) revealed that knowledge sharing studies related to global software development were highly increased since 2007 with a remarkable increase in 2014.

With regard to database, Fig. 10 shows that ScienceDirect is considered the most productive database that stores numerous KM processes research, followed by Emerald, Google Scholar, IEEE, Springer, Taylor & Francis, respectively among the other databases. These databases cover a sufficient amount of research on KM processes and its relationship with a wide range of ISs. This result could benefit future research, in which, KM scholars could refer to these databases for collecting the KM articles.

6. Conclusion

Previous KM processes review studies afforded a valuable insight into the research trend of KM. Nevertheless, these review studies neglected the analysis of KM processes with regard to their effect on ISs. In this study, we carried out a systematic literature review for KM processes studies related to ISs, attempting to provide a comprehensive analysis of the existing studies and to discuss the implications of analysis results. The present review study revealed 8 new findings. First, knowledge sharing is the most frequent KM process studied, followed by knowledge acquisition and knowledge application, respectively. Second, knowledge sharing was found to positively affecting the adoption, acceptance, and implementation of E-business systems, Knowledge Management Systems, IS outsourcing, ERP systems, blogs, wikis, cloud-based VLE, E-Government services, cloud computing,
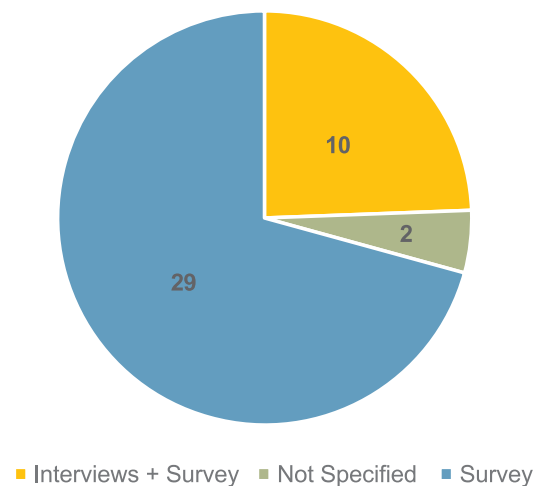

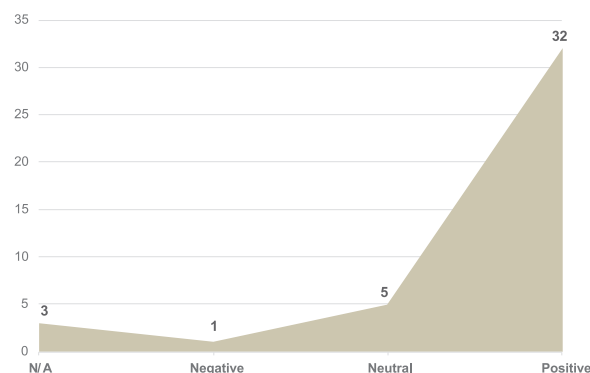**Fig. 2.** Distribution of studies by research methods.

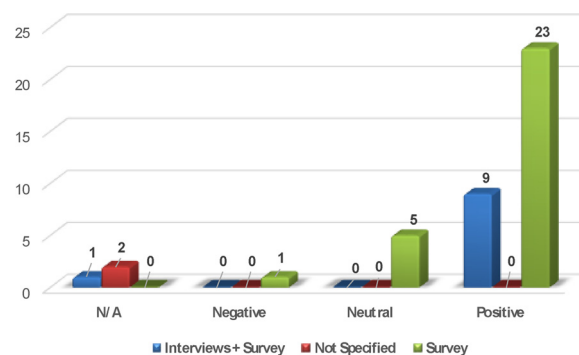**Fig. 3.** Distribution of studies in terms of research outcomes.

Fig. 4. Distribution of studies by research outcomes and methods.

social web, Google applications, social software, software process improvement, CRM, social media, enterprise crowdsourcing systems, and Collaborative Commerce. Additionally, knowledge acquisition was significantly influencing the adoption, acceptance, and implementation of E-business systems, IS outsourcing, CRM, teachers' network community, and collaborative commerce. Moreover, knowledge application was positively affecting the adoption, acceptance, and implementation of E-business systems, CRM, and Collaborative Commerce. Third, questionnaire surveys were found to be the primarily relied research methods for data collection in the context of KM processes. Fourth, 78% of the analyzed studies registered positive research
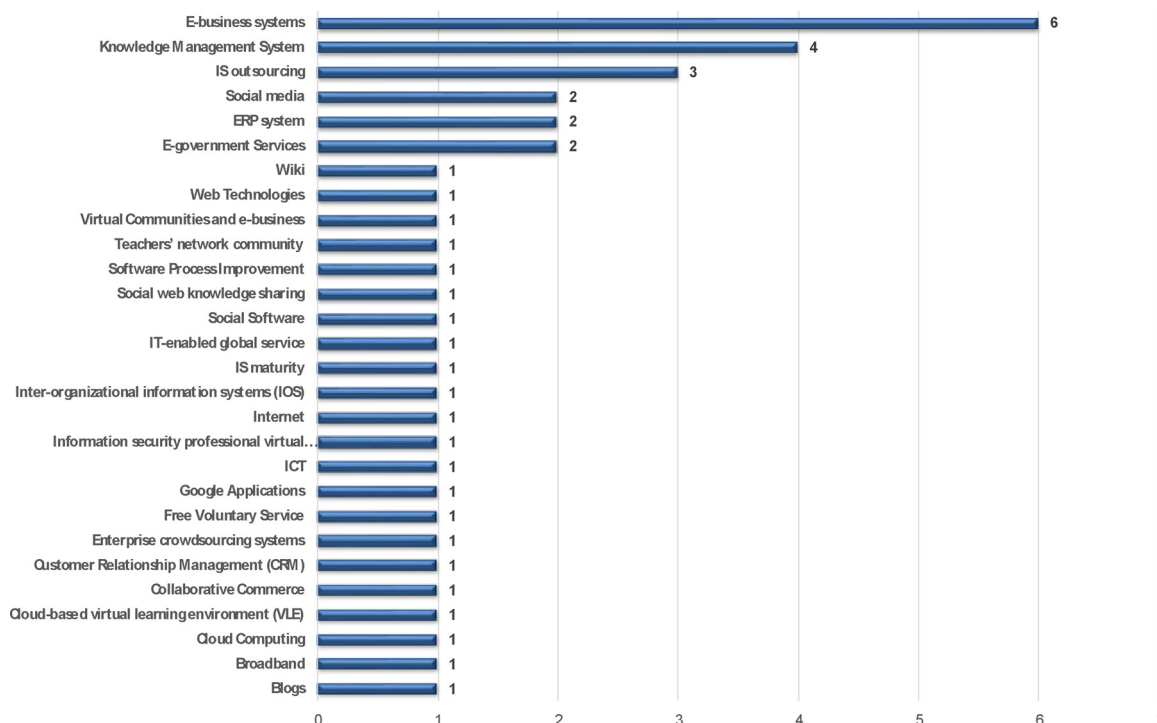
Fig. 5. Distribution of studies in terms of information systems types.

■ Blog users ■ Citizens ■ ESN users ■ Not Specified ■ Academics
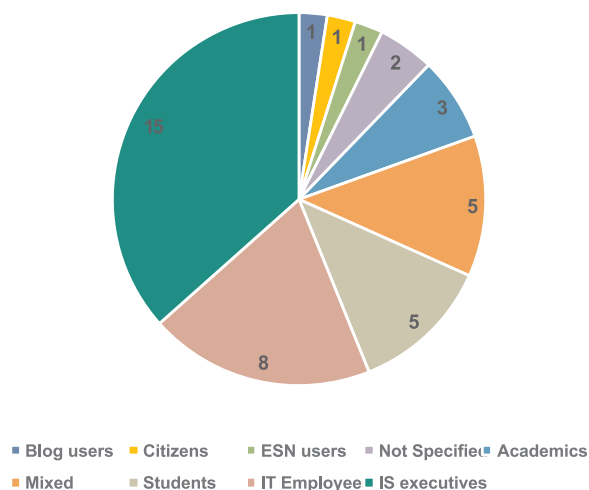■ Mixed ■ Students ■ IT Employee ■ IS executives

Fig. 6. Distribution of studies in terms of participants.

outcomes, followed by 12% as neutral outcomes. Furthermore, 56% of the analyzed studies that achieved positive outcomes mainly relied on questionnaire surveys as a method for data collection. Fifth, in terms of IS type, most of the analyzed studies focused on investigating the impact of KM processes on E-business systems, knowledge management systems, IS outsourcing, respectively among the others. Sixth, in terms of participants, most of the analyzed studies were primarily focused on IS executives/managers in terms of data collection, followed by IT employees, respectively. Seventh, the majority of the analyzed studies were carried out in Taiwan, Malaysia, and China, followed by Spain and Korea, respectively among the other countries. Furthermore, the

majority of the analyzed studies that registered positive outcomes were undertaken in China, followed by Taiwan, Spain, and Korea. Eighth, with regard to year of publication, KM processes studies related to ISs have witnessed a remarkable increase of published articles in 2013 and 2017.

Although KM processes like knowledge sharing, knowledge acquisition, and knowledge application were shown to have a significant impact on various ISs, there is still an open door for further research to investigate the impact of these processes on other types of ISs. In addition, it has been noticed that knowledge storage, knowledge protection, and knowledge creation were less studied considering their relationship with ISs. Similarly, (Lee et al., 2007; Migdadi et al., 2016) suggested investigating the influence of knowledge protection on the success and implementation of E-business systems as research overlooked the impact of this type of knowledge on the adoption and implementation of ISs. To that end, further research should take this gap into consideration and attempt to examine the impact of these KM processes on different types of ISs. To conclude, the findings of this review study provide an insight into the current trend of KM processes research involving ISs studies and form a valuable reference for future studies in KM processes related to ISs.

As a limitation, this systematic review was restricted to certain databases for collecting the research studies (i.e., Springer, ACM Digital Library, Taylor & Francis, ScienceDirect, IEEE, Wiley, Emerald, and Google Scholar). In that, these databases may not provide a comprehensive representation of all articles published on KM processes and their relationship with ISs. Further research could extend this study by including studies from other databases such as: Web of Science, Scopus, Sage, among many others. In addition, future research could also focus on finding the type and benefit of influence between each KM process and its corresponding IS.
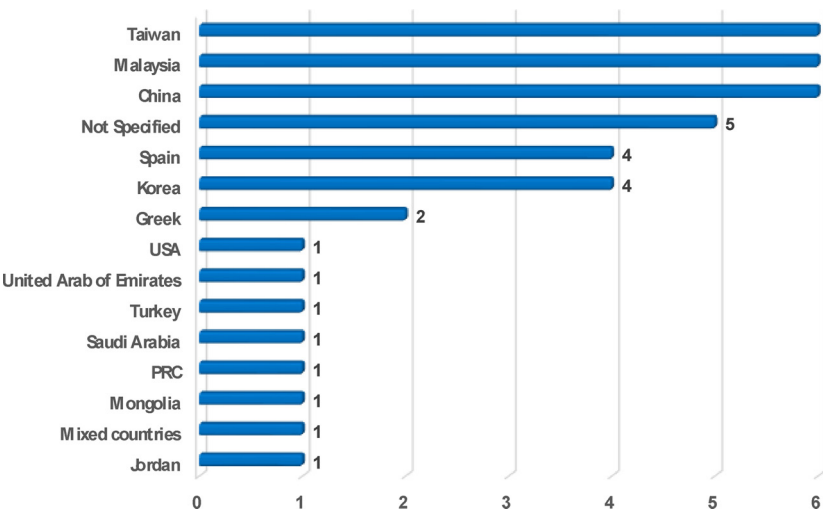
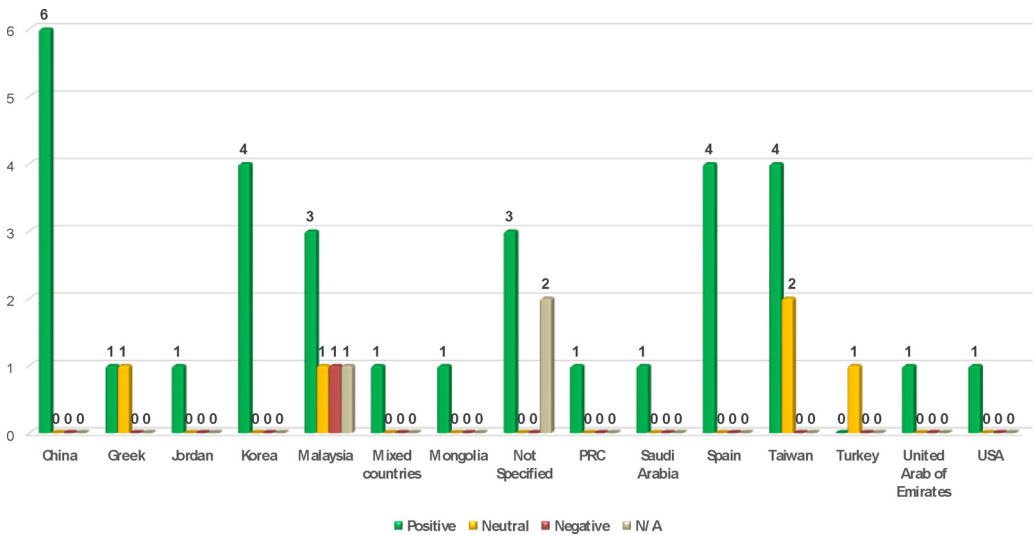**Fig. 7.** Distribution of studies by country of implementation.

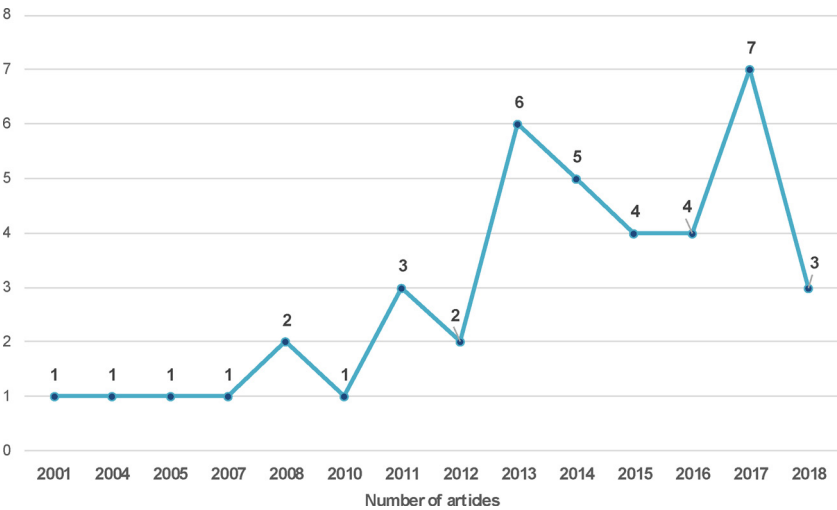**Fig. 8.** Distribution of studies by country of implementation and research outcomes.

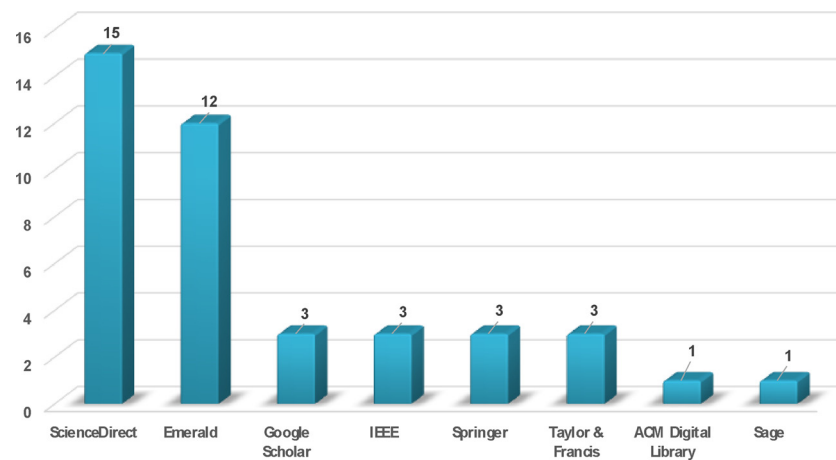

Fig. 9. Distribution of studies by publication year.

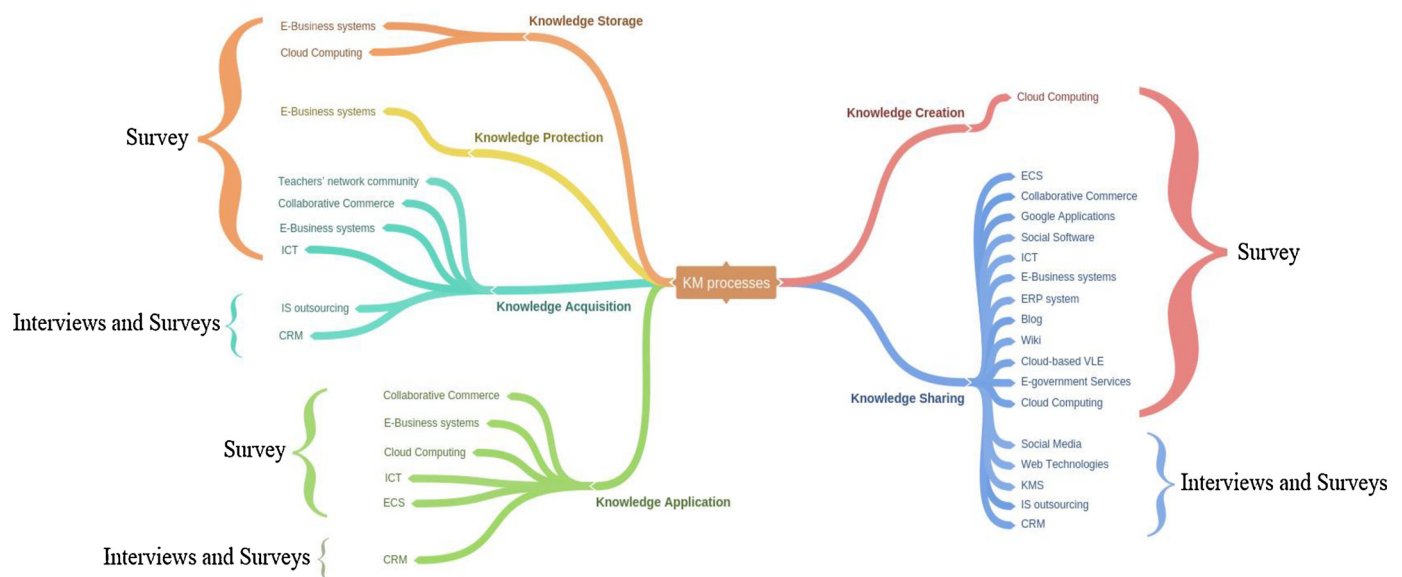**Fig. 10.** Distribution of studies in terms of database.

Fig. 11. Mind Map of KM processes, information systems, and methods.

Acknowledgement

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