

## **Knowledge Management and Innovation: A Critical Literature Review**

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## **Abstract**

This study aims at establishing the state-of-the-art link between knowledge management (KM) and innovation. For this purpose, the study critically reviewed research published in KM and innovation domain over the last ten years. A systematic search strategy was employed to retrieve relevant empirical studies from the Web of Science. Thereafter, the authors applied a critical review strategy to analyse and synthesise the findings of the selected studies. The study's findings disclose that research in the recent past increased exponentially in KM-innovation domain. In terms of impact, KM contributes to different types of innovation associated with organisational processes, products and services. However, it was noted that there are several factors that interplay significantly between KM and innovation. This study has found that KM plays a vital role in bring innovation in business organizations. In contrast, a few studies explored how KM can play role to offer innovative services in academic libraries that require further investigation. From a methodological perspective, the scholars used mainly quantitative approaches compared to qualitative or mixed methods. This is clearly an issue that needs to be addressed by the KM research community since qualitative and pragmatic studies tend to provide better explanatory and descriptive findings. Besides, identifying gaps in theoretical and methodological approaches, this study has found that KM plays a vital role to bring different types of innovation in all sectors of the economy.

**Keywords:** knowledge management, innovation, knowledge management processes, critical literature review, mediating factors.

# 1 Introduction

The recent trends in maintaining competitive advantage in the contemporary organisations have enhanced the importance of knowledge as a strategic asset (Davenport & Prusak 1998). From the epistemological dimension, knowledge can be contrasted as explicit and tacit knowledge (Nonaka, 1994). While ontologically, knowledge may exist at different levels; individual, group and organisational level (Nonaka & Takeuchi, 1995). Individual knowledge resides in individuals' minds, their thinking, and joined with experiences and their talents (Omotayo, 2015). Organisational knowledge is reflected in products and services, create and sell to customers, and formed through interactions between technologies, techniques and people (Rowley, 2003). The efficient and effective management of knowledge provide multiple benefits to an organisation such as efficient and productive working environment to increase organisational performance and innovation to business functions and processes that ultimately maintain sustainable competitive advantage (Wang & Noe, 2010; Hemmati & Hosseini, 2016).

Innovation is a multi-stage process in which organisations transform ideas into new and improved products, services and/or processes (Tohidi & Jabbar, 2012). It can be implemented in several ways according to different strategic thinking, for instance, radical, revolutionary or incremental perspectives (Xu, 2015). Research shows that there is a close relationship between KM and innovation that support sustainable competitive advantage in organisations (Plessis, 2007; Nonaka & Takeuchi 1995; Bashir et al., 2008).

The combined effects of KM and innovation have been studied in various sectors, including business sector (Lopes et al., 2017; Chaghoshi & Amini 2017); public sector (Moos et al., 2011); health and medical sector (Noordin & Karim 2015) and educational sector (Draghici et al., 2015). Several studies also reveal that there is an increasing interest in intermediary factors that support KM to bring innovation. For example, the intermediary factors are intellectual capital (Hussinki et al., 2017), management approaches (Pawlowsky & Schmid 2012), corporate culture (Lin et al., 2014), organisational learning capacity (Liao & Wu, 2010) etc. Keeping in view close relationship between KM and innovation, and the increasing importance of innovation in organisational competition and survival, the study reported in this paper aimed at establishing the status of research addressing the link between KM and organisational innovation.

## 1.1 Research questions

To achieve the study's aim, the following research questions (RQ) were established:

RQ1: Does KM influence innovation? If so, how?

RQ1a: What are the state-of-the-art and emergent trends of KM in innovation?

- RQ1b: What is the impact of KM in innovation?  
RQ1c: Which KM processes do lead to innovation?  
RQ1d: What are the types of innovation that result from KM in organisations?  
RQ2: Which methods are adopted in KM and innovation research?

## **2 Research Design**

This study conducted in two phases. Firstly, the systematic extraction of research studies was carried out. During the second phase, a critical analysis of the selected studies was completed.

### **2.1 Systematic search strategy**

Before engaging in the necessary critical review, a systematic strategy was adopted as suggested by Nunes et al. (2009). Accordingly, the review process began with the selection of keywords and building search queries. These were then submitted to appropriate information resource databases in order to provide a preliminary understanding and exploration of KM and innovation landscape. This strategy provides a systematic and transparent means of gathering, synthesising and assessing the base articles collection upon which the critical analysis was performed. Researchers have successfully used this type of approach to investigate phenomena in KM domain (Nunes et al., 2017; Sarka & Ipsen 2017).

#### **2.1.1 Selection of source and search strategy**

In their widely cited article on literature review, Jessen and Lacey (2006) recommended that researchers should explicitly explain the search criteria used in the study so that readers can evaluate the scope and replicate their reviews. As KM is a multidisciplinary research area, no disciplinary limit was imposed in the search queries. The Web of Science (WoS) as the vital information resource database was used for selecting relevant studies. Although we acknowledge that WoS does not cover all relevant journals that address KM, it was deemed that this particular resource indexes all the most significant and well-established ones and therefore would be ideal for a first integrative and exploratory study on KM and innovation. According to Jesson et al. (2011), when undertaking a critical literature review, researchers should access all knowledge in all journals, regardless of impact status. There might be good papers in low-ranked journals, which did not pass the strict criteria for inclusion in top journals. So, we decided to consider all journals indexed in WoS irrespective of SSCI indexing and impact factor and including those in the Emergent Source Citation Index (ESCI) and in the Conference Proceedings Citation Index- Social Science and Humanities (CPCI-SSH).

The first step in the extraction process was identification of keywords and the production of search strings. Three keywords, “knowledge management”, “knowledge management process\*” and “innovation”, were selected to frame three search strings:

1. Search String: in-title: “knowledge management” AND “innovation”
2. Search String: in-title: “knowledge management process\*” AND “innovation”
3. Search String: in-topic: “knowledge management” OR “knowledge management process\*” AND innov\*

String 1 and 2 aimed to identify papers that use the combination of KM and innovation in the title by identifying the centrality of these concepts in the authors’ perception. Search string 3 aimed to identify those papers where the relation between KM and innovation is explicit in the abstract or keywords (e.g., topic) but not on the title, therefore denoting that the authors’ perception of focus is elsewhere but this relation is still relevant to their studies.

### *2.1.2 Inclusion and exclusion criteria and selection of relevant studies strategy*

The three systematic searches used in this study returned a total of 1514 papers which were then checked against the pre-determined eligibility criteria. Papers were inspected one by one for relevance including review of abstracts and full paper titles, and duplicated articles. Only the empirical studies published in journals and conference proceedings written in English from 2008 to 2017 were included, whereas review papers, editorials, guest reviews, book chapters, and articles whose content was either merely theoretical or not relevant were excluded. Studies, where the full-text was not available, were also excluded. Figure 1 illustrates the entire process of retrieving the final 65 relevant studies. To ensure the validity of this process, two of the co-authors engaged individually with this crucial filtering process and created independent lists of the selected articles. Both lists were then compared, and differences negotiated and discussed so that a final list was agreed.

## *2.2 Critical review strategy*

A critical review should criticize, synthesise and describe the current state of knowledge in a subject area (Galvan & Galvan, 2017). Following Jesson and Lacey (2006) guidance, the critical review component of this study aimed to identify strengths, limitations, omissions, and biases as well as to synthesise findings and indicating how the study fits into a broader context. So, this study used the critical lens composed by the relationship between KM and innovation to analyse the selected empirical studies.

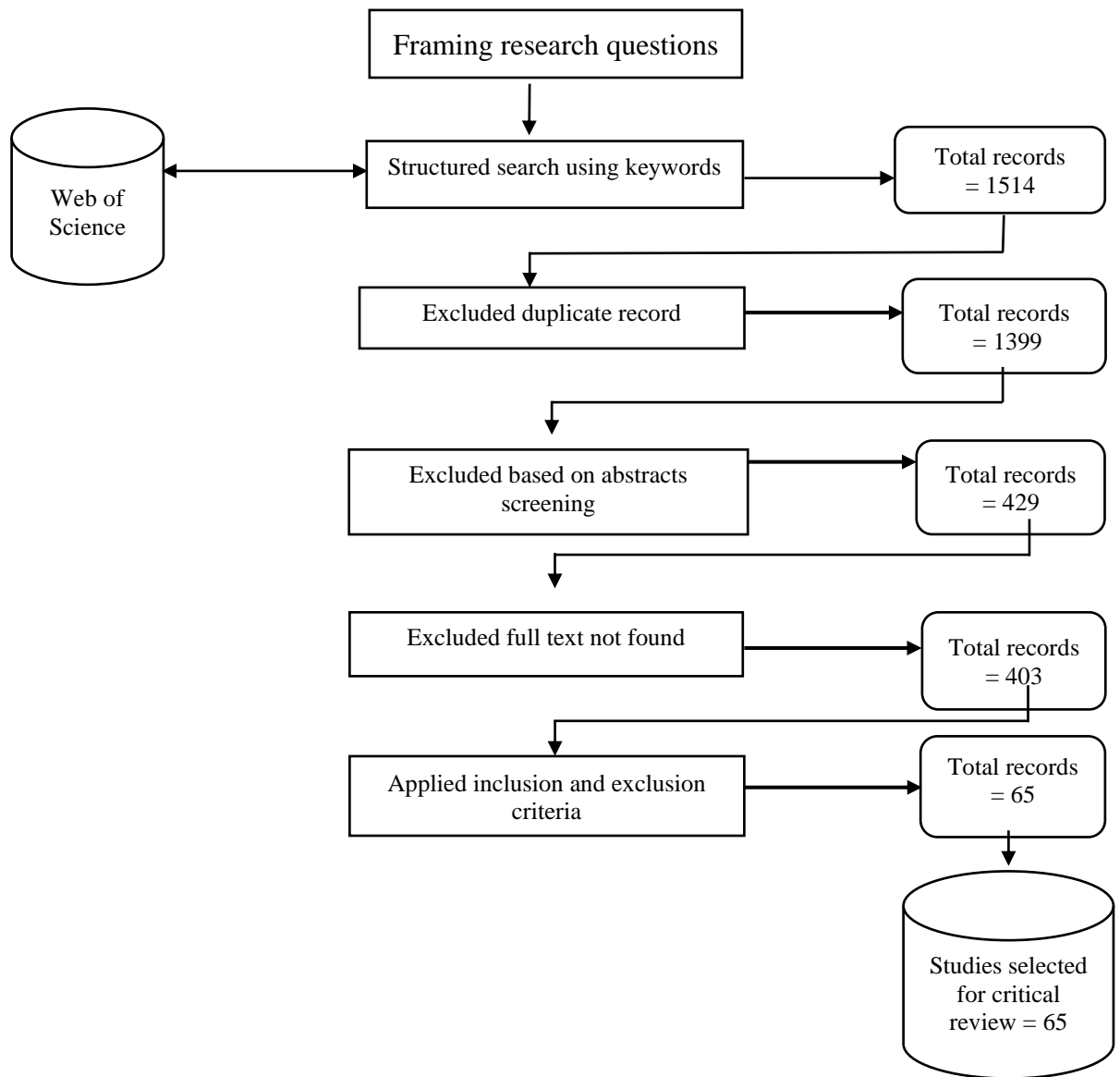


Figure 1. Systematic literature review flow diagram

### 3 Research Findings

#### 3.1 Research trends

Figure 2 illustrates general trends in KM-innovation research according to the year of publication (RQ1a). Overall, the analysis of the quantitative data reveals that research has significantly increased in the second half of that period. However, this increase seems to have stabilized from 2010 to 2013 around a

relatively low number of three publications per year. In 2008, only one study published. The year 2009 is the exception in this period with a relatively high of six studies published. In the last four years, 2014 to 2017, an increasing number of publications is quite noticeable as a trend, and primarily, with a sharp growth in 2017 could be attributed.

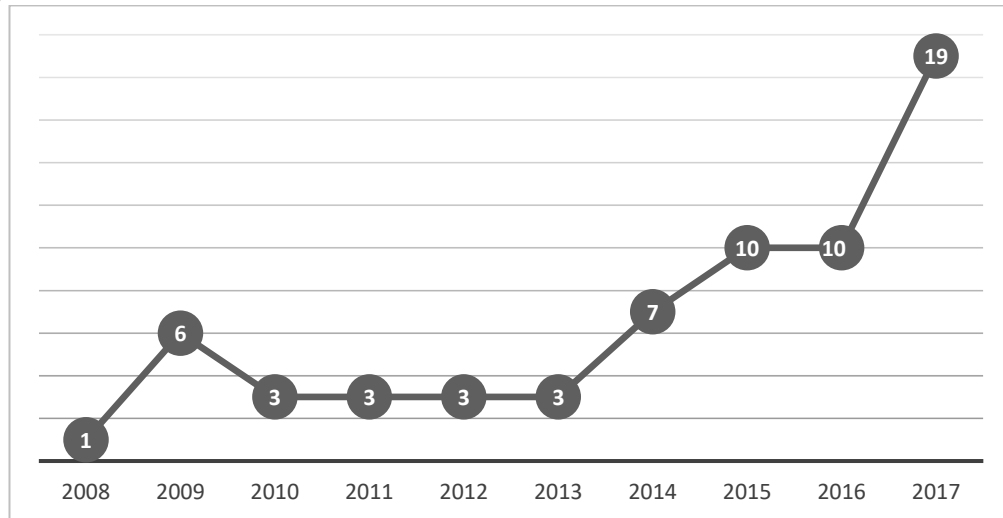


Figure 2. Research trend in KM and innovation

### 3.2 *Perceptions of the centrality of KM and Innovation as a research item*

This section describes how researchers address KM and innovation in the extant literature (RQ1b, RQ1c, and RQ1d). For this purpose, the section is structured into three sub-sections; namely, (1) impact of KM on innovation (RQ1b), (2) KM processes and innovation (RQ1c), and (3) the types of innovation that result from KM in organisations (RQ1d).

#### 3.2.1 *Impact of KM on innovation*

The first stream of the retrieved papers explains that knowledge is a critical strategic resource that supports to create value in organisations. Moreover, the relationship between KM and innovation is getting importance in research and practice (Liao & Wu, 2010). Researchers argue that KM positively affect organisational innovation (Tsai, 2016; Gloet & Samson, 2016) in entire enterprises, e.g., manufacturing firms (Noruzy et al., 2013; Marques et al., 2016), banks (Kießling et al., 2009), automobile (Shang et al., 2009); hospitals (Tang, 2017; Ghasemi et al., 2017), small and medium enterprises (SMEs, Byukusenge & Munene, 2017; Fan et al., 2017), small asset management company (Khadir-Poggi et al., 2014), software companies (Hemmati & Hosseini, 2016), various business sectors (Fidel et al., 2016) and different types of industries-manufacturing, wholesale, retail trade, services, transportation and storage (Inkinen et al., 2015). KM also creates an environment for individuals to initiate innovative practices to complete tasks (Bai & Yu, 2017). Such innovative practices are not only linked to business organisations, but higher

education institutions can also get benefits by employing KM for innovative library services (Islam et al., 2015) and to improve higher education institutional performance (Bai & Yu, 2017). So, KM brings innovation that leads to increased business performance (Taherparvar et al., 2014), organisational sustainability (Lopes et al., 2017), project performance, and achieving project benefits (Hemmati & Hosseini 2016).

Table 1. Impact of knowledge management on innovation

Criterion	Mediator	Predictor	Context	Source
Service innovation in libraries	Knowledge application/use, knowledge/sharing and transfer	Knowledge capture, knowledge creation	Worldwide librarians	Islam et al. (2017)
Organisational innovation	Organisational learning	KM	Iranian agricultural bank	Nouri et al. (2017)
	IT application, organisational capabilities		Iranian software development companies	Hemmati & Hosseini (2016)
	Corporate culture		Taiwanese manufacturing industries	Lin et al. (2015)
	External knowledge acquisition	Social intelligence (social awareness, social understanding, social Interactions)	Australian non-profit organisations	Kong (2015)
	Capacity for internal assimilation, capacity for internal sharing, coordination among R&D personnel, communication fluency among R&D personnel	External knowledge acquisition	Spanish innovative technology-based firms	Segarra-Ciprés et al. (2014)
	Information technology capability	Knowledge conversion, knowledge protection	Malaysian Multimedia Super Corridor	Mohamad et al. (2017)
	Knowledge creation	Knowledge sharing	Portuguese companies - footwear, textile, moulds, metallurgy,	Costa & Monteiro (2016)

			information technologies, automotive components, plastics, chemicals, paper and cardboard, and ceramics.	
	Knowledge application	Knowledge sharing	Chinese firms	Li et al. (2009)
	Reverse knowledge transfer	Multi-nationality, internal social capital, external social capital	Spanish multinational companies	Jiménez-Jiménez et al. (2014)
	Top management support, employee involvement, continuous improvement, customer focus	Knowledge creation, knowledge storage, knowledge transfer, knowledge application	Taiwanese high-tech companies	Hung et al. (2010)
Behavior innovation, product innovation, process innovation, market innovation, strategic innovation	Organisational learning (Management commitment, system perspective, openness and experimentation , knowledge transfer and integration)	Knowledge acquisition, knowledge conversion, knowledge application	Taiwan financial firms	Liao & Wu (2010)
Technical innovation	KM	Supplier integration, customer integration, internal integration	Jordanian manufacturing	Ayoub et al. (2017)
Product innovation	Knowledge creation, knowledge storage, knowledge transfer, knowledge application	Knowledge oriented leadership	Spanish technology industries	Donate & de Pablo (2015)
	Knowledge acquisition	Information capability, relationship quality	Taiwan financial firms	Liao & Barnes (2015)

	Customer KM	Market innovation	Taiwanese manufacturing industries	Lin et al. (2012)
Performance innovation	Knowledge-oriented HR practices	KM	Spanish technology industries	Donate & Guadamillas (2015)
	Knowledge sharing	Transformational leadership and/or transactional leadership and	Project managers or technicians joining the construction projects in China	Zheng et al. (2017)
	Social web knowledge sharing	Commitment-based HR practices, information system integration	Spanish manufacturing SMEs	Soto-Acosta et al. (2017)
	KM	Industry cluster (industry resources, industry relationship)	Taiwan export processing zones, industrial zones and science park	Lai et al. (2014)
	KM dynamic capability	KM	French high-tech SMEs	Alegre et al. (2011)
	KM	Strategic human resource practices	Taiwanese firms	Chen & Huang (2009)
	Customer KM	Market innovation	Taiwanese manufacturing industries	Lin et al. (2012)
	KM	Knowledge workers' intelligence quotient emotional quotient and spiritual quotient	Malaysian health institute	Noordin & Karim (2015)
	KM	Social interactions	Taiwanese firm	Huang & Li (2009)
	Top management support, employee involvement, continuous improvement, customer focus	Knowledge creation, knowledge storage, knowledge transfer, knowledge application	Taiwanese high-tech companies	Hung et al. (2010)



Although there is a close relationship between KM and innovation; however, it was found that there are several enablers act as mediating and moderating factors to bring diverse types of innovation in organisations. Table 1 explains the mediating catalysts that support to enhance the impact of KM on innovation. However, in some cases, KM itself acts as a moderating factor in stimulating innovation (Li et al., 2009).

### 3.2.2 *Knowledge management processes and innovation*

In KM and innovation domain, scholars and practitioners have outlined generic KM processes somewhat differently both in number and content that lead to diverse classifications. However, there is unanimously agreed upon consensus that KM processes are essential antecedents of innovation (Nonaka & Takeuchi, 1995; Plessis, 2007). As shown in Table 2, different KM processes bring diverse types of innovation, such as administrative, technical, process, product, marketing, and so forth (RQ1c).

Table 2. Knowledge management processes and innovation

#	Author	KA	KS	KAPP	KC	KI	KU	KAB	KO	KD	KID	KMD	KE	KPT	KDP	KST	KDS	Context	Innovation
1	Al-Sa'di et al. (2017)	√	√	√														Jordanian manufacturing firms	Product and process innovations
2	Chaghoshi & Amini (2017)	√	√	√	√													Iranian alloy steel supply chain	Product, marketing, process, and organisational innovation
3	Cong et al. (2017)	√		√	√	√												Chinese SMEs	Technological innovation
4	Migdadi et al. (2017)	√	√		√											√		Jordanian manufacturing and service organisations.	Product, marketing process and organisational innovation
5	Väyrynen et al. (2017)		√															Finland SMEs	Open innovation
6	Yusr et al. (2017)	√	√	√														Malaysian Manufacturing sector	Innovation performance
7	Obeidat et al. (2016)	√	√				√											Jordanian enterprises and consulting firms	Organisational innovation
8	Sepahvand & Mohammadi (2015)	√		√				√	√								√	Iranian sports employees	Organisational innovation
9	Aboelmaged (2014)	√	√	√														United Arab Emirates manufacturing firms	Technological and administrative innovation
10	Soto-Acosta et al. (2014)		√															Spanish SMEs	Organisational innovation
11	Alegre et al. (2013)															√	√	French biotechnology companies	Innovation performance
12	Lee et al. (2013)	√	√	√												√		Malaysian SMEs manufacturing organisations.	Product and process innovation
13	Lai & Lin (2012)	√	√		√											√		Taiwanese Manufacturing firms	Technological innovation
14	Pawlowsky & Schmid (2012)	√			√	√				√						√		German corporations	Organisational innovation
15	Lin et al. (2012)				√	√					√	√						Taiwan High-tech firms	Organisational innovation
16	Andreeva & Kianto (2011)	√	√		√													Production and service sectors industries of three countries – Russia, China and Finland	Innovation performance
17	Kianto (2011)	√	√															European SMEs	Continuous innovation
18	Chen et al. (2010)		√		√													146 Taiwanese firms	Technology and administrative innovation

19	Jiang & Li (2009)		√		√										German firms	Innovative performance
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Notes. KA: Knowledge acquisition; KC: Knowledge creation; KST: Knowledge storage; KS: Knowledge sharing; KAPP: Knowledge application; KI: Knowledge integration; KU: Knowledge utilization; KAB: Knowledge absorption; KO: Knowledge organization KO; KD: Knowledge diffusion; KID: Knowledge identification; KMD: Knowledge modification; KPT: Knowledge protection; KO: knowledge organization; KE: Knowledge embodiment; KDP: Knowledge development; KDS: Knowledge dissemination

### 3.2.3 Innovation types

This section presents the findings related to RQ1d; what are the types of innovation that result from KM in organisations.

Knowledge is a multifaceted and multi-layered concept and is considered one of the core factors that leads to various types of innovation in organisations. On the other side, innovation is a broader concept, and still, there is no unanimous agreed upon consensus of the conceptualization and operationalization of innovation (Amara & Landry, 2005). So, researchers defined and categorized innovation in numerous ways that resulted in multiple definitions and approaches.

The findings of this study reveal that KM and innovation are closely linked. Moreover, KM creates an environment that causes innovation to take place. Specifically, KM acts as a key catalyst to bring diverse types of innovation in organisations. Figure 3 explains the innovation types that result from KM in organisations. The innovation types are based on the information retrieved from the selected studies. Notably, organisational innovation, performance innovation, product innovation, process innovation, technological innovation, administrative innovation, and open innovation are the most popular types of innovations reported in the reviewed studies.

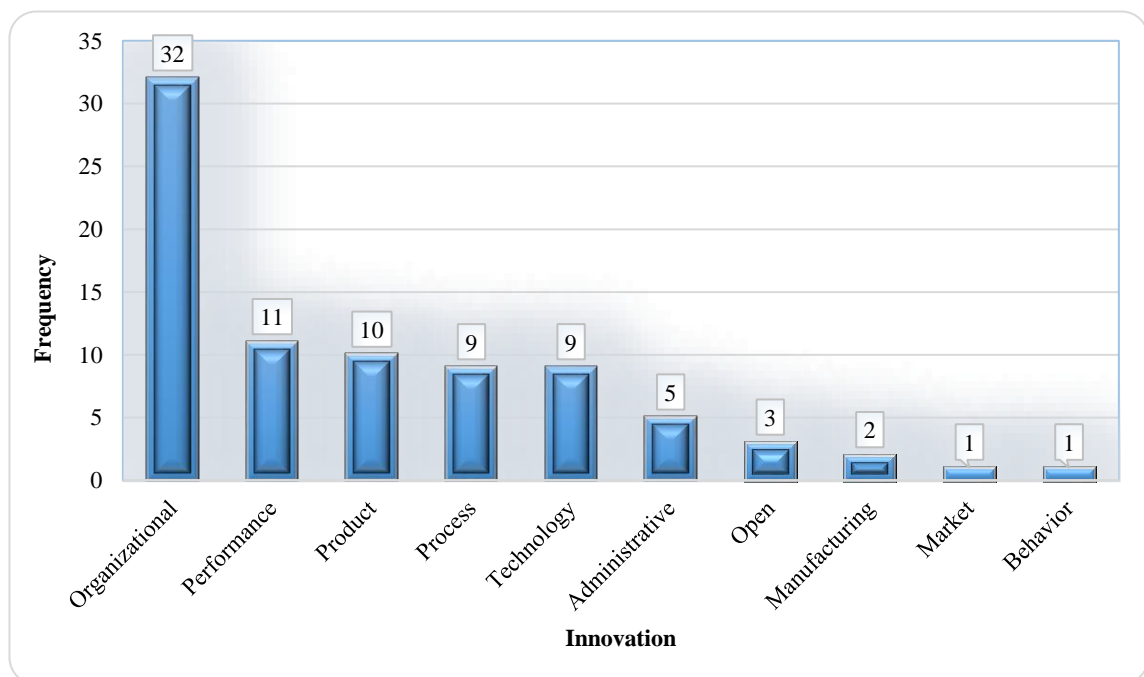


Figure 3. Types of innovation

### 3.3 Research method - knowledge management and innovation

To address RQ2, this study classified the selected KM-innovation publications based on the research methods employed. The analysis presented in Figure 4 describes that a vast majority of the studies (57; 88%) reported was quantitative in nature and researchers employed cross-sectional survey methodology using a structured questionnaire. Out of the total, seven studies reported qualitative methods and opted for data collection techniques such as

semi-structured interview, focus group, and qualitative survey with open-ended questions. Only one study reported mixed-method research (MMR) approach using observation, semi-structured interviews, and documentation (company documents and electronic data). Overall, therefore, quantitative studies were found to dominate, but most of the quantitative studies relied on small samples selected through convenient sampling, making them unreliable to generalize the research findings.

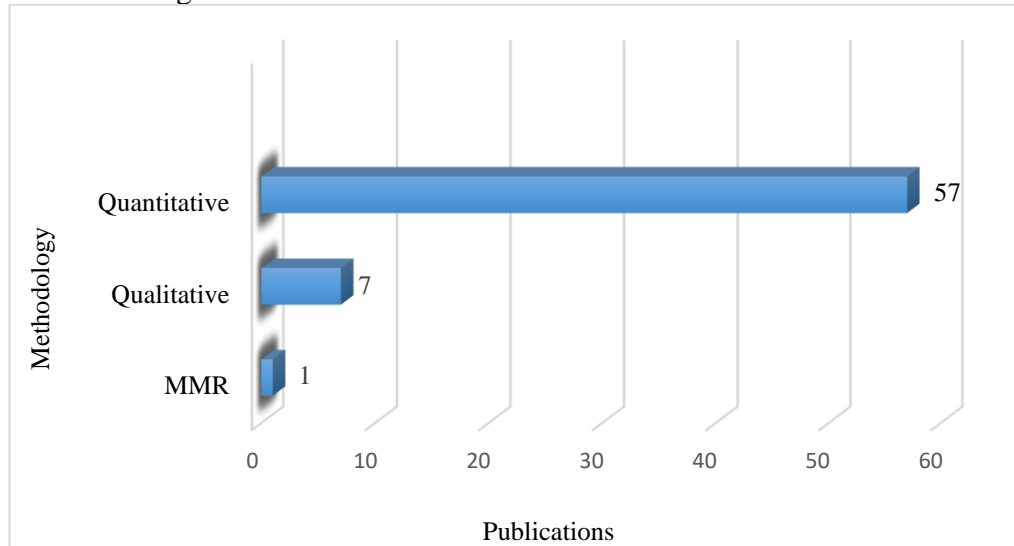


Figure 4. Research methodology adopted in the studies

#### 4 Discussion on Findings

The study reported in this paper critically reviews KM and innovation studies published during the last decade. The research findings indicate that increasing research trend is visible, especially in the recent past. It was also found that there is a close relationship between KM and innovation. Moreover, KM processes contribute to different types of innovation associated with organisational processes, products, and services. Innovation is a complex and multi-stage process in which organisations transform ideas into new and improved products, services and/or processes (Tohidi & Jabbar, 2012; Plessis, 2007). Therefore, KM alone is not enough to bring innovation in organisations (Uddinet al., 2017). The findings disclosed that researchers adopted numerous theories and models to investigate the impact of KM on organisational innovation. Nevertheless, they ignored some critical enablers that are considered crucial to leverage KM for diverse types of innovation. Such factors include organisational culture, leadership and strategy (Martinez-Conesa et al., 2017), dynamic capability (Lu & Liang, 2017), absorptive capacity (Ashok et al., 2016), boundary-spanning (Gloet and Samson 2013), individual creativity (Lin et al., 2012), knowledge worker intelligence (Noordin & Karim, 2015), and organisational structure and demographic characteristics of employees (Nouri et al., 2017).

Some topics received limited attention that need further investigation. For example, only three studies reported KM and open innovation (Lopes et al., 2017; Väyrynen et al., 2017; Martinez-Conesa et al., 2017). According to Lopes et al. (2017), open innovation plays a crucial role in leveraging KM as a strategic asset that influences organisational sustainability. On the other hand, a vast majority of the reviewed studies (60; 93%) addressed only business enterprises

and ignored the higher education sector; two studies investigated the effect of KM on service innovation in university libraries (Islam et al., 2017; Islam et al., 2015), while the other two explored the impact of KM on innovation from the perspective of Chinese and Malaysian universities (Salleh & Wahib, 2017; He, 2008). So, further research is required to investigate the impact of KM on innovative services in academic and research libraries.

Most of the studies (57; 89%) adopted a quantitative approach using a structured questionnaire to collect data from a single informant designated as manager, executive, chief executive and so on. Among these, several quantitative studies were conducted through a cross-sectional survey in limited time using convenient sampling technique, and they also reported a low response rate (Taherparvar et al., 2014; Ayoub et al., 2017). So, a small sample response from informants might not reflect an accurate representation of the phenomena studied. Moreover, innovation and organisational performance were measured through self-reported responses and lacked in the analysis of organisational documents, e.g., financial reports, rating indexes, etc. So, it is risky to generalize the results of such studies (Hemmati & Hosseini 2016; Väyrynen et al., 2017). Also, biases may occur if responses are provided by a single representative from a firm (Aboelimged, 2014). Besides these, quantitative studies rely on a questionnaire for data collection and lack in using multiple data-collection approaches (Pawlowsky & Schmid, 2012). In contrast to quantitative investigation, seven studies opted for qualitative research approach while only one study reported mixed-method research. So, researchers should apply qualitative and mixed-methods approaches to gain more in-depth insight into KM-innovation phenomenon.

Knowledge sharing and knowledge acquisition, among other generic KM processes, are found vital enablers to build both employees' skills and collective knowledge that contribute to bringing innovation, either incremental or radical, for entire enterprises. Thus, organisational leadership should concentrate on knowledge acquisition activities. Moreover, leadership should create a conducive knowledge-sharing environment, where new ideas and solutions can be developed, that lead to innovation.

## **5 Conclusion**

This study aimed at an in-depth understanding of KM and innovation research. The study's findings reveal that research in KM-innovation landscape has increased significantly during the recent past. Although KM impacts positively on innovation and brings diverse types of innovation and improves organisational performance in entire enterprises, however, researchers and practitioners paid less attention to the factors that mediate and/or moderate between KM and innovation while developing theoretical frameworks. Moreover, a pragmatic approach, that combines the strengths of both positivist and interpretivist methodologies might help to improve the situation. Besides, identifying gaps in theoretical and methodological approaches, this study has found that KM plays a vital role in all sectors of an economy, but higher education has been neglected in the research.

To retrieve the relevant studies, the search queries limited to WoS databases, namely, SSCI, ESCI, and CPCI-SSH. Moreover, this study considered the studies published in the English language during the last decade. Despite the limitations, the findings of this study are beneficial to scholars interested in

building upon and expanding theoretical and empirical studies in KM and innovation domain. From the practitioner's perspective, this study offers insights to managers that would support in distinguishing the different types of KM processes that lead to diverse types of innovation.

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