The Effect of Technological Innovation and Knowledge Management Process on Organisational Agility: A Systematic Literature Review

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ABSTRACT

Organizational agility has become essential and its importance has increased after COVID-19. There are inconsistent findings regarding the factors that affect organizational agility. This study focuses on the effect of technological innovation and the knowledge management process by reviewing the literature related to these variables. Three databases, Scopus, Web of Science (WoS), and Google Scholar, were used using certain search keywords, and a total of 30 articles were identified between 2010 and 2022 and reviewed. The findings showed that the number of articles has increased sharply during and after the COVID-19 pandemic. However, the use of theories to explain organizational agility is still emerging, with the resource-based view, the dynamic capability, and the knowledge-based view being the most used theories. The sample size is increasing to meet the structural equation modeling requirements. The effect of technological innovation and the knowledge management process is positive in most studies. More studies are needed to examine organizational agility as a dependent variable in different countries, contexts, and industries. In addition, future studies should examine other moderating variables in this context.

Keywords-technological innovation; knowledge management process; organizational agility; resource-based view; dynamic capability; knowledge-based view

I. INTRODUCTION

The term agility was first coined in 1982 and gained recognition at the organizational level after 1991 [1, 2]. Organizational agility is defined as the ability to swiftly reconfigure resources to produce different products and services that meet the changing needs of the market [3]. Organizational agility has important implications for organizational competitiveness and performance [4-6]. It also affects the sustainability of an organization and its survival in the market [7, 8]. It is mainly about the ability of an organization to adapt to its environment and survive unprecedented changes [9, 10]. The importance of organizational agility has increased recently due to high uncertainty and market instability [11]. For these reasons, many studies have focused on predictors of organizational agility and methods to improve its level within organizations to meet current and future challenges [12-16]. However, studies on this topic focused mainly on the manufacturing sector, since the concept of organizational agility has its roots in the supply chain and its applications [17]. This is still the case, as many studies continue to focus on manufacturing [13, 18-20].

Many researchers have examined agility and attempted to understand the factors that can lead to agile organizations. However, there are inconsistent findings regarding these factors. Although some studies related agility to the use of technology that helps in predicting changes and speed the process of decision-makers [5, 10, 2121], others believe that agility is more related to the ability of organizations to manage their knowledge [22-24] and the capability of leadership during uncertainty [13-14]. Similarly, the theories that can help explain agility are still emerging, with a focus on dynamic capability and resource-based view [12, 20, 25]. This study performs a systematic literature review to understand the status of organizational agility and the effect of the knowledge management process and technological innovation on it.

The importance of technological innovation has increased for organizations, as they are urged to invest in technology to achieve competitive advantage and survive in a changing environment [26-27]. Several studies indicated that to succeed in the contemporary world, organizations must invest in technology because it promotes adaptation, sustainability, global reach, cooperation, innovation, and efficiency [28-29]. Organizations can take advantage of new possibilities, increase competitiveness, and manage the challenges of the digital era by embracing and using technology [30, 31]. Along with investments in technology, organizations must manage their knowledge to avoid reinventing the wheel and deploy organizational knowledge to support decision-making and confront unpredictable changes in their environment [32, 33]. KMP is critical to developing the competitiveness of an organization and achieving high organizational agility [15, 16].

II. RESEARCH METHODOLOGY

This study performed a systematic literature review to investigate the research status and present directions for future work [34-36]. Keywords were developed based on the title and objective of this study. The search keywords included terms such as "knowledge management process", "technological innovation", and "organizational agility". A combination of these terms was used to find studies on the topic. Three main databases were used: Scopus, which has a large number of reliable journals, Web of Science (WoS), known for its quality and reliability, and Google Scholar. A total of 891 articles were identified. However, using inclusion and exclusion criteria, this number was reduced. Duplicate articles (n = 189) were removed. The articles were sorted according to inclusion criteria. The first inclusion criterion was the time of publication. This study focused on articles from 2010 to 2022, and therefore articles before 2010 were removed. The second criterion was the language, and non-English articles were removed. A sub-search was performed to select only articles that have the word "agility". This reduced the number of articles to 56. The titles and abstracts were screened to further refine the search results, resulting in removing nine articles based on their quality. Then the whole body of the articles was read. This resulted in a review of 30 articles related to the topic. Figure 1 shows the process of identification, selection, and reviewing the articles.

III. FINDINGS

This study reviewed 30 articles on organizational agility, knowledge management, and technological innovation. The following sections present the background of the reviewed articles.

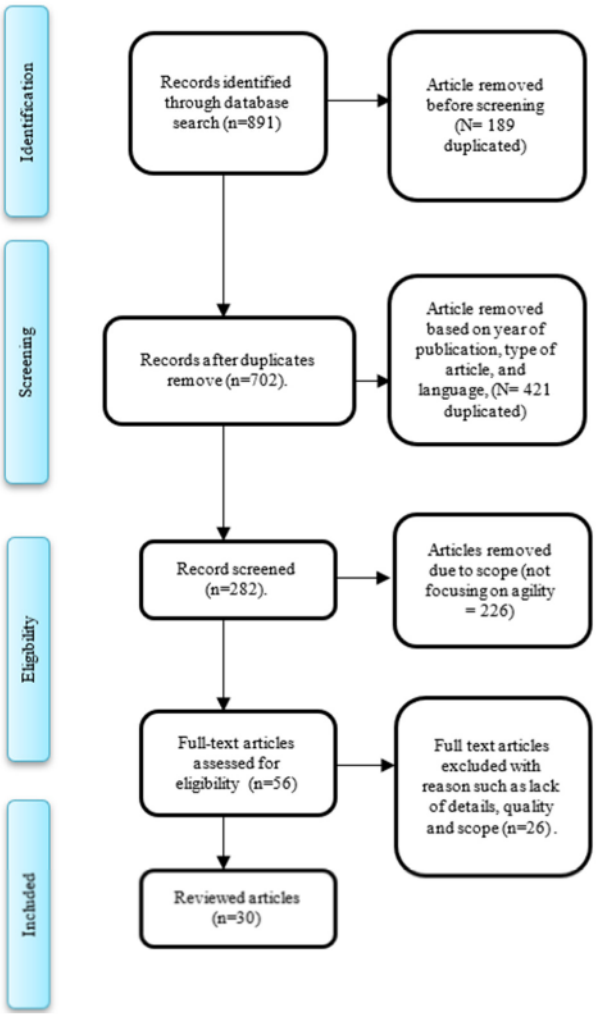


Fig. 1. Article selection and filtration.

A. Profile of Reviewed Articles

Since the topic of organizational agility is still emerging, the number of articles was limited until 2014. A slight increase was observed in 2015-2018, and a sharp increase was noticed after 2020. This could be due to the outbreak of the COVID-19 pandemic, which affected organizations and revealed a lack of organizational agility for most of them. The articles were distributed in 10 countries. The highest number of studies were performed in Iran (17%) followed equally by China (10%), the US (10%) Pakistan (10%), Nigeria (10%), and Spain (10%). Other countries, such as Jordan, Egypt, India, and Indonesia, had fewer studies. Review studies accounted for 14%, indicating that researchers are still attempting to understand the status of organizational agility. Only one study examined organizational agility in more than one country. In terms of

continent, Asia was ahead with 60% of the studies, followed by 16% in Africa, and equally 12% in Europe and America. In terms of industries, publicly listed companies or groups of industries in a country were examined in 28%, followed by the manufacturing sector with 20%, Small and Medium Enterprises (SMEs) with 12%, and higher education with 12%. Other industries, such as banking, telecommunications, service companies, the automotive industry, and pharmaceuticals, received less attention. Several theories were applied to define the variables to predict organizational agility. However, 15 studies (50%) did not use a specific theory. This again confirms that the literature on organizational agility is still explorative in nature, without being based on a theory. Four studies used the resource-based view theory. This theory can explain the effect of technological innovation on organizational agility, as technological innovation is part of the resources and capabilities of an organization. Dynamic capabilities and knowledge-based view were used in two studies each. Other theories were less used, such as legitimacy theory, innovation diffusion theory, stakeholder theory, institutional theory, and upper echelon theory.

These studies presented a varied number of responses. On average, the mean sample size was 251 with a minimum of 91 and a maximum of 720 responses. The increase in sample size was to meet the requirements of structural equation modeling, where the minimum sample size to use this model is at least 200 [45]. However, some studies used a sample size of less than 150. This could be because these studies used the first generation of data analysis, such as the Statistical Package for Social Sciences (SPSS).

B. Effect of Knowledge Management Process and Technological Innovation on Organizational Agility

The main objective of this study was to identify the effect of the knowledge management process and technological innovation on organizational agility. Table I shows a summary of this relationship.

TABLE I. SUMMARY OF RELATIONSHIPS BETWEEN KMP, TI, AND OA

Ref.	I.V	Dependent variable/mediator: OA
[5]	RFID	+
[6]	KM Exploration, KM exploitation	+ +
[7]	KS culture, IT	Insignificant Insignificant
[8]	KAP	+
[38]	KMP	+
[39]	KM, TI	+ +
[37]	KS	+
[22]	KM	+
[21]	IT, KM	+ +
[25]	Collaborative KC	+
[40]	IS capabilities.	+
[16]	KMP, KM infrastructure	+ +
[15]	KS	+

KM: Knowledge Management, KMP: Knowledge Management Process, KAP: Knowledge Application, TI: Technological Innovation, KC: Knowledge Creation, IC: Information System, KS: Knowledge Sharing

Most studies found that the effect of the knowledge management process and technological innovation is positive, except one study [7] that found an insignificant effect. It can be seen that most studies examined certain components of the knowledge management process, such as Knowledge Sharing (KS) [15, 37], Knowledge Application (KAP) [8], Knowledge Creation (KC) [25], or a holistic approach, such as examining the effect of knowledge management [21, 22]. However, the studies in [16, 38] examined only the effect of the knowledge management process on organizational agility. Again, the effect of the knowledge management process tends to be positive and significant in organizational agility. In terms of technological innovation, this can include Radio Frequency Identification (RFID), Information Technology (IT) use, and Information Systems (IS) capability, which tend to affect positively organizational agility in four studies [5, 21, 39, 40], while only one study found an insignificant effect [7]. However, it was noticed that most studies examined organizational agility as a mediator, while few examined it as a dependent variable.

IV. DISCUSSION

The findings showed that the number of studies has increased sharply during and after the COVID-19 pandemic, and most of them were conducted in developing and emerging countries. This contradicts [41], which found that there are limited studies on organizational agility in developing countries. However, this could be because this study examined the period before 2020. In terms of continents, the findings showed that most of the studies on the topic were conducted in Asia, followed by Africa, Europe, and America.

In terms of industry, most of the studies focused on the manufacturing industry. However, other industries were found to increasingly attract study interest in organizational agility. The publicly listed companies had the highest number of studies, followed by the manufacturing industry. This shift, again, could be due to the effect of COVID-19 on the readiness of organizations to meet unprecedented changes and challenges. In terms of theories, several studies were early exploratory studies without using a theory to explain the relationship among variables. The resource-based view was the most widely used theory, followed by the dynamic capability and knowledge-based view. The focus was on the resource-based view, as it is a comprehensive theory that can explain the link between internal resources and capabilities and organizational agility of organizations [42]. Dynamic capabilities theory focuses on the ability of an organization to adapt and innovate in a changing environment [43], while the knowledge-based view focuses on the ability of an organization to manage its knowledge to create a competitive advantage and better performance [44].

In terms of the sample size used in quantitative studies, the sample size for most studies was above the rule of thumb proposed by [45, 46]. This indicates the emerging trend to use structured equation modeling such as smart Partial Least Square (Smart PLS) and Analysis Of Moment Structure (AMOS), which are models capable of testing complex relationships that include second-order mediators and moderators. In terms of the effect of the knowledge

management process and technological innovation on organizational agility, the review showed that some studies examined knowledge management or its components, such as knowledge sharing, knowledge creation, and knowledge application. However, few studies examined the effect of the knowledge management process on organizational agility. Most studies showed a positive effect, except one study that found an insignificant effect. Limited studies examined the effect of technological innovation on organizational agility. Most studies examined the use of IT or IS capabilities. The effect of IT was found to be positive on organizational agility, while only one study found it insignificant. The lack of studies on technological innovation is in line with previous studies that suggested examining the use of technology and technological innovation in the context of organizational agility [47]. Furthermore, it was noticed that most studies used organizational agility as a mediator, while limited studies examined organizational agility as a dependent variable.

V. CONCLUSION, LIMITATIONS, AND FUTURE WORK

This study reviewed the literature related to the knowledge management process, technological innovation, and organizational agility. A total of 30 studies were reviewed systematically. The findings showed that the number of studies increased after the outbreak of COVID-19. More studies have been conducted in non-developed countries and other sectors than manufacturing. The sample size of the studies is increasing to meet the requirements of structured equation modeling. Most studies found a positive relationship between the knowledge management process and technological innovation, but there is a lack of studies examining both of them. Most studies used organizational agility as a mediator, highlighting a lack of studies using it as a dependent variable. The findings of this study are limited to the reviewed articles published in these three databases during 2010-2022. In addition, the search keywords were limited to the three variables examined.

Future studies should examine several avenues to expand the findings of previous studies. First, the number of studies is still limited. Thus, more studies are needed to examine organizational agility as a dependent variable, because most studies used it as a mediator or moderator variable. Iran had the most studies compared to other countries. However, more studies are needed in other emerging economies, such as the Gulf Cooperation Council (GCC), which includes Saudi Arabia, the United Arab Emirates (UAE), Kuwait, Qatar, Oman, and Bahrain, or other Southeast Asian countries, such as Malaysia, or Latin America. In terms of industry, most studies focused on publicly listed companies and manufacturing. More studies are needed in the public sector, as most studies have focused on the private sector. In the public sector, higher education, public service organizations, and public manufacturing organizations can be the target population.

More studies are needed to examine organizational agility as a dependent variable. This can be done using theories such as dynamic capabilities, resource-based view, or knowledge-based view. The contingency theory can be also used, as it has shown that organizations must create a fit between external and internal factors to achieve better performance and respond to changes in the current environment [48, 49]. A combination of these theories can also help in understanding organizational agility. A combination can be made between the resource-based and knowledge-based views to examine resource-related variables, such as technological innovation, and knowledge-based variables, such as the knowledge management process, on organizational agility. Previous studies used organizational agility as a mediator. Future studies should also examine other variables, such as environmental uncertainty, sustainable performance, and organizational trust, in the context of organizational agility and its link with the knowledge management process and technological innovation.

Although this study is a literature review, decision-makers can benefit from learning how the knowledge management process and technological innovation can affect organizational agility. Having an organized knowledge management process can contribute to organizational agility. Furthermore, the deployment of technologies such as Enterprise Resource Planning (ERP) and Expert Systems (ES) can contribute to the use of innovative technologies, which could then affect the level of organizational agility.

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