Impact of COVID-19 Crisis on Knowledge Management Practices in Sultanate of Oman

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Abstract: This research was conducted with the aim of identifying various changes made to knowledge management (KM) practices implemented by organizations in the Sultanate of Oman following the onset of the COVID-19 crisis. Further, the study focused on identifying the impact of those changes on various aspects of human resources management. Snowball and purposive sampling techniques were used to collect relevant data from 110 line managers in various organizations in the Sultanate of Oman. Data were analyzed using descriptive statistics and Chi-squared and post-*hoc* tests. The Bonferroni correction method was adopted to reduce the risk of Type I error. The findings indicated that organizations started utilizing an inside-out approach to KM after the COVID-19 crisis began, shifted KM process from manual to computer-based and spending from conventional to e-KM activities. Key finding is that the organizations demonstrated an increased dependency on internal knowledge sources. In addition, line managers began measuring the effectiveness of KM practices, a metric which had been mostly neglected in the pre-pandemic period. Perceived benefits of these changes included increased employee motivation and engagement, increased employee learning and job-related skill, along with an enhanced knowledge-sharing culture across the organization. Important measures taken to mitigate the perceived negative impact of these changes, or enhance the perceived positive impact, included consistent persuasive communication with employees and identifying alternate financial resources to support KM activities. This research contributes to the field of KM and projects it as a supportive discipline to effective crisis management. Findings of this research can help in identifying the areas of training and improvements in the KM framework. This research is global and topical in nature as it relates to the e-KM practices during the ongoing global COVID-19 crisis and portrays the changing e-learning scenario in the organizations in Oman, one of the prominent countries in the middle east and represents the middle east regional culture and economy.

Keywords: COVID-19, Crisis, knowledge acquisition, knowledge storing, e-learning, knowledge sharing culture, measurement of effectiveness

1. Introduction

Global crises affect all aspects of life, including the functioning of the corporate sector, and have a significant impact on various individual stakeholders and society at large (Jacob, 2012; OECD, 2020). The ongoing health crisis, COVID-19 has proved itself to be one of the worst global crises humans have ever experienced; in addition, fear of the disease, social distancing measures, travel bans, and widespread global unpredictability have prompted a new recession and impacted the global economy (Ozili and Arun, 2020). The COVID-19 pandemic has affected all sectors of the economy at the macro level, as well as all functional areas of businesses at the micro level. This study is significant as it directly deals with the impact of COVID-19 on one of the business functions, Knowledge Management (KM). The COVID-19 crisis has pressurized the organizations to make changes to their KM practices. In this context, it was decided to carry-out research with the aim of identifying various changes made to the ongoing KM practices and the impact of those changes. The study was conducted from the perspective of line managers working at public and private sector organizations in the Sultanate of Oman, one of the leading economies in the middle eastern part of the world (Evans, 2018) which is spread across 18 countries with more than 410 million population. The paper is structured as follows: a description of the problem, i.e., impact of COVID-19 crisis on KM practices in Oman, detailed literature review to identify the underlying theory and extant literature in the research area, clearly formulated research objectives and methodology, detailed discussion of results and providing implications for practice and research in the area of KM implementation during the ongoing COVID-19 crisis.

2. Background

This review reflects on relevant topics related to the effect of the current COVID-19 crisis on KM practices in the Sultanate of Oman. The review starts with the definition and meaning of a crisis, progresses to the role of KM in

crisis management, and concludes with KM practices in the Sultanate of Oman. This creates a basis for the subsequent research and allows for the identification of specific research objectives.

Etymologically, the word 'crisis' originates from the Ancient Greek '*krísis*' meaning "vitally important or decisive state of things" (Online Etymology Dictionary, n.d.). According to the Oxford Learner's Dictionaries (n.d.), a crisis refers to a time of great danger, doubt, or difficulty during which problems must be solved, or important decisions made. From a business perspective, a crisis is defined by three common elements: unexpected circumstances, a visible threat, and insufficient time for decision-making (Stern, 2003). Organizations may experience various types of crisis (Miller, 2004) such as, natural crises - cyclone Emma, economic or financial crises - sub-prime, technological crises - y2k, and malevolence - WannaCry. In terms of recent events, the ongoing COVID-19 pandemic can be added to the list of crises currently being faced by organizations. The respiratory disease caused by the coronavirus has emerged as one of the greatest health and socioeconomic threats in modern history with devastating consequences, including the loss of an estimated 400 million jobs (Patterson, 2020).

According to Davenport and Prusak (1998), KM includes building an organization-wide repository of job-related information, essentially including all aspects of KM such as policies and practices along with establishing an organization-wide culture of knowledge sharing. Rosário et al., (2021) reviewed the literature from 2009 to 2019 on KM in health management and concluded that KM is highly fragmented and requires development. Mnasri and Papakonstantinidis, (2020) through their case research conducted in Belgium suggested detrivialization as a method to explore existing knowledge and indicated that effective organizational communication can contribute to this strategy. According to Arias-Pérez, Velez-Ocampo, and Cepeda-Cardona (2021), digitalization of knowledge management activities can help improve organizational performance through enhanced innovation capability. KM implementation operates on the premise that individuals who are embodied with knowledge are expected to share their knowledge with fellow employees (Dul, Ceylan and Jaspers, 2011) to ensure a collective improvement in performance (Yakhlef, 2010) and create a competitive advantage for their organization (Hislop, 2013). But it is noteworthy to mention that individual differences do play key role in the effective implementation of KM across the organization. Turyahikayo, Pillay and Muhenda (2021) in their research based on in-depth interviews of the public sector employees, found that Knowledge seekers attitude is one of the major antecedents of knowledge sharing behavior. Similarly, research focusing on the role of individual behavior indicates that confidence in the employees could influence both knowledge transfer in case of knowledge givers and knowledge reception in case of learning employees (Nair, Pillai and Demirbag, 2021). Research by Afshar-Jalili, Cooper-Thomas, and Fatholahian (2021) on counter-productive knowledge behavior indicates that individual differences is one of the antecedents of knowledge behavior of employees at workplace. However, while companies often make an effort to prioritize knowledge sharing as a key activity within their organization (Amayah, 2013), not all employees participate in the process, with some choosing to withhold their knowledge from others (Connelly et al., 2012). Hence, it is also important to address issues such as knowledge hiding when building a knowledge-sharing culture across an organization (Peng, 2013). Our literature review focusing on individual differences is important as this paper focuses on employees as individual knowledge seekers during the current pandemic.

2.1 Relationship between KM and crisis management

Literature on relationship between KM and crisis management indicates that effective implementation of KM helps during crises. Rosário et al., (2021) opined that in the current pandemic crisis, effective implementation of KM facilitates the utilization of healthcare information and supports management decision making in hospitals. According to Marie and Horváthová (2019), every crisis could be an effective source of knowledge. Wang and Belardo (2009) concluded that there were significant relationships between KM strategies and crisis characteristics. AhmadYousefi et al. (2020) reported a positive relationship between KM components and crisis management programs in their recent research on drought crisis management. Shaw et al. (2007) studied the importance of building a KM strategy during times of crisis in the United Kingdom and found that managers used knowledge to combat crisis and concluded that identifying deficiencies in the attitudes of people towards KM processes enabled managers to effectively overcome the negative effects of a crisis. Abuzyead and Sherif (2017) indicated that while managers focus more on knowledge acquisition, storage and transfer, implementation would contribute more effectively during crisis. They emphasized that organizations should create a room for implementation of the knowledge learnt. Back in 2017, Alkandari, Masa'deh and AL-Lozi conducted literature review to understand the relationship between KM and crisis and concluded that KM has a key role to play and is a key variable in organizational crisis management strategy. According to them, usually crisis management

focuses on managing financial resources whereas using knowledge to find solutions to organizational crisis can be helpful. Koraeus and Stern in 2013 and Hosseini et al. in 2014 conducted studies to understand the role of KM in dealing with natural crises and found that KM enables instant learning and helps not only in solving the ongoing crisis but also it prepares the organization for next crisis. This is important because, the damage range can be reduced with the help of knowledge and can support informed decisions. According to Cania and Korsita (2015), who researched about the economic crisis that began in 2008, KM plays an important role to successfully cope with crisis situations and can emerge as an effective tool during difficult times. More recently, Marcão, Pestana and Sousa (2020) conducted research on the impact of current pandemic, COVID-19 in pharma sector and proved that Gamification can contribute to employee engagement in KM activities particularly during the pandemic times.

Thus, the available literature on relationship between KM and crisis, explains the role KM can play in effective crisis management but not about the impact of crisis on KM activities of the organizations. This led us to formulate the research question i.e., what is the impact of the current crisis, COVID-19 on the KM activities of the companies in Oman.

2.2 KM practices in Oman

In recent years, organizations in the Sultanate of Oman have recognized the importance of implementing KM strategies, especially with the recent knowledge revolution and the rapid flow of knowledge in all sectors (Supreme Council for Planning, 2019). The Government of Oman has begun to promote web platforms like Knowledge Oman to contribute to the goal of transforming the country into a knowledge-driven society (Knowledge Oman, n.d.). According to research conducted by Al-Busaidi et al. (2010) in the petroleum sector, "motivated employees gain significant benefits from sharing their knowledge to a repository knowledge-management system". Further, Shamsudin et al. (2016) found that knowledge-collecting behavior was perceived to hold several advantages over knowledge-donating behavior among Omani employees, including increased perceptions of job security, employability, and promotional opportunities. In 2019, the leading oil and gas exploration and production company Petroleum Development Oman (PDO) organized a stakeholder's event titled 'Knowledge Management: Towards a Knowledge-based Economy', aimed at not only raising awareness about KM practices in the country, but also to support Oman's 2040 vision of a knowledge-based economy (Knowledge management key, 2019). According to Al-Toubi and Malik (2018), PDO is a pioneer of KM implementation in the country and uses both KM governance and resources to achieve business goals by successfully implementing various KM practices, such as learned lessons, staff on-boarding (including skills profiling), and best practices sharing sessions. This indicates that various KM practices are currently being implemented in Oman, benefiting both employees and other stakeholders.

In general, KM practices in the Sultanate of Oman differ from one organization to another, as each organization follows different KM application processes and models according to its strategic attitudes. Some organizations consider KM to be an integral component of HRM, while others allocate a special section or department for KM. These disparate approaches in the implementation of KM are closely related to the thinking and policies employed by those in senior management positions, in addition to the size of the organization itself and the scope of its activities. At the same time, all organizations in Oman subscribe to a perceived need for complementarity and interdependence between KM and HRM actions. Thus, even after reasonable implementation of KM practices, there nevertheless remains a dearth of research related to KM in the Sultanate of Oman (Al-Busaidi et al., 2010).

3.   Research objectives and methodology

The current research is aimed at identifying answers for some of the key research questions related to KM implementation in organizations. It is the need of the hour to find out whether the ongoing COVID-19 crisis has affected the KM practices of organizations in Oman. If yes, what changes did the organizations make to their KM practices after the COVID-19 crisis began? How are those changes implemented: whether stopped totally or reduced or increased or being done differently? Did the changes affect the main purposes of KM: learning and development, knowledge sharing, skill development, improved performance due to learning, etc.? Did the impact vary with sector, size and department of the organization? What is being done to mitigate the perceived negative effect of the changes? Thus, based on these research questions, the key objectives of this research were formulated as, identifying the changes made to KM practices by organizations in the Sultanate of Oman after the onset of the ongoing COVID-19 crisis, evaluating the perspective of line managers with regard to the

impact of those changes on various aspects of HRM, and identifying measures taken to enhance the positive effects and mitigate the negative effects of these changes.

This descriptive research was conducted to study the impact of the current COVID-19 crisis on KM practices in the Sultanate of Oman which is a representative of middle eastern as well as the global economy. Domestic organizations such as Zubair Corporation and Bank Muscat are global firms with businesses spread across the world. Also, the manpower of Oman is majorly based on expatriate population drawn from different parts of the world, thus giving a global perspective to this study. The sample comprised line managers in various public and private sector organizations in the Sultanate of Oman. Snowball sampling and purposive sampling techniques were used as non-probability methods of recruiting participants (Taherdoost, 2016). Two sampling techniques were used to select the sample from the population. Firstly, the snowball sampling technique was used as it was difficult to identify employees from the managerial cadre. The questionnaire link was circulated among those in the managerial positions who are known to the researchers. Further, they were requested to forward and circulate the questionnaire link to those whom they are aware of. It is assumed that people have their own networking with those in their professions, level of jobs and area of functioning. Secondly, the purposive sampling technique was used to ensure that the respondents held reasonable information and knowledge of various KM practices in their respective organizations (Saunders, Lewis and Thornhill, 2007).

A link to a self-administered questionnaire was sent to more than 300 respondents through email and via WhatsApp messages. Overall, 114 responses were received, of which 110 valid responses were used in the analysis. The data was analyzed using SPSS software (version 17.0). Descriptive statistics, multiple-response set analysis, and Chi-squared analysis were employed to study changes made to KM practices following the onset of the current COVID-19 crisis (Chisnall, 2004; Saunders, Lewis and Thornhill, 2007). These analyses were helpful in analyzing the empirical data. But the important aspect is interpretation of data which cannot be made based on only the initial analyses. Hence, post-*hoc* tests were conducted to strengthen the interpretation of the findings. A post-*hoc* analysis was conducted using Cramer's V value to evaluate the strength of associations between the respondents' demographic characteristics and their responses (Cramer, 1946; Cohen, 1988; Kim, 2017; Saunders, Lewis and Thornhill, 2007). A contingency table analysis enabled evaluation of the differences between categories (Argyrous, 1997) and the Bonferroni correction method was utilized to avoid Type I error (García-Pérez and Núñez-Antón, 2003).

3.1 Questionnaire design

The questionnaire used in the current research was divided into two parts to determine the demographic characteristics of the sample and their responses to problem-related questions, respectively. Demographic questions in Part A included the type of organization (i.e. public or private) at which the respondent was employed, the size of their organization in terms of number of employees (i.e. small, medium, or large), and their specific department (i.e. Production, HR, Finance, Marketing, etc.). Problem-related questions in Part B were designed to: (a) seek information related to changes to KM practices after the current COVID-19 crisis began; (b) determine the perceived impact of those changes on various aspects of HRM; and (c) seek information related to measures adopted to enhance the positive impact or mitigate the negative impact of those changes. Questions in the latter section of the questionnaire were presented in the form of 10 statements covering various key aspects of KM, including knowledge identification and acquisition, knowledge storing and sharing, measurement of the effect of KM activities, spending on KM activities, and other aspects. Respondents were required to identify the type of change made to the given practice in their respective organizations (i.e. no change, totally stopped, reduced, slightly increased, and drastically increased). Aspects related to HRM included employee motivation, engagement, learning, job-related skills, performance, and knowledge-sharing culture in the organization. The respondents were required to identify the perceived impact of changes to these HRM aspects (i.e. no impact, somewhat negative impact, high negative impact, somewhat positive impact, and high positive impact). The final question in the questionnaire was designed to identify measures taken to enhance the positive impact or mitigate the negative impact of changes made to KM practices with regards to these aspects of HRM.

3.2 Reliability and validity of the questionnaire

The questionnaire was translated into the local language of Arabic in order to ensure understanding of the questions by the respondents and receive accurate responses, thereby enhancing the reliability of the collected data. The reliability of the instrument was found to be satisfactory at a Cronbach's alpha value of 0.719 (Cronbach, 1951).

4. Results and discussion

4.1 Demographic characteristics of the sample

The demographic characteristics of the sample are presented in Table 1. Overall, 35.5% of the respondents were from public sector organizations, while the remaining 64.5% were employed in private sector organizations. This finding is indicative of national statistics as, according to the 2020 e-census, 63% of all employees in Oman work in private sector (Al Hattali, 2020). The size of the organization was determined based on the number of people employed in that organization, as per Gartner's classification of organization size (Gartner glossary, n.d.) and the classifications of the Public Authority for the Development of Small and Medium Enterprises, Riyada, Oman (New SME classification, 2016). The majority of respondents worked in medium-sized organizations with between 101 and 999 employees. Although the respondents represented various diverse backgrounds—viz. Marketing and Customer Service, Production and Quality Control, Finance and Accounting, and Health, Safety and Environment (HSE) Management—the majority (~35%) were employed in HR department.

Table 1: Demographic characteristics of sample (N=110)

Demographic variable		Number	Percentage
Type of organization	Public	39	35.5
	Private	71	64.5
Number of employees	Less than 100 employees	20	18.2
	101 to 999 employees	66	60.0
	1000 employees and more	24	21.8
Department of the respondent	Production / Quality	20	18.2
	HR / Administration	37	33.6
	Finance / Accounting	21	19.1
	Marketing / Customer service	19	17.3
	Others - HSE, etc.	13	11.8

4.2 Changes to knowledge management practices after COVID-19

It is well-known that the current COVID-19 pandemic has impacted all spheres of life, including the business environment. As a result, organizations across the world have had to make changes to several functions, such as reducing production, adopting contact-less activities, and changing their financial plans. In this research, we aimed to identify the changes made to KM practices by organizations in Oman after the COVID-19 crisis began.

Respondents indicated the level of change made to each KM practice—including knowledge identification and acquisition, knowledge storing, knowledge sharing, measurement of the effectiveness of KM activities, and spending on KM activities—at their respective organizations. The respondents indicated the degree of change made to each KM practice as either no change, totally stopped, reduced, slightly increased, or drastically increased.

Table 2: Changes made to KM practices after the onset of COVID-19 crisis

KM component	Practice	Level of change made (% of responses)				
		No change	Totally stopped	Reduced	Slightly increased	Drastically increased
Knowledge identification & acquisition	From external sources	23.6	---	64.5	7.3	4.5
	From internal sources	20.9	---	3.6	29.1	46.4
Knowledge storing methods	Using paper-based processes	30.9	---	69.1	---	---
	Using computer-based processes	19.1	---	0.9	21.8	58.2
Knowledge sharing sessions	External resources	29.1	---	57.3	7.3	6.4
	Internal resources	27.3	---	2.7	27.3	42.7
Spending	On conventional KM activities	19.1	---	80.9	---	---
	On e-KM activities	30.0	---	17.3	22.7	30.0

KM component	Practice	Level of change made (% of responses)				
		No change	Totally stopped	Reduced	Slightly increased	Drastically increased
Other KM aspects	Measurement of effectiveness	25.5	---	---	25.5	49.1
	Overall use of IT	29.1	---	---	30.0	40.9

Two important findings can be noticed from the analysis presented in Table 2. Firstly, many organizations in the Sultanate of Oman persevered with KM practices (i.e. did not completely stop) after the onset of the COVID-19 crisis. Secondly, approximately 20–30% of organizations did not make any changes to KM practices, thereby maintaining the status quo. Therefore, it appears that the current COVID-19 pandemic has not disrupted or ceased the KM activities of these organizations. These findings are consistent with those reported by Wenzel, Stanske and Lieberman (2020) during their research into strategic responses to crisis with specific reference to the COVID-19 pandemic, wherein it was found that perseverance or status quo responses were being adopted by some companies as a medium-term strategy. It was found in the current research that majority of the organizations have increased the usage of digital processes in KM. This finding conforms with the related literature which clearly states that business models and KM practices are shifting from manual to electronic processes (Seetharaman, 2020; Priyono, Moin and Putri, 2020; Arias-Pérez, Velez-Ocampo, and Cepeda-Cardona, 2021).

4.2.1   Knowledge identification and acquisition

Following the onset of COVID-19, organizations in the Sultanate of Oman changed from an outside-in to an inside-out approach with reference to the identification and acquisition of knowledge. Around 65% of respondents indicated that their organization had reduced practices related to identifying and acquiring knowledge from external sources (Table 2). This finding also matches results from Wenzel, Stanske and Lieberman (2020), who similarly found that companies retrench or reduce certain activities during crises. However, such an approach does not necessarily affect the innovativeness of an organization as Doloreux (2015) concluded that firms do not lose innovative ability if they do not seek knowledge from external sources. It seems that many managers began to realize the utility of their manpower after the pandemic began and started searching for knowledge within existing internal sources. Indeed, 75.5% of respondents indicated that their organizations began searching for knowledge internally. Thus, these data indicate a trend towards an inside-out approach to knowledge identification and acquisition after the COVID-19 crisis began.

As presented in Table 3, the Chi-squared analysis revealed that the size of the organization was significantly associated with knowledge identification and acquisition practices (χ^2(6, N = 110) = 17.263; p <0.01). A Cramer's V value of 0.280 greater than the standard 0.22 indicated a strong, statistically significant association between the variables (Cramér, 1946). Although the contingency table analysis revealed that medium and large organizations reduced such practices after the COVID-19 crisis began, the z-test post-*hoc* analysis with Bonferroni correction revealed that the difference was significant only for medium-sized organizations (p <0.05). Thus, it can be concluded that small and large organizations are still dependent upon external sources for their knowledge identification and acquisition practices. This finding matches with the studies of Marie and Horváthová (2019) who surveyed managers and owners of small businesses in Czech Republic and found that small organizations are benefitting from tapping the knowledge from internal as well external sources.

Furthermore, a strong, statistically significant association was observed between knowledge identification and acquisition practices and the respondents' department within the organization (χ^2(12, N = 110) = 22.791; p <0.01; Cramer's V = 0.263) (Table 3). Based on this initial analysis as well as the contingency table analysis, it was found that Finance, Marketing and HSE departments have increased such practices compared to Production and HR departments in the surveyed organizations. However, the z-test post-*hoc* analysis with Bonferroni correction revealed that this difference was not significant (p <0.05). Thus, it can be interpreted that increases in knowledge identification and acquisition from internal sources occurred across entire organizations, irrespective of department. This finding contradicts with Falkenberg, Woiceshyn and Karagianis (2003) who found that organizations are shifting from internal to external sources of information and the costs of knowledge transactions have increased. But now, during the current pandemic crisis, the organizations are forced to cut costs and that could be a reason for shifting back to the internal sources.

4.2.2   Knowledge storing methods

Nearly 70% of respondents indicated that their organizations had reduced usage of manual knowledge storing processes, such as paper files and manually filled forms (Table 2). In turn, 80% of respondents indicated that their organizations had increased computer-based knowledge storing processes after the COVID-19 pandemic began in order to avoid human contact and adhere to social distancing guidelines. This finding conforms with conclusions drawn by Seetharaman (2020) regarding the business model shift from physical to digital processes after the onset of the COVID-19 pandemic. Changes to knowledge storing practices were not associated with the type of organization, size of the organization, or the department of the respondents. Thus, it can be interpreted that this change is pervasive across all sectors of businesses. This finding is consistent with those reported in a case study analysis by Priyono, Moin and Putri (2020) in which companies were observed to convert their ongoing physical business functions to digital platforms, with this digitalization occurring across all types of business and across all departments within an organization.

4.2.3   Knowledge sharing sessions

Overall, 70% of respondents reported that their organizations had increased the number of knowledge sharing sessions with the help of internal resources (Table 2). This indicates that trainers and speakers for these knowledge sharing sessions were employees of the organization. This is a major change compared to previous practices of inviting external speakers, along with nominating and sponsoring employees for external training programs. This finding corresponds to Amayah's (2013) research indicating that companies prioritize knowledge sharing as a key activity in their organization. Similarly, Dul, Ceylan and Jaspers (2011) opined that employees who are embodied with job-related skills and knowledge are expected to share it with their colleagues. There was a strong, statistically significant association between 'reduction in dependency on external resources for knowledge sharing sessions' and the size of the organization (χ^2(6, N = 110) = 21.629; p <0.01; Cramer's V = 0.314) (Table 3). The Chi-squared analysis, contingency table analysis, and subsequent post-*hoc* tests with Bonferroni correction indicated that medium-sized organizations have implemented this change more than small and large organizations (p <0.05). Thus, it can be interpreted that small and large organizations are still dependent on external sources for knowledge sharing sessions and training programs. This finding contradicts with the findings of Capello (1999) who indicated that knowledge generation and sharing in large organizations happens internally. But is consistent with the opinion of Svetina and Prodan (2008) that small organizations can be benefited by relying on the external sources of knowledge.

4.2.4   Spending on knowledge management activities

The majority of the respondents (81%) indicated that their respective organizations had reduced spending on conventional KM activities, such as remuneration to speakers, expenses related to facilities for KM sessions, and other organizing expenses such as printing and stationery. This is very likely due to a reduced dependency on external speakers and resources, along with the reduced need for physical resources, as well as the ubiquitous nature of the Internet allowing for digitization of KM activities. In turn, respondents indicated that their organizations had increased spending on digital KM activities, such as purchasing KM software and registering for online KM platforms. Changes with regards to spending on KM activities were not associated with any of the demographic variables of the respondents. This is likely because most organizations have shifted from conventional to e-KM practices regardless of sector or department, due to which their spending on former has decreased while the latter has increased. This finding is consistent with observations reported by Wang and Wu (2020) who found that COVID-19 has forced organizations in the health sector to adopt information technology (IT)-enabled KM practices. While the researchers did not focus on the costs involved with this change, it can be inferred that shifting from physical to IT processes involves increased spending on IT-related or digital activities.

4.2.5   Measurement of effectiveness of knowledge management practices

Three-quarters of respondents (75%) reported that their organizations had only begun to measure the effectiveness of KM sessions and activities after the COVID-19 pandemic had begun. In contrast, only a quarter of respondents indicated that their organizations had already started measuring the effectiveness of their KM activities prior to the current pandemic. As presented in Table 3, changes to the implementation of measurement metrics to evaluate the effectiveness of KM activities was associated with type of organization, although the effect size of this association was medium (Cramer's V=0.303; p <0.05). In particular, public sector organizations drastically increased measurement of the effectiveness of KM processes after the COVID-19 crisis began (χ^2(2, N = 110) = 10.12; p <0.01). The z-test post-*hoc* analysis with Bonferroni correction confirmed this difference to be significant (p <0.05).

Table 3: Association between changes made to KM practices and demographic variables - χ2 independent test

Change	Associated with	*p*-value	Effect size (Cramer's V)	Contingency table analysis	Bonferroni correction
Reduction in identification and acquisition of knowledge from external sources	Size of organization – small, medium & large	0.008 Significant	0.280 Strong	Medium and large organizations	Significant for only medium organizations
Increase in identification and acquisition of knowledge from internal sources	Department of the respondent – Fin, Mktg, Production, HR, HSE	0.030 Significant	0.263 Strong	Finance, Marketing and HSE departments	Not significant for any department
Reduction in number of knowledge sharing sessions from external sources	Size of organization – small, medium & large	0.001 Significant	0.314 Strong	Medium organizations	Significant
Increase in the measurement of effectiveness of KM practices	Type of the organization – public & private	0.006 Significant	0.303 Medium	Public sector	Significant

4.3 Perceived impact of changes to knowledge management practices

This analysis presents findings related to the perception of the respondents with regards to the impact of aforementioned changes to KM practices on various aspects that are relevant for HRM. For this purpose, we have selected few aspects that are key and relevant for HRM which included, employee motivation, employee engagement, employee learning, job-related skills, employee performance, and the knowledge-sharing culture in the organization. This is important because according to Wang (2009), KM, as an integral part of HRM, plays a pivotal role when implementing crisis management strategies. The respondents indicated the perceived effect of KM changes on each of these aspects as either having no impact, somewhat negative impact, high negative impact, somewhat positive impact, or a high positive impact (Table 4).

Table 4: Perceived impact of changes to KM practices on various aspects of HRM (% of responses)

	No impact	Somewhat -ve impact	Highly -ve impact	Somewhat +ve impact	Highly +ve impact
Employee motivation	20.9	---	---	23.6	55.5
Employee engagement	11.8	---	---	33.6	54.5
Employee learning	11.8	---	---	40.9	47.3
Job related skill and knowledge	11.8	---	---	37.3	50.9
Employee performance	10.0	---	---	41.8	48.2
Knowledge sharing culture in the organization	10.9	---	---	37.3	51.8

At the outset, it can be noted that the respondents did not perceive the KM changes to have any negative impact. This finding corresponds with those reported in a review of related literature by Beheshtifar (2013) wherein employees were found to exhibit organizational optimism. Furthermore, the majority of respondents (88.1%) indicated that post-COVID-19 changes made to KM practices positively impacted employee engagement. This is consistent with the findings of Juan et al. (2018) who found that knowledge sharing positively affects employee engagement. In addition, 79.1% of respondents indicated that KM changes had a positive impact on employee motivation; thus, it can be concluded that knowledge itself can be a motivator. Similarly, a case study analysis conducted by Åmo (2006) in Norway indicated that employees can be motivated to be more innovative by increasing their knowledge base.

According to the line managers, changes made to KM practices were perceived to positively impact employee learning (88.2%), job-related skills (88.2%), employee performance (90%), and the knowledge-sharing culture of the organization (89.1%). Yakhlef (2010) also noted that knowledge sharing resulted in a collective improvement of employee performance. Another recent study by Ahmed et al. (2020) with reference to employee motivation and knowledge management during COVID-19 also reported similar results. According to these researchers, an

organization-wide knowledge-sharing culture has a positive impact on organizational performance. Chi-squared and subsequent contingency table analyses revealed that public sector organizations more frequently reported KM changes to have an impact on job-related skills (χ^2(2, N = 110) = 6.69; p <0.05; Cramer's V = 0.247). However, the z-test post-*hoc* analysis with Bonferroni correction revealed that this difference was not statistically significant (p >0.05). Thus, it can be interpreted that the perceived impact of changes made to KM practices was equal across all departments and organizations, regardless of type of the organization or sector of the organization.

4.4 Measures taken to mitigate the negative effect and/or enhance the positive effect of changes to knowledge management practices

This analysis is aimed to identify measures taken by organizations to mitigate the perceived negative effects and/or enhance the positive effects of changes made to KM practices following onset of the current COVID-19 crisis. A total of 108 valid responses to this question were received and used in the analysis.

Table 5: Measures taken to mitigate -ve effect/enhance +ve effect (multiple response set analysis, N=108)

Measures taken	N	% of overall responses	% of respondents
Persuade employees consistently through communication	55	27.4%	50.9%
Find alternative financial resources to support knowledge management activities	43	21.4%	39.8%
Making partnership with other organization/institution to cover the needs	41	20.4%	38.0%
Reduce some of the knowledge management activities rather than complete stop or removal	30	14.9%	27.8%
No measures taken	24	11.9%	22.2%
Motivate employees through rewards and incentives	8	4.0%	7.4%
Total	201	100.0%	186.1%

Data are presented in Table 5 arranged in descending order. In total, 55 respondents (50.9%) indicated that their organization had attempted to persuade employees consistently through communication to cope with KM changes. This finding agrees with the findings of Shaw et al. (2007) who found that companies in the UK utilized improved internal communication to attempt to persuade employees during a crisis. This is important because not all employees may be willing to share their knowledge (Connelly et al., 2012), known as knowledge hiding behavior (Peng, 2013). Hence, it can be interpreted that companies in the Sultanate of Oman have been implementing measures of crisis communication and change management techniques to encourage acceptance of KM changes.

The second most frequently reported measure by respondents (39.8%) was to identify alternative financial resources for KM sessions, such as sponsors. Al-Toubi and Malik (2018) reported that large organizations in Oman provide resources as part of their overall KM governance. In addition, in order to mitigate the negative impact of KM changes, 38% of respondents reported that their companies had begun exploring partnership options with external parties, such as training institutions and benchmarked organizations. Moreover, nearly 30% of respondents indicated that their organizations had reduced KM activities rather than halting such activities entirely. However, the majority of the respondents (~93%) reported that their organizations did not provide incentives to encourage a knowledge-sharing culture. But this point needs to be seriously noted as Jackson et al. (2012) reported that lack of reward is a major barrier to the growth of KM practices. One key finding of the current analysis was that approximately one-fifth of respondents reported that their organizations had not taken any measures to mitigate the negative effects and/or enhance the positive effects of changes made to KM practices after the COVID-19 crisis began. This is alarming as such measures represent an important aspect of both change management and crisis management processes within an organization.

Further, the crosstabulation analysis revealed that the most common measure, i.e., to persuade employees consistently through communication, was most frequently adopted by small and medium organizations, in private sector and by HR and Marketing departments. However, as per the Chi-squared analysis, these measures together did not vary according to the sector or organization size or department of the respondents.

Thus, it can be interpreted that managers in all departments and all types and sectors of organizations have made similar changes.

5.   Conclusion and recommendations

This research was conducted to examine changes made to KM practices by organizations in the Sultanate of Oman following the onset of the COVID-19 crisis. This study is conducted from the perspective of line managers only and included the measures taken to enhance the perceived positive effects and mitigate the perceived negative effects of these changes. Moreover, the study was restricted to organizations in the Governorate of Muscat. As the snowball sampling technique was used, it cannot be assured that the sample completing the questionnaire was representative of the entire population group.

The current research helped in finding the answers for research questions raised in formulating the research problem. The ongoing COVID-19 crisis has impacted various functional areas of businesses including the KM function. Organizations in Oman have made changes to their regular KM practices after the crisis began. The changes can be noticed from the point-of-view of KM framework including, knowledge identification and acquisition, knowledge storing and sharing, along with spending on KM activities and measuring the effectiveness of KM implementation. It is in fact interesting to know that some of the organizations have not made any changes and continued their ongoing KM practices even in case of COVID-19 crisis that has hit their bottom line. This is consistent with the conclusion made by Wenzel, Stanske and Lieberman (2020). Organizations have indeed changed the way their KM activities are being performed. While large organizations started depending more on the internal resources, small and medium firms' knowledge needs are being fulfilled through external sources (Marie and Horváthová, 2019). Spending on KM activities is being significantly reduced due to the dependency on e-knowledge sources and digital processes (Seetharaman, 2020; Priyono, Moin and Putri, 2020; Arias-Pérez, Velez-Ocampo, and Cepeda-Cardona, 2021). Important change made to KM practices is that the managers now started measuring the effectiveness of the KM implementation that was mainly missing the pre-COVID-19 period. The perceived impact of those changes has been notably positive on organizational behavior. For example, the changes made to KM practices have resulted in increased employee engagement in the KM activities, enhanced employee learning of job-related skill, and has increased the knowledge sharing culture in the organizations. Line managers have undertaken several measures to mitigate the perceived negative effect or enhance the positive effect of the changes including, persuasive communication (Ahmed et al., 2020; Shaw et al., 2007) and finding alternative financial resources to support the KM activities (Al-Toubi and Malik, 2018).

As KM practices can help to combat crises, it is recommended that such practices be made an important part of all functional areas of business. KM is an effective component of crisis management not only in preventing and reducing negative consequences, but also in enhancing the ability of both the organization and its employees to cope positively. KM can accelerate the process of managing change in an organization, enhancing the skills of its employees, and contributing to its rapid growth. Organizations, whether private or public, must fulfill their knowledge needs through internal sources, especially during the current crisis since it is not clear when the pandemic will end. As small organizations are still dependent on external sources of knowledge, it is recommended that they either develop their own internal knowledge resources or search for cost-effective external sources in order to reduce expenses related to KM practices. Effective use of computer-based KM activities would also yield better results, such as the use of tailored software. In addition, the number of digital knowledge sharing sessions can be increased, as there are no restrictions on the physical presence of employees due to the availability of the Internet and local intranet networks. Recorded virtual sessions also allow learners not only to refer back to learning resources whenever needed, but also to acquire knowledge at their own pace. As knowledge itself is a motivator, managers can use KM practices as an opportunity to motivate their employees, thereby enabling managers to leverage knowledge sharing as a non-monetary motivation technique. In turn, a reduction in KM practices or ceasing such activities completely negatively affects employee motivation. Additionally, the continuation of KM practices enhances organizational knowledge-sharing culture during a crisis.

5.1   Implications for research

Changes made to KM practices have a positive impact on employee engagement, job-related skills, and overall organizational performance. This research implies identifying effective ways of measuring the impact of KM practices so as to inform the design and implementation of specific programs to suit the needs of the

organization. It implies the observation and investigation of crisis management and change management principles in the effective implementation of KM changes. For instance, while cost reduction with regards to KM sessions contributes to crisis management, persuading employees to participate in the KM process contributes to change management.

5.2 Implications for practice

The findings of this research can help in identifying the areas of training for line managers in areas related to measurement of effectiveness of KM practices across the world in general and across the middle east region in particular, as this research was conducted in Sultanate of Oman, one of the dynamic and diversifying economies in the region. The current research analysis shows that organizations in the Sultanate of Oman have made various changes to their KM practices in response to the ongoing COVID-19 crisis, with such changes having a perceived positive impact on employee learning, job-related skills, and the overall knowledge-sharing culture of the organization. The research also revealed that the organizations have taken certain measures to mitigate the perceived negative impact or enhance the positive impact of these changes, including consistent persuasive communication with employees and identifying alternate financial resources to support KM activities.

5.3 Future scope of study

It was found in this research that small and large organizations in the Sultanate of Oman are still dependent upon external resources for knowledge identification and acquisition. This could be attributed to a lack of appropriate knowledge resources within the organization in the case of small organizations, or due to the increasing accessibility of affordable external knowledge resources via the Internet in large and small organizations alike. This proposition could be tested in future studies.

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