ISSN 2228-9860 eISSN 1906-9642 CODEN: ITJEA8

International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies

http://TuEngr.com

Tackling the Pandemic: A Knowledge Management Perspective

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Paper ID: 13A5D

Volume 13 Issue 5

Received 03 January 2022
Received in revised form 01 April 2022
Accepted 07 April 2022
Available online 19 April 2022

Keywords:
Coronavirus; COVID-19; Knowledge sharing; Knowledge creation; Knowledge acquisition; Crisis management.

Abstract

The current coronavirus pandemic represents a huge challenge for nations and organizations around the world. The present paper discusses how knowledge management could be applied to guide organizations during such a traumatic event. Specifically, building upon Mitroff's model of crisis management, the paper asserts that the acquisition, creation, sharing, utilization, and storing of knowledge are essential for organizations as they deal with the pandemic. The paper suggests some required organizational, team, and individual requirements that, when appropriately available, should help organizations in their knowledge management efforts.

Disciplinary: Management, Knowledge Management, Crisis Management, Technology and Innovation

Cite This Article:

Fallatah, M. I., (2022). Tackling The Pandemic: A Knowledge Management Perspective. *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies, 13*(5), 13A5D, 1-10. http://TUENGR.COM/V13/13A5D.pdf DOI: 10.14456/ITJEMAST.2022.88

1 Introduction

The coronavirus pandemic (Covid-19) and its subsequent variants represent a once-in-a-lifetime crisis that organizations of all kinds need to overcome. It has unfolded with an extreme speed and is characterized by a high level of uncertainty that increases the already-huge challenges usually associated with crises (Baker et al, 2020). In the business world, many organizations of all sizes have been struggling. Some have been closed, and others have been forced to mass layoffs (Alfaro et al, 2020; Bartik et al, 2020). To survive, leaders around the world must have the self-awareness to react quickly and have a solid system in their organizations to cope with such traumatic events (Carmeli & Schauboerck, 2008; Dwivedi, 2020; Garcia, 2006; He et al., 2021).

In the current paper, knowing the importance of knowledge as a source of competitive advantage and the role of organizations to integrate specialized knowledge (Grant, 1996), I discuss

the role of knowledge management in managing traumatic crises. Knowledge management, defined as the organizational process of acquiring, creating, sharing, and storing knowledge (Alavi & Leidner, 2001; Darroch, 2003), has been growing rapidly as a field of study (Serenko & Dumay, 2017). Specifically, its impact on managing crises has been much discussed in the literature (e.g. Wang & Belardo, 2005).

The Mitroff crisis management model is used to illustrate the phases that organizations go through in crises (Mitroff, 1994). The role of several knowledge management activities in managing crises is explained in the extant paper to act as a guideline for organizations.

2 Literature Review

2.1 Crisis Management in Organizations

An organizational crisis is defined as a low-probability, high-impact event that threatens the viability of an organization, which suggests a swift decision (Pearson & Clair, 1998). According to the literature, two conditions surround crises (Pauchant & Mitroff, 1992). First, they disturb the entire system, and the manager's assumptions are challenged. Second, they cause a serious threat to the survival of the organization. The coronavirus pandemic is, indeed, a crisis that threatens organizations and requires quick decisions. Therefore, managing such a crisis effectively is essential for organizations to survive (Mitroff et al., 1987). Pearson and Clair (1998) define crisis management as "*a systematic attempt by organizational members with external stakeholders to avert crises or to effectively manage those that do occur.*" It is impossible to prevent all crises, but organizations can build a systematic way to manage them effectively (Mitroff et al, 1987).

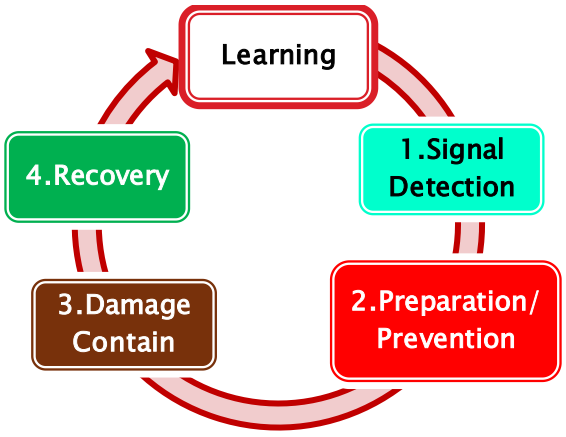

Figure 1: Mitroff's Five Phases of Crisis Management

The literature suggests that crisis management goes through five phases: signal detection, preparation and prevention, damage containment, recovery, and learning (Mitroff, 1994; Pearson & Mitroff, 1993). Figure 1 depicts the five phases of crisis management.

As explained in the literature *(*Mitroff, 1994; Pearson & Mitroff, 1993), the *Signal detection* phase focuses on how organizations can monitor and assess early warning signs to prepare and prevent crises before they occur. The second phase, *Preparation and Prevention*, involves managers actively looking for risk factors and taking necessary measures to reduce any potential damages to

the organization. Next, in the third phase, *Damage Containment* is a phase after the crisis already has occurred. It involves making sure the crisis is contained and as many areas of the organization are safe. The fourth phase is *Recovery*, which emphasizes returning to normal operations as soon as possible. Lastly, after recovering from the crisis, *Learning* is the final phase, where the crisis should be reviewed and analyzed so the organization can improve its crisis management skills for future events.

During crises, organizations need to act quickly to mitigate the damages. Making timely decisions requires having the right knowledge at the right place and time. Hence, knowledge management is key in crisis management.

2.2 Knowledge Management in Organizations

The knowledge-based theory of the firm asserts that knowledge is one of the most valuable resources and that firms are repositories of knowledge that needs to be integrated (Kogut & Zander, 1996; Grant, 1996). Knowledge could be acquired from the environment or created by the organization internally.

The literature informs us that knowledge resides within individuals (Polanyi, 1962; 1966), and that creation of new knowledge comes about through interactions among individuals (Fleming, 2001; Nonaka, 1994; Nelson & Winter, 1982; Polanyi, 1966; Rosenkopf & Nerkar, 2001; Schumpeter, 1934). Such interactions lead to the exchange of diverse information that each individual holds (McFadyen & Cannella, 2004; Nahapiet & Ghoshal, 1998; Zack et al., 2009). At the firm level, knowledge-based theories assert that the main role of firms when it comes to knowledge management is to combine, coordinate, and integrate individual knowledge to form a cumulative firm knowledge (Grant, 1996; Nelson & Winter, 1982, Kogut & Zander, 1996; Roos et al., 1997). That being said, firms are not equal in their abilities to manage knowledge, and the literature suggests that some critical resources are behind such differences. Those resources are related to the three dimensions of knowledge: human, relational, and structural (firm) knowledge (Bontis et al., 2000; Edvinsson & Malone, 1997; Sveiby, 1997)

First, as stated earlier, knowledge resides within individuals (Polanyi, 1962; 1966). It follows that *human capital*, defined as the stock of knowledge that individuals within the firm possess, is paramount for organizations (Bontis et al, 2000; DeCarolis & Deeds, 1999; Smith, Collins, & Clark, 2005). It is based on the quantity and quality of individual knowledge that firms are able to find basic knowledge to combine or integrate in order to have an overall firm knowledge. Hence, firm knowledge is influenced, at least partially, by the stock of knowledge of their employees.

Second, the relationships that employees have among each other within the firm also represent an integral resource for organizational knowledge. While the *relational capital* in the knowledge management literature focuses, for the most part, on the knowledge that organizations receive from external stakeholders (Roos et al, 1997), employees could gain knowledge from each other, whether from other employees from the same functional unit or other units within the organization. In the network literature, such relationships are depicted as ego networks, defined as

the set of alters to which each employee is directly tied (Nahapiet & Ghoshal, 1998). Networks are critical for knowledge acquisition, sharing, and creation because they represent a key element for knowledge exchange (Bouty, 2000; McFadyen et al., 2009; Nahapiet & Ghoshal, 1998; Wang, 2016). Specifically, networks facilitate the process of knowledge flow among employees and provide a mechanism through which employees can share their distinctive knowledge. Accordingly, firms in which employees are well-connected and have effective relationships to exchange information tend to be more likely to acquire, share, and create knowledge.

Third, *structural capital* refers to organizational knowledge that is embedded in its routines, processes, and systems (Bontis et al, 2000; Roos et al, 1997). Hence, it is an essential capital that enables firms to manage knowledge. Firm routines are integral not only in facilitating knowledge flow among individuals but also in storing and organizing the employees' collective knowledge to form organizational knowledge (Hargadon & Fanelli, 2002). Importantly, when employees, especially knowledge workers, leave an organization, their tacit knowledge is typically lost (Fallatah, 2020). Yet, firm routines and processes tend to mitigate the effect of such a loss, because each individual's knowledge is embedded within those routines (Nelson & Winter, 1982; Roos et al, 1997). This is better articulated by resource-based theory (Barney, 1991), which states that the resources that each firm possesses are the main drivers of their performances. Thus, the routines that each firm goes through in the knowledge management process are firm-specific and, as a firm resource, are influential in the effectiveness of firms' knowledge management.

2.3 Knowledge Management During Crisis

Crises have different phases, and managing knowledge requires different types of knowledge management activities in each phase. Table 1 illustrates the roles of various knowledge management activities during the crisis management phases.

Table 1: The Role of Knowledge Management in Crisis Management

KM Activity	Definition	Organizational Requirement	Phases
Knowledge Acquisition Knowledge Creation	an organization's ability to identify and acquire externally generated knowledge that it needs the generation of new knowledge that did not exist before	- Potential absorptive capacity in all phases - Flexible structure - Social capital - Appropriate structure for SECI - Solid knowledge base	All phases Preparation/Prevention Damage Containment
Knowledge Sharing	the provision of know-how to help others and collaborate with others to solve problems	- Supportive organizational culture - Supportive management - Adequate technology - Appropriate team, interpersonal, and individual characteristics	
Knowledge Utilization Knowledge Storing	Turning existing knowledge into beneficial ends and putting it into an operational context where it becomes meaningful Recording knowledge in the organizational memory	- Effective KMS - Supportive Organizational culture and routine -Organizational memory	Damage Containment Recovery Learning

SECI = Socialization, Externalization, Combination, and Internalization

First, in the signal detection phase, organizations need to acquire relevant knowledge to detect any useful signal of a potential crisis. In the preparation and prevention phase, organizations still need to look for knowledge about risk factors and other relevant knowledge that might be needed to prepare for the crisis. Additionally, creating valuable knowledge becomes necessary to inform prevention decisions. The third phase, damage containment, is a phase where organizations still need to create knowledge, but also need to share timely knowledge amongst their different departments and individuals. The last two phases, Recovery and Learning, require monitoring what has been transcribed in the aftermath of the crisis and storing relevant knowledge in organizational memory (Al-Hashem et al., 2021). Below is a brief overview of the different knowledge management activities and a discussion on how they could be used effectively in crisis management.

2.3.1 Knowledge Acquisition

Knowledge acquisition refers to an organization's ability to identify and acquire externally generated knowledge that it needs (Zahra & George, 2002). As a valuable resource, and especially throughout the coronavirus pandemic and similar crises, knowledge should be continuously sought after by organizations. During health-related pandemics like the coronavirus, firms must seek knowledge from health associations at the local, national, and international levels. It is also key to acquire external business-related knowledge about their products and the technology required to produce them. Generally, all related knowledge that could help the decision-making process is essential to acquire during a pandemic.

While all organizations would like to have knowledge at their disposal, some organizations are better equipped to acquire it than others. Absorptive capacity (Cohen & Levinthal, 1990), especially potential absorptive capacity (Lane & Lubatkin, 1998; Zahra & George, 2002), is essential for organizations in their effort to identify and acquire external knowledge (Pan et al., 2020). Another important element for organizations to improve their knowledge acquisition capabilities is having a flexible structure that enables employees to receive and process new external stimuli (Lyles & Baird, 1994; Lyles & Salk, 1996). Research has also emphasized the role of social capital in acquiring external knowledge (Kogut & Zander, 1992; Robertson et al., 2019). Social capital facilitates the exchange of knowledge amongst partners through frequent interactions (Nahapiet & Ghoshal, 1998), given that partners are willing to share and exchange knowledge (Cohen & Levinthal, 1990; Dyer & Singh, 1998).

Overall, starting from detecting signals of a potential crisis, to receiving updated knowledge throughout the crisis, organizations need the capacity to identify and acquire new external knowledge. Such capacity requires a high level of potential absorptive capacity, flexible structure, and a high level of social capital.

2.3.2 Knowledge Creation

The importance of creating knowledge for firms is well-established in the literature (Grant,

1996; Nonaka, 1994; Fallatah, 2018). During crises where informed decisions are needed promptly, the importance of creating knowledge increases. While knowledge acquisition is a continuous process that lives throughout the pandemic and beyond, knowledge creation is another important activity that organizations need during the probing and prevention, and the damage consignment phases.

Knowledge creation refers to the generation of new knowledge that did not exist before (Nonaka, 1994). The literature suggests that knowledge resides within individuals (Polanyi, 1966), and that creation of new knowledge comes about via exchanging diverse information in frequent interactions (Nahapiet & Ghoshal, 1998; Nonaka, 1994; Nelson & Winter, 1982; Polanyi, 1966). At the organizational level, knowledge-based theories assert that the role of firms is to combine, coordinate and integrate individual knowledge to form overall firm knowledge (Grant, 1996; Kogut & Zander, 1996). That being said, organizations differ in their ability to create new knowledge, and the literature suggests that certain critical resources are behind such differences. Those resources are based on the three dimensions of knowledge: human, relational, and structural (firm) knowledge (Bontis et al., 2000).

Nonaka and Takeuchi (1995) introduced the knowledge creation model, in which they described how the two types of knowledge, explicit and tacit, are converted into organizational knowledge. Tacit knowledge, defined as intangible knowledge that cannot be codified, could be converted into other tacit knowledge via *Socialization*, and into explicit knowledge, defined as tangible and codified knowledge, via *Externalization*. On the other hand, explicit knowledge could be converted into other explicit knowledge via *Combination*, and into tacit knowledge via *Internalization*.

Therefore, it is paramount for organizations to have a structure and a system that allows individuals to socialize, externalize, internalize, and combine in order to create new knowledge. Additionally, since new knowledge is a byproduct of existing knowledge, it is concluded that organizations with more existing knowledge are more likely to create a new one (Nonaka & Takeuchi, 1995). It is also important to note that knowledge is not equally valuable and that more valuable knowledge leads to higher performance (Fallatah, 2018).

2.3.3 Knowledge Sharing

Knowledge sharing refers to the provision of know-how to help others and collaborate with others to solve problems (Wang & Noe, 2010). During a pandemic, I argue that knowledge sharing is paramount throughout the pandemic, especially in the first three phases. Organizations need to share knowledge amongst their various units (Abdolshah & Abdolshah, 2011). For example, to make a critical decision about shutting down a business or relying on e-commerce only, health-related information about the severity of the disease and whether employees could be easily infected, should be shared with the Human Resources (HR) and marketing departments to examine the possibility of laying off some employees and to make sales projections, respectively.

To have an effective knowledge sharing mechanism, research suggests that organizational culture that supports knowledge sharing along with management and technological support is key (Carmeli & Schauboerck, 2008; Wang & Noe, 2010). Also, several team and interpersonal characteristics are found to be necessary for a smooth knowledge-sharing process. For example, gender diversity and the structure of social networks within the organization are positively related to effective knowledge sharing (Sipior, 2020; Wang & Noe, 2010). At the individual level, especially knowing that knowledge resides within individuals (Polanyi (1966), employees play a critical role in the success of the organizational knowledge management system. For example, it has been found that employees who are open to experience (Cabrera & Cabrera, 2006) and those with higher education and longer work experience are more likely to share knowledge with their colleagues (Constant et al., 1994).

Thus, during a crisis such as a coronavirus pandemic, organizations should focus on exploiting a culture that encourages knowledge sharing among employees (Hendryadi et al., 2019), allowing for a quick and trusted knowledge-sharing process. Additionally, organizations with the right individuals who are characterized by knowledge-sharing traits, and those organizations with a structure that supports team diversity, are more likely to handle knowledge management in a crisis.

2.3.4 Knowledge Utilization

In the knowledge management literature, knowledge utilization has been defined as turning existing knowledge into beneficial ends and putting it into an operational context where it becomes meaningful (Oluikpe, 2015). During a traumatic crisis such as the coronavirus pandemic, acquiring, creating, and sharing knowledge should equip managers with utilizable knowledge to make informed decisions. For organizations, Knowledge is expected to be utilized mainly in the probing and preventing phase, and the damage containment phase.

The effectiveness of knowledge utilization depends mostly on the knowledge value (Fallatah, 2018), the quality and reliability of the knowledge management system (Alavi & Leidner, 2001), and the organizations' culture and routine that enables easy and quick knowledge sharing.

2.3.5 Knowledge Storing

It is critical for organizations to store all acquired and created knowledge. Essential to storing knowledge is organizational memory, a construct that is composed of the structure of its retention facility, the knowledge contained in it, and the process of knowledge acquisition and retrieval (Walsh & Ungson, 1991). Organizations should store knowledge routinely in their memory and retrieve it when needed (Al-Hashem et al, 2021; Huber, 1991). Such knowledge includes operational knowledge on how to do things, as well as the knowledge required for reporting purposes. Importantly, tacit knowledge that is considered a source of competitive advantage should be stored to avoid losing it when key knowledge workers leave the organization.

In crises, storing knowledge in organizational memory is vital during the later phases. During the recovery phase, organizations deal with the outcomes of their decisions. In this phase, it

is important to take notes of what went right and what went wrong. Storing such information in the organizational memory is essential for learning, the last phase of crisis management. An organizational memory with all knowledge acquired, created, shared, and stored in the current crisis, with the right culture and a reliable KMS, should be retrieved easily in future crises.

3 Conclusion

Knowledge management plays a vital role in managing crises such as the coronavirus pandemic (Wang & Belardo, 2005). Acquiring relevant and updated knowledge during the life of the crisis, especially early on, should help in detecting signals of a potential crisis. Additionally, building on existing knowledge, organizations should strive to create a new one. All acquired and created knowledge would not be useful enough without a system that enables knowledge sharing. During the peak of the crisis in the probing and prevention, and the damage containment phases, effective knowledge creation and sharing are of utmost importance. Equally important is having an organizational memory where knowledge is stored and then retrieved by managers to utilize them and make informed and timely decisions. Organizational memory is also useful for organizations to retrieve knowledge for future cases.

4 Availability of Data and Material

Data can be made available by contacting the corresponding author.

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