

How Knowledge-Intensive Organizations Thrive Under Dynamic Conditions: An Organizational Capability Perspective

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Abstract: Knowledge-intensive organizations primarily rely on knowledge and expertise as key strategic resources. In light of economic, social, and health-related crises in recent years, such organizations increasingly need to operate in dynamic environments. However, examinations on dynamic capabilities specifically in knowledge-intensive organizations remain scarce. This is remarkable given the role that knowledge holds as an economic resource in developed countries. To provide an explanation of how knowledge-intensive organizations can prevail among competitors under dynamic conditions, the authors integrate two literature streams in a knowledge-intensive context: the knowledge-based view and the dynamic capabilities approach. The knowledge-based view focuses on the nature of organizational knowledge as a critical resource and illustrates specific properties of knowledge in contrast to traditional means of labor such as capital. The dynamic capabilities approach on the other hand is about a firm's ability to integrate, build, and reconfigure internal and external resources and can be drawn on to explain organizational success through adaptation to dynamic contexts. In this conceptual study, the authors propose a research model linking knowledge processes to organizational performance through two different paths: (1) Operational capabilities permit organizations to make their living in the present and refer to efficiency. (2) Dynamic capabilities allow organizations to change their resource base and, therefore, enable their long-term survival in dynamic environments by focusing on effectiveness. Additionally, the authors hypothesize a moderating effect of environmental dynamics on the relationship between dynamic capabilities and performance. The study offers a comprehensive overview on the interplay between dynamic capabilities and the knowledge-based view, offering valuable insights for both researchers and practitioners in the field.

Keywords: Dynamic capabilities, Knowledge-intensive organizations, Knowledge management, Knowledge-based view, Environmental dynamics

1. Introduction

Today's enterprises increasingly face the challenge of having to operate in highly dynamic environments. Dynamics can occur in different areas: for example, enterprises may face pressure from their competitors, so their actions need to be anticipated and appropriate responses taken. For example, competitors may quickly launch new products and services, thereby changing the competitive landscape (e.g. Arias-Pérez et al. 2021). Another area of dynamics is the unexpected changes in customer behavior. For example, customers may show diminishing levels of loyalty and switch to other suppliers. Still another area of dynamics may be the changes in customer demands. As customers are becoming used to gaining quick access to customized products and services, enterprises need to ensure that they can deliver in such short time frames (e.g. Denning 2016). However, the availability of resources may shift under short time frames if central components to their products become scarce. The COVID-19 pandemic has accelerated this situation: lockdowns and restrictions due to the pandemic have led to a shortage of both tangible and intangible resources, such as knowledge. Therefore, competition for scarce resources is accelerating (e.g. Butt 2021). Even at the end of the pandemic as economies are recovering, the shortage of resources remains an issue. This situation raises the question of how enterprises can cope with ongoing challenges posed by a dynamic environment.

Given these challenges, organizations must have the ability to adapt to changing conditions to secure their long-term survival. One approach that helps explain why enterprises thrive in such conditions is the dynamic capabilities (DCs) concept. DCs refer to a firm's capacity to innovate, adapt to change, and create change that is favorable to customers and unfavorable to competitors (Teece et al. 2016). Enterprises need to be able to quickly recognize and make use of opportunities and transform themselves to meet environmental changes. The concept of DCs explicitly acknowledges observations from enterprise practices. It takes into consideration that organizations in rapidly changing environments tend to put less emphasis on extensive strategic considerations and more emphasis on the identification and realization of opportunities. Thus, DCs provide a conceptual framework for understanding the success of enterprises operating in challenging environments.

In the case of knowledge-intensive organizations (KIOs), competitive advantage depends on one specific resource: knowledge. Compared with other resources, knowledge is largely characterized by its intangibility. The question arises of how KIOs can use this intangible resource in knowledge processes to drive their performance, while being able to adapt to dynamic environmental conditions. Contrary to DCs in non-KIOs (e.g. Cegarra-Navarro et al. 2016), considerably less is known about DCs in KIOs. To be precise, the role of DCs in KIOs has hardly been examined (Stei et al. 2021). In particular, it remains unclear what mechanisms link knowledge processes to KIO performance and how KIOs can address environmental dynamics by relying on DCs. This topic seems worth examining, as KIOs are an important type of organizations all around the globe. Knowledge resources can be seen as central resources in many economies. To reflect this relevance research has used the term knowledge economies (e.g. Makani and Marche 2010). The number and economic meanings of KIOs are also likely to continue rising. In this study, we address this issue and examine the nature of relevant capabilities in KIOs.

In particular, our conceptual study explores how organizational capabilities (operational as well as dynamic) can contribute to the performance of KIOs. We aim to answer the following research question: *how do organizational capabilities drive KIOs' performance under dynamic conditions?* We propose a conceptual model that links organizational knowledge processes to relevant forms of organizational capabilities, which, in turn, affect KIO performance in dynamic contexts.

In the following section, we provide the theoretical background to shed light on relevant aspects of the knowledge-based view (KBV). We then analyze the nature of KIOs and describe the role of knowledge management. Next, we elaborate the concept of DCs and its approach to organizational change. We then derive a conceptual model that links knowledge processes to performance through different capabilities. Finally, we discuss our findings, present our contributions to theory and practice, and provide avenues for future research.

2. Theoretical Background

2.1 Knowledge-Based View and Knowledge-Intensive Organizations

In strategic management literature, the KBV of the firm is considered as a variant of the resource-based view (RBV). The RBV regards enterprises in terms of their resources and capabilities. Its central assumption is that not all resources are distributed equally among enterprises, nor do enterprises share the same capabilities. This heterogeneity in resources and capabilities is considered the source of competitive advantage and disadvantage. Especially resources that simultaneously meet the so-called VRIN (valuable, rare, imperfectly imitable and non-substitutable) conditions play a major role in this regard. The RBV therefore provides an explanation of competitive effects caused by resource heterogeneity (Helfat and Peteraf, 2003).

The meaning of knowledge in a knowledge economy is without doubt extensive. Organizational knowledge has found its way into enterprises' strategic considerations. KIOs use knowledge primarily as the means of production as Drucker famously noted (1993). This is a central difference from traditional organizations, which rely on labor and capital. In light of its generally rising importance in many economies, knowledge now represents "the most valuable global commodity" (Gorman, 2002, p. 219).

KIOs require the intellectual capabilities of their employees for the production of goods and services (Singh and Chandwani, 2014). Indeed, almost all organizations use knowledge to some extent to create their products. Even manufacturing firms depend on the knowledge resource, e.g. in servitization efforts. For example, Szász et al. (2017) have described how a more developed context with respect to education and knowledge favors servitization. However, KIOs rely specifically on knowledge, as it is often their only resource. This knowledge represents both input and output of KIOs (Makani and Marche, 2010). Prior research has noted a variety of characteristics to describe the nature of KIOs. KIOs:

- Have a high degree of autonomy and less hierarchical structures (e.g. Greenwood, 2009).
- Operate in a business-to-business market with a relatively small number of customers (e.g. Swart and Kinnie, 2003).
- Are located particularly in the service sector (e.g. Alvesson, 1993).
- Employ workers with formal education, including the doctoral degree level (e.g. Starbuck, 1992).
- Use knowledge as the primary input (e.g. Robertson and Swan, 1998).

Makani and Marche (2010) provide an extensive overview of KIO-defining factors. However, the label of a KIO lacks clarity. For example, the intensity of knowledge can even be heterogeneous within the same company (Makani and Marche, 2010). Given this ambiguity of KIOs, we follow Greenwood (2009, p. 5), who stated that

KIOs “have to integrate and diffuse knowledge throughout the value chain. This kind of broadly diffused and integrated value chain becomes a defining characteristic of [KIOs]”. Typical KIOs are consultancy enterprises, marketing agencies, IT developers, or financial providers.

Kogut and Zander (1992) introduced a knowledge-related theory that argues that firms are superior to markets when it comes to the sharing and transferring knowledge of individuals or groups in organizations. According to this theory, knowledge is contained within individuals, but it is also expressed by certain organizational routines, particularly how individuals cooperate in organizations. A routine in this regard might be “behavior that is learned, highly patterned, repetitious, or quasi-repetitious, founded in part in tacit knowledge” (Winter, 2003, p. 991). With respect to this organizational knowledge, Nonaka and Takeuchi (1995) suggest the creation of organizational knowledge as a process of the interaction between explicit and tacit knowledge. This is a common and well established classification: one can distinguish between explicit knowledge, which is “transmittable in formal, systematic language”, and implicit knowledge, which is “personal, context-specific, and therefore hard to formalize and communicate” (Nonaka and Takeuchi, 1995, p. 59). Given the relevance of knowledge to organizations, especially KIOs, knowledge must be managed accordingly. Indeed, the management of knowledge is a key strategic challenge to ensure enterprise success and competitiveness (Behringer and Sassenberg, 2015).

The KBV focuses on the role of knowledge as a key resource for organizations. It distinguishes between explicit and tacit knowledge and describes the meaning of knowledge for organizational success. In particular, tacit knowledge can be the source of competitive advantage as it reflects the VRIN conditions. The KBV typically provides suggestions on how to create, retain, transfer and use organizational knowledge (Easterby-Smith and Prieto, 2008). Thus, this approach can be drawn on to explain the role of organizational knowledge and its relevance for organizational success. With respect to the question of how KIOs can cope with environmental dynamics, it however lacks suggestions for organizational change. This topic is central to the DCs concept, which we elaborate on in the next subsection.

2.2 Dynamic Capabilities

The DCs concept gained rising attention in the 1990s (e.g. Teece and Pisano, 1994). Since then, it has become an established concept in management strategy research that acknowledges the dynamics of markets. Specifically, the DCs concept can be drawn on to gain an understanding of the success of organizations in highly dynamic and competitive environments. Its central idea is that, to thrive, organizations need to be aware of opportunities in their environments and make use of these opportunities. The DCs concept acknowledges dynamic developments in the business environment and help explain changes within organizations. It is this connotation of change and evolution that is indicated by the term ‘dynamic’ (Easterby-Smith and Prieto, 2008). Similar to the RBV, it attributes differences in competitive positions to different possessions of resources and capabilities. These capabilities in turn influence organizational performances.

Originally, Teece et al. (1997, p. 516) defined DCs as “the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments”. Eisenhardt and Martin (2000, p. 1107) subsequently extended the definition by putting emphasis on the environment: “the firm’s processes that use resources—specifically the processes to integrate, reconfigure, gain and release resources—to match and even create market change”. These resource (re-)configurations are particularly important in emerging, colliding, splitting, evolving, and dying markets. In a further established definition, Helfat et al. (2007, p. 1) described a DC as “the capacity of an organization to purposefully create, extend, or modify its resource base”.

A resource can be understood as an asset or input to production and it is important for the organization to own the asset, control it, or have regular access to it (Helfat and Peteraf, 2003). These assets are part of the organization’s resource base and include “tangible, intangible, and human assets (or resources) as well as capabilities which the organization owns, controls, or has access to on a preferential basis” (Helfat et al., 2007, p. 4).

For a better understanding of the nature of DC, it makes sense to consider capabilities in general. An organizational capability refers to “the ability to perform a particular task or activity” (Helfat et al., 2007, p. 1). Literature typically distinguishes between two forms of capabilities: operational capabilities (OCs) and DCs. OCs represent ordinary or technical capabilities. Referencing a hierarchy-of-capabilities, Winter (2003) describes OCs as zero level capabilities or ‘how we earn a living now’ capabilities. OCs allow for routine operations and ensure short-term survival. While the purpose of OCs is stability, the focus of DCs is on change. Capabilities that change aspects as products or processes are labelled as first-order DCs. DCs shift the organizational resources to where

they can add value in the future. Both types of capabilities are required for the long-term survival of organizations and their thriving in the long run; neither OCs nor DCs can ensure this survival alone.

To describe organizational success, Teece (2007) introduced the DCs framework, which can be drawn on to understand three different aspects of DCs: sensing opportunities, making use of these opportunities, and managing threats/transforming themselves. To gain a long-term competitive advantage, organizations need to rely on capabilities that cannot be or are difficult to imitate by their competitors. Tacit knowledge can be seen as a central resource. If it meets the VRIN conditions, it can enable the creation of capabilities that lead to organizational advantage. DCs are typically developed within enterprises, they usually cannot be transferred in a market. DCs reflect capabilities that are developed through a combination of assets or a re-combination of existing capabilities (Katkalo et al., 2010). Examples are intellectual capital, processes, customer relationships or specialist expertise.

We use the term environmental dynamics to describe volatility that manifests in fast and unexpected changes in environmental conditions. We follow Tallon and Pinsonneault (2011, p. 466) and define environmental dynamics as “the frequency and extent of change in critical market variables”. In dynamic environments and extreme forms of dynamic markets, in which even basic industry characteristics such as boundaries, competitors, and customers are in flux, no specific advantage is sustainable. Rather, superior performance occurs by continuously creating temporary advantage (Eisenhardt and Santos, 2000).

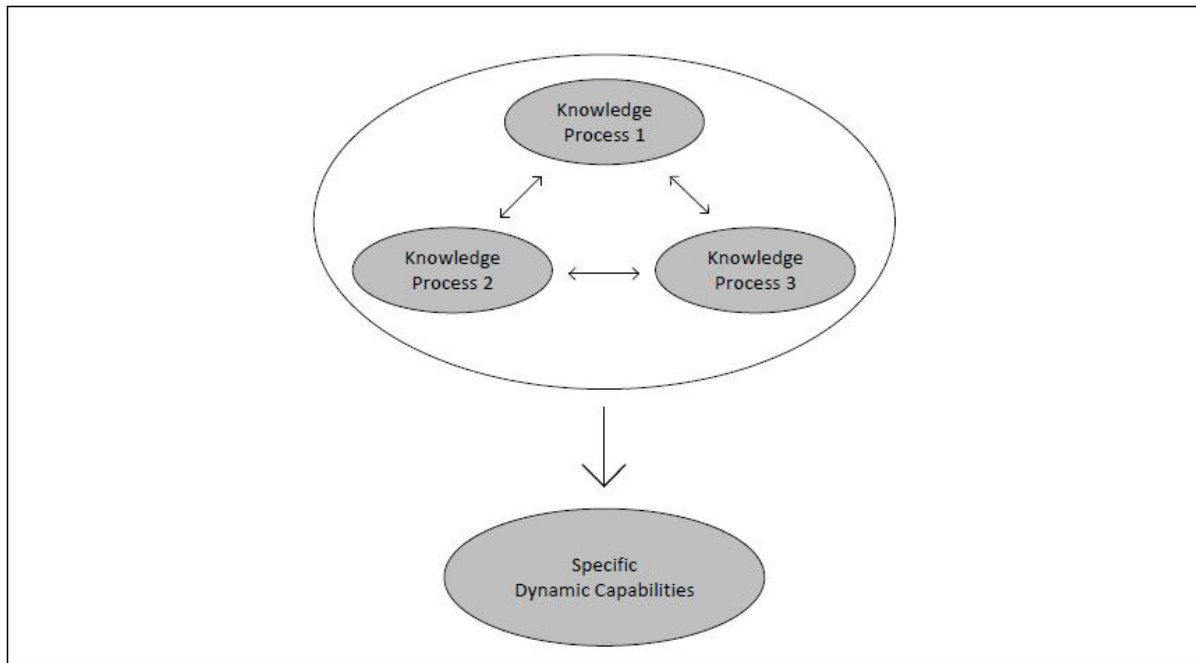


Figure 1: Dynamic Capabilities due to the Interaction of Processes (adapted from Helfat et al., 2007)

DCs are often seen in terms of processes. Helfat et al. (2007) attribute this to the observation that the performance of DCs depends on the processes used to apply them. However, they are an effect of the interaction of processes. For our study, we follow this process perspective on DCs. Figure 1 displays DCs developed from the interaction of different knowledge processes.

3. Towards a Conceptual Model of KIOs Thriving Under Dynamic Conditions

To shed light on how organizational capabilities drive KIO performance in dynamic environments, we propose a conceptual model in the following section. This model shows the relationships between relevant constructs to illustrate to paths by which KIOs can make use of knowledge processes to drive their performance: OCs and DCs. We also include environmental dynamics as a moderating variable.

As mentioned before, knowledge can be seen as the central resource for KIOs. To make use of this resource, KIOs apply different knowledge processes. We follow Alavi and Leidner (2001) and focus on the knowledge processes creation, storage, transfer, and application. On one hand, such knowledge processes can be expected to improve capabilities that favour every day operations of KIOs: OCs allow to organizations to make a living (e.g. Winter, 2003). These capabilities refer to operational improvement and efficiency. We propose:

Proposition 1 (P₁): Knowledge processes have a positive impact on operational capabilities.

On the other hand, these knowledge processes can also contribute to capabilities that allow KIOs to change and adapt to environmental conditions. The knowledge processes can facilitate development of such DCs (e.g. Kaur, 2016). We expect:

Proposition 2 (P₂): Knowledge processes have a positive impact on dynamic capabilities.

DCs allow KIOs to shift internal resources. Therefore, these organizations can help create new capabilities and reconfigure existing operational capabilities (e.g. Eisenhardt and Martin, 2000):

Proposition 3 (P₃): Dynamic capabilities have a positive impact on operational capabilities.

OCs refer to capabilities that allow KIOs to use their primary resource knowledge and offer their products and services. OCs particularly refer to improved efficiency of everyday operations, which can be associated with increased performance (e.g. Tan et al., 2007):

Proposition 4 (P₄): Operational capabilities have a positive impact on KIO performance.

DCs facilitate the adjustment of resources and capabilities, empowering KIOs to respond to changing conditions (Teece, 2007). This flexibility enables KIOs to capitalize on opportunities and mitigate threats:

Proposition 5 (P₅): Dynamic capabilities have a positive impact on KIO performance.

DCs enable KIOs to respond to their environment, in particular to dynamic developments. One can expect the positive impact of DCs on KIO performance to depend on the rate of dynamics of their environment. In relatively stable environments, the impact may be rather small. However, in dynamic environmental conditions a reconfiguration of resources may be beneficial to performance (Eisenhardt and Santos, 2000). We hypothesize a linear moderating relationship for these dynamics and propose:

Proposition 6 (P₆): The positive impact of dynamic capabilities on KIO performance is positively moderated by environmental dynamic.

Figure 2 displays our research model, that shows the relationships between knowledge processes, OCs, DCs and KIO performance.

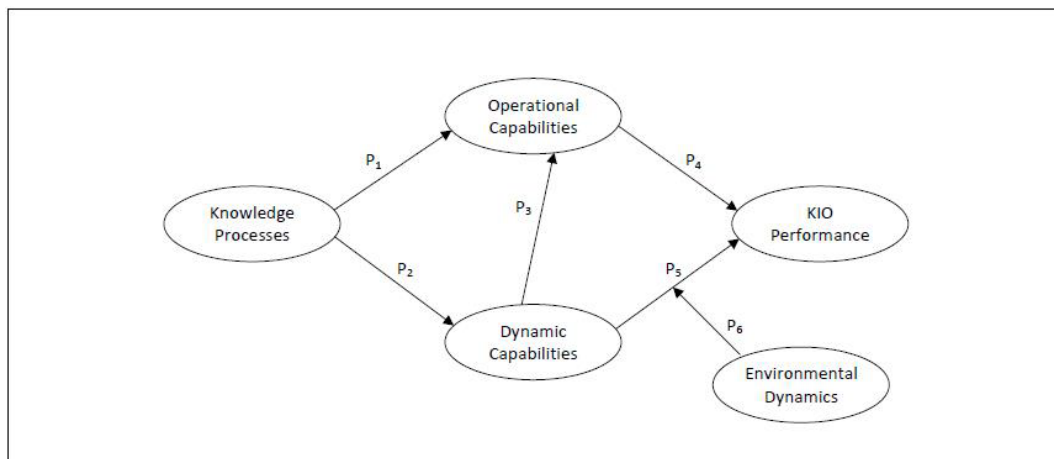


Figure 2: Conceptual Model on the Relationships Between Knowledge Processes, OCs, DCs and KIO Performance

4. Discussion

In our study, we integrate the KBV and DC approaches to explain how knowledge processes impact on KIO performance. While the KBV provides a specific view on knowledge and focuses on the creation, retaining, transfer and use of knowledge - the DCs primarily deal with the development and recombination of capabilities and the renewal of organizational resources and assets (Easterby-Smith and Prieto, 2008).

Both the KBV and DCs concept, stress the importance of the knowledge resource, which is an organizational asset and can be applied to create value. Knowledge assets typically cannot be bought or acquired in a market (Teece, 2001) but, instead, must be built within organizations. While knowledge is owned by the employees of

an enterprise, there is also an organizational knowledge pool. This type of knowledge develops as a result of routines and processes within the organization (see Teece, 2001). Therefore, organizations are knowledge repositories, that need to create, transfer, accumulate, integrate, and use their knowledge assets (Krzakiewicz, 2013). In dynamic environments, KIOs not only need to focus on the amount of knowledge that is being contained within. In such environments, the overall pool of knowledge is not the only key to success; rather, competitive advantage rests on a KIO's capacity to create and renew relevant knowledge (e.g. Eisenhardt and Santos, 2000).

Additionally, both approaches put heavy emphasis on the role of the tacit aspect of organizational knowledge. The nature of tacit knowledge makes it relatively hard for competitors to imitate and transfer this asset. Therefore, it may be seen as a source of long-term competitive advantage (Eisenhardt and Santos, 2000). In today's organizations, knowledge inhabits the role as the most important strategic resource and organizational success rises and falls with the questions of if organizations are able to secure their access to specific knowledge resources or are able to create or renew these knowledge assets (Krzakiewicz, 2013). This tacit knowledge and the processes referring to it can be seen as one of the central aspects of the DC concept (Teece, 2009).

With respect to the organizational capabilities, our model is in line with the hierarchy-of-capabilities concept (Winter, 2003). OCs can be understood as zero-level capabilities, that enable the everyday operational functioning in KIOs. DCs are first-order capabilities that allow KIOs to build, renew and reconfigure OCs (P_3); they are about the modification of functional processes. Additionally, there is an additional capability that represents a second-order capability: organizational learning. This capability resides above the capability hierarchy, as it allows KIOs to change and modify their DCs (Easterby-Smith and Prieto, 2008). In our model, this organizational learning is a result of the knowledge processes that drive OCs (P_1) as well as DCs (P_2).

Despite describing a systematic organizational change approach, DCs are not the only way for organizational change. Winter (2003) describes another way: ad-hoc problem solving. This type of change is of a spontaneous nature and occurs when organizations need to react to sudden environmental influences. However, it is important to note that building DCs does require (sometimes substantial) investments. From an economic standpoint, using ad-hoc problem solving may be more reasonable.

Our proposed model also contributes to research on environmental dynamics with respect to DCs. We include this environmental dynamic in the model as a moderating variable (P_6): we expect that the more dynamic the environment is, the more DCs can affect operational performance; we hypothesize a linear relationship. However, prior research suggests a more differentiated view on these dynamics. According to Eisenhardt and Martin (2000), DCs reveal a certain stability in moderately dynamic environments. With increasing dynamics in 'high-velocity markets', this stability disappears and DCs tend to become unstable and challenging to sustain. In such cases, enterprises often use ad-hoc problem solving to adapt to changing environments.

5. Conclusion

In this research, we propose a conceptual model that integrates aspects from both the KBV and DCs approaches to understand how KIOs can thrive in dynamic environments. Our analysis focuses on the primary resource of KIOs that is knowledge.

Our study has a variety of contributions to theory. We focus on KIOs that require knowledge as organizational fuel. To gain competitive advantage, not only do enterprises need to use this resource properly, but they also need to renew and reconfigure it accordingly (Krzakiewicz, 2013). We have emphasized the role of knowledge for both approaches, KBV and DCs. We have furthermore stressed the role of organizational learning in the development of DCs. In KIOs, the ability to learn is critical to building DCs. According to Teece (2009), the ability to learn and adjust is common in all organizations with strong DCs. In general, organizational learning can be considered as a key requirement for KIO and non-KIO success.

Our study opens up avenues for future research. Further studies may empirically test our conceptual model to find out under what conditions OCs or DCs better mediate the impact of knowledge processes on KIO performance. This would help understanding what drives KIO performance under dynamic environmental conditions. Additionally, we have pointed out different knowledge processes. Particular organizational learning plays a major role in KIOs. This is closely related to the knowledge processes. This learning ability in the DCs context could be further examined. Another topic for future studies is the question of how technological advancements can contribute to the use of knowledge resources. As mentioned, knowledge may be tacit and, thus, difficult to codify. This tacit knowledge may be the key for gaining competitive advantage as it may be in the VRIN (valuable, rare, imperfectly imitable and non-substitutable) conditions. This prevents competitors to

acquire this tacit knowledge and make use of it. Future research could examine the role of this tacit knowledge in the creation of organizational capabilities and determine how organizations can make use of this tacit knowledge. For example, today's communication tools may be able to extract this tacit knowledge from employee communications and codify it automatically.

Our study also provides implications for practice. We describe the interplay between OCs and DCs. In doing so, we address an area of conflict that can be observed in enterprise practice. Organizations face the challenge to balance out today's operations that pay for the current state and tomorrow's operations that will repay in the future. To balance out the diverging goals of these two streams, KIOs face the challenge to find a balance between both paths. It is a reality that organizations need to cope with rapidly and unexpectedly changing conditions in dynamic environments. Today's KIOs have to cope with them and continue pursuing their businesses. The ongoing discussion of organizational agility shows the practical relevance of this topic. Enterprises need to be able to properly function in unpredictable conditions. They specifically need to answer the question of how they can build or adjust their existing resource base to find or create and make use of opportunities in their environment. Organizations furthermore need to be aware of threats and avoid them. Our study can be drawn on to see how organizational knowledge processes can drive KIO performance and, more importantly, what organizational capabilities are at play. In developing relevant DCs, KIOs can become robust to environmental change and even thrive in under such challenging conditions. Organizations may also use our conceptual model to predict their performance in different states of environmental dynamism. This study can provide hints on whether the development of DCs makes sense from an economic perspective. As this development comes with costs, enterprises need to determine if these costs are in a reasonable ratio to the expected benefits. Our model can help to quantify the benefits and, therefore, support the organizational investment decision.

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