The Invisible Asset: Pathways to Enhanced Operational Efficiency

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Abstract
This research investigates the intricate relationship between knowledge management (KM) practices and operational efficiency (OE) within contemporary organizations. By adopting a qualitative approach and drawing upon the rich insights of chief knowledge officers (CKOs), who are at the forefront of KM initiatives, the study aims to unravel the mechanisms through which KM can be leveraged to enhance operational processes and drive efficiency gains. The findings reveal that CKOs perceive KM as having a profound impact on OE through five key mechanisms, which are delineated in a comprehensive model: (1) reducing time to find the right knowledge; (2) achieving cost savings; (3) minimizing redundant efforts; (4) facilitating resource allocation for role training; and (5) enhancing insights for informed decision-making. In today's knowledge-driven era, KM is crucial in enhancing operational excellence. By bridging the gap between theory and practice, this study holds the potential to shape the strategic direction of organizations and inform their efforts to optimize operational performance through effective KM practices. The proposed model and insights provide a roadmap for organizations to refine their KM initiatives, foster a culture of continuous improvement and innovation, and leverage their "invisible assets" to achieve long-term success in the knowledge-driven economy.

Keywords
Operational Efficiency; Productivity; Performance Improvement; Innovation; Learning Organizations

Introduction

Operational efficiency (OE) is a critical metric that quantifies the effectiveness of profit generation relative to operational costs. It encapsulates an organization's capacity to augment revenue or returns without escalating costs. A high OE index indicates an organization's success in cost reduction while preserving or enhancing the quality and quantity of output and services. In the realm of business and manufacturing, OE can be interpreted as the capability to produce superior products or deliver exceptional services utilizing minimal resources, such as capital, time, and labor (Al Doghan & Sundram, 2023; Al-Qubaisi & Ajmal, 2018; Baik et al., 2013; Coelli et al., 2005; Fried et al., 2018; Lee & Johnson, 2013).

Organizational knowledge, often referred to as the "invisible asset," is a critical resource that underpins an organization's ability to innovate, compete, and succeed in today's knowledge-driven economy. It encompasses the collective expertise, insights, and wisdom embedded within and acquired by an organization over time (Abuaddous et al., 2018; Bolisani & Scarso, 2021; Durst et al., 2019; Namdarian et al., 2020). In the contemporary business landscape, there is a growing recognition that knowledge, in isolation, does not guarantee value creation. Consequently, organizations strive to optimize their knowledge assets' management to realize their strategic objectives and cultivate dynamic business capabilities (Heisig et al., 2016; Tseng & Lee, 2014).

Enhancing OE is frequently a key strategic objective for firms aiming to improve their overall performance. The existing body of literature is replete with quantitative studies that have investigated the relationship between Knowledge Management (KM) and firm performance (see, for example, Ahmad et al., 2017; Bayari et al., 2022; Namdarian et al., 2020). However, these studies have not specifically focused on OE, and there is a noticeable lack of interpretive research approaches in this area. This gap leaves a significant void in our understanding of the nuanced dynamics between KM and OE, particularly in modern organizations increasingly driven by knowledge.

The present study is a sincere attempt to address this critical gap. Given the strategic importance of OE for organizational success (Al Doghan & Sundram, 2023; Fried et al., 2008; Lee & Johnson, 2013), it is imperative to explore the mechanisms through which KM practices can contribute to its enhancement. We do so by adopting a unique approach that emphasizes the insights of Chief Knowledge Officers (CKOs), who are at the forefront of KM initiatives within organizations. Our fundamental aim was to augment these viewpoints, thereby illuminating the practices they utilize in the realm of KM that can be harnessed to bolster OE within their distinct organizational contexts. An authentic perspective on the value added by KM initiatives, particularly concerning OE, can offer a compelling rationale for economically justifying investments in KM.

This endeavor not only underscores the importance of KM in enhancing OE but also provides valuable insights into the practical applications of KM strategies in diverse organizational settings. The CKOs' perspectives provide a cohesive, practice-driven model grounded in real-world experience for harnessing KM practices as a key driver of operational excellence.

Related works

OE can be defined as the ratio of output procured from the business to the input expended to conduct business operations and is a pivotal metric for business. Fundamentally, OE gauges an organization's capacity to deliver products or services in the most cost-effective manner without sacrificing quality. It serves as a measure of the efficiency of an organization's operations in terms of cost, but also quality and speed. In essence, OE embodies the practice of achieving amplified output with diminished input and measures the efficiency of a business process or operation. It is a principal determinant of an organization's profitability and competitiveness (Al-Qubaisi & Ajmal, 2018; Fried et al., 2018; Lee & Johnson, 2013).

OE is also intrinsically linked to robust and sustainable financial performance, and, as the literature shows, there is a positive correlation between OE and a firm's competitiveness, management performance, and employees' productivity (Kholopane, 2016; Tan & Olaore, 2021). Moreover, in specific instances, OE has been observed to positively impact the enhancement of organizational innovation (Al Doghan & Sundram, 2023). Organizations that enhance their efficiency may experience alterations in profitability, both in the present and subsequent years. Specifically, a positive correlation was shown by Baik et al. (2013) between OE changes to contemporaneous and future returns.

Conversely, an organization that operates inefficiently can encounter a multitude of repercussions. Due to escalated operational costs, it may grapple to compete effectively in the market. It may experience reduced customer satisfaction due to the substandard quality of its products or services. Moreover, it may find it challenging to innovate and adapt to the ever-changing market conditions due to a scarcity of resources. In the long term, diminished OE can lead to reduced profitability and may even threaten the organization's survival (Al Doghan & Sundram, 2023; Baik et al., 2013; Coelli et al., 2005; Cu et al., 2021; Fried et al., 2018; Lee & Johnson, 2013).

Knowledge is universally recognized as a crucial strategic asset within any organization, serving as the cornerstone for sustained organizational success (Bolisani & Scarso, 2021; Bolisani et al., 2018; Gold et al., 2001). KM refers to the processes associated with identifying, creating, and sharing knowledge within an organizational environment (Ahmad et al., 2017). That is, in essence, KM is not just about harnessing the existing knowledge within the organization but also about facilitating the creation of new knowledge and ensuring its accessibility and usability for all members of the organization (Al-Qubaisi & Ajmal, 2018; Nakash & Bouhnik, 2022).

The extensive benefits of systematic, consistent, and methodical KM within an organizational environment have been extensively dissected in empirical and theoretical works over the years (Abuaddous et al., 2018; Bolisani & Scarso, 2021; Bolisani et al., 2018; Fugate et al., 2009). However, numerous challenges related to the development of performance measurement in KM are yet to be adequately addressed. In many respects, due to the elusive nature of knowledge (Bolisani et al., 2012), the discipline is beleaguered by a lack of universally accepted and standardized procedures and methods for measurement (Nakash et al., 2022; Nakash & Bouhnik, 2022).

Extant literature has empirically validated a robust positive correlation between KM practices and performance outcomes. In other words, the caliber of organizational performance is found to be significantly influenced by either optimal or flawed management of knowledge assets (Abuaddous et al., 2018; Ahmad et al., 2017; Mills et al., 2011; Namdarian et al., 2020; Tseng & Lee, 2014). This underscores the pivotal role of effective KM in shaping organizational outcomes. This relationship is often mediated by factors such as organizational culture, leadership, and technology infrastructure, which can either facilitate or hinder the effective management of knowledge (Abuaddous et al., 2018; Bayari et al., 2022; Fugate et al., 2009).

Specifically, empirical evidence has not concentrated its focus on the authentic and non-intermediary testimonies of KM practitioners concerning core elements linked in

this field (Nakash et al., 2022). A global study conducted a decade ago involving KM specialists concluded that the value proposition of KM warrants further exploration. However, it lacked their insights on the contribution of KM to OE (Heisig et al., 2016). While previous research identified a relationship between KM processes and OE, it focused solely on the oil and gas industry (Al-Qubaisi et al., 2018). Moreover, it seems that a significant portion of the research literature does not delineate the specific mechanisms through which KM methodologies and technologies contribute, promote, and foster OE.

Procedures

The data collection process for this research employed a qualitative inductive approach, meticulously following the guidelines proposed by Strauss and Corbin (1998). This methodology was chosen to gain an in-depth understanding of the intricate relationship between KM practices and OE from the perspectives of those at the forefront of KM implementation.

Data collection

The primary data source for this study was semi-structured, in-depth interviews with 22 CKOs, each with an average of 12 years of experience in KM (SD = 6.26). A purposive sampling technique ensured that participants had the requisite expertise and practical experience to provide rich and insightful perspectives. Most of these CKOs (n=13, 59.09%) held advanced degrees in KM, further validating their subject-matter expertise. This combination of academic qualifications and extensive professional experience lent credibility and depth to their perspectives, grounding the data in both theoretical knowledge and real-world applications. Participants represented a diverse array of institutions, including public entities, governmental agencies, manufacturing organizations, industrial corporations, and high-technology enterprises. This diversity was intentionally sought to capture potential variations and nuances in the relationship between KM practices and OE across different sectors and industries.

The semi-structured nature of the interviews was pivotal to our data collection process. This approach balanced maintaining a consistent line of inquiry, guided by a pre-determined set of open-ended questions, with the flexibility to allow new themes and perspectives to emerge. This flexibility enabled us to explore emergent ideas and probe for deeper insights (Corbin & Strauss, 2014). Among the questions we posed were: How do you conceptualize the relationship between KM and OE? What strategies can be employed to enhance OE through KM? What potential risks does poor KM pose to organizational OE? Each interview lasted approximately one hour. The interviews were conducted ethically, ensuring the confidentiality and anonymity of the participants. We obtained informed consent from all participants and adhered to established data handling and storage protocols.

Data analysis

Following the data collection phase, we undertook a rigorous data analysis process utilizing thematic analysis. This method incorporated both open-ended and closed-

ended coding processes, as delineated by Strauss and Corbin (1998). The open-ended coding phase involved a meticulous line-by-line examination of the interview transcripts, facilitating the identification of initial concepts and categories within the data. Subsequently, we employed a closed-ended coding process, which entailed refining and consolidating these concepts and categories into overarching themes.

Additionally, we adopted theoretical sampling techniques, selectively revisiting the data or seeking additional data sources to explore further and refine the emerging themes and concepts. This iterative process ensured that the analysis remained firmly grounded in empirical evidence while simultaneously allowing for the refinement and elaboration of theoretical underpinnings (Corbin & Strauss, 2014). Crucially, our methodological approach was inductive rather than deductive, enabling patterns and theories to emerge organically from the data.

Results

The findings reveal that the contribution of KM to OE is grounded in five fundamental pillars. According to the CKOs who participated in this study, these pillars represent the bedrock of KM's impact on efficiency. They epitomize the critical domains where KM processes can significantly enhance operational performance and productivity. The subsequent model delineates these five strata, which are further explicated in the corresponding subsections below (see Figure 1).

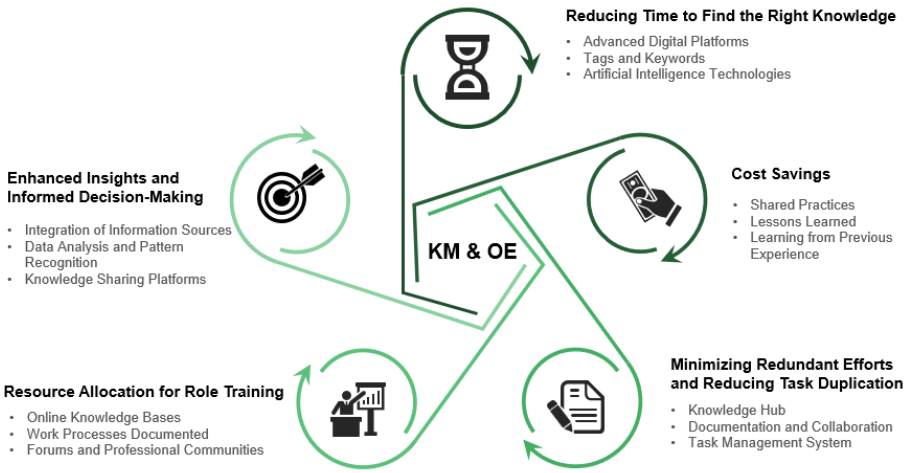

Figure 1. CKOs' Perceptions of the Interrelationship of KM's Impact on OE
(Authors' contribution)

Reducing time to find the right knowledge

Numerous knowledge workers spend much time searching for the knowledge needed to perform their routine tasks and fulfill their roles. The participants report that excellence in KM significantly contributes to conserving this time through several avenues. Firstly, advanced digital platforms can facilitate rapid document searches, thereby reducing the time required to locate specific knowledge. Secondly, using tags

and keywords relevant to organizing and cataloging knowledge items enables end-users in organizational systems to filter them more efficiently. Thirdly, advanced artificial intelligence (AI) mechanisms can automatically provide end-users with suitable knowledge without any active effort in searching and in a personalized manner. When the average time to find the right knowledge is reduced, workers can focus on their operational tasks instead of wasting time on lengthy searches. As resources are effectively redirected to value-creating activities rather than inefficient administrative tasks, KM indirectly achieves an improvement in OE. These efficiency efforts may increase productivity, as the saved time can be dedicated to other work tasks.

Cost savings

KM can contribute to cost savings through three steps. Firstly, the implementation of shared practices ensures that all employees work according to uniform standards and processes, reducing the need for repeated training and minimizing the likelihood of costly errors. Secondly, analyzing and sharing lessons from previous projects and tasks allow the organization to avoid repeating failures, replicate successes, and streamline processes, leading directly to resource and time savings. Thirdly, the creation of a knowledge repository containing information about solutions that have worked in the past and those that have not saved financial costs associated with trial and error. Ultimately, professional and focused KM enables waste reduction and cost-cutting by transforming the organization into a learning entity, which may increase productivity and lead to profitability. This cost-saving allows the organization to operate and manage its resources more appropriately, maintaining competitiveness and the ability to respond quickly to market changes.

Minimizing redundant efforts and reducing task duplication

According to the authentic experiences of the CKOs, optimal KM can prevent work redundancy through three strategies. Firstly, the creation of a knowledge hub that allows full access to existing knowledge sources can prevent work overlap and duplicate efforts. Secondly, documenting experience and collaboration among teams ensures that the knowledge acquired during various projects is available to everyone, thereby reducing the need to perform the same task twice. Thirdly, using task management systems, which are connected in integration to KM applications, allows tracking of knowledge consumption and work progress and prevents overlap between different workers and teams. When redundant efforts and task duplication are reduced, the organization can operate its resources more efficiently, increase output, and reduce costs. Avoiding "reinventing the wheel" fosters improved OE, as each worker can focus on tasks that add value rather than tasks that have already been performed or are unnecessary.

Resource allocation for role training

Continuous self-learning and training are achieved through successful KM, which may enhance the operational capabilities. The allocation of resources dedicated to role training is achieved in three ways. Firstly, the development of accessible online knowledge repositories allows new employees to learn at their own pace and revisit the material as needed, reducing the need for lengthy and intensive frontal training.

Second, detailed work process documentation and guidelines enable employees to understand their tasks and responsibilities independently, reducing the time and resources required for training. Thirdly, professional forums and communities facilitate knowledge and experience sharing among employees, easing training and enabling continuous learning and peer support. When the resources dedicated to training are reduced, the organization can invest more in value-creating activities and reduce overall costs. When employees receive ongoing supportive knowledge, a learning flow is achieved, replacing traditional learning that relies on rote memorization. In fact, implementing structured methods for knowledge accessibility allows for increased OE due to the rapid training of new employees, shortening the time of entry into the role and minimizing overlap times.

Enhanced insights and informed decision-making

KM provides employees access to relevant and updated content, facilitating informed and rapid decision-making in three key strategies. Firstly, the effective integration of information from various sources aids in creating a comprehensive and complete situation picture for informed decision-making. Secondly, the use of AI-based cognitive computing that provides tools for data analysis enables the identification of patterns and trends that were not visible to the naked eye, leading to deeper insights. Thirdly, knowledge-sharing platforms allow employees to enrich each other and make decisions based more on collective experience. When enhanced insights and informed decision-making occur, particularly regarding investment paths in times of turmoil and crisis, the organization can respond quickly and efficiently to changes in the business environment, reduce risks, and seize opportunities. This leads to improved OE, as decisions are based on quality knowledge, not on "gut feelings" that do not hold in reality.

Discussion

This research explored the role of KM in enhancing OE and elucidated the specific pathways through which KM practices can be effectively implemented to optimize operational processes. The findings reveal that CKOs perceive KM as having a profound impact on OE through five key mechanisms. The model proposes the following pathways through which KM influences OE: **(1)** reducing time to find the right knowledge, enabling personnel to allocate more time to value-creating activities; **(2)** achieving cost savings through standardized processes, leveraging lessons learned, and establishing knowledge repositories; **(3)** minimizing redundant efforts and task duplication by providing centralized access to existing knowledge; **(4)** facilitating resource allocation for role training through accessible online repositories, process documentation, and continuous peer learning; and **(5)** enhancing insights for informed decision-making by integrating disparate information sources, leveraging AI, and promoting knowledge sharing.

The CKOs reported that minimizing the duration expended in the pursuit of task-specific knowledge enables personnel to allocate more time to activities that generate operational value instead of administrative tasks. This observation is congruent with previous research suggesting that inefficient KM practices may lead to knowledge workers investing approximately 15-25% of their time in information retrieval

(Feldman, 2004). Moreover, these findings are corroborated by a recent investigation involving 716 employees and managers in post-COVID-19 pandemic government offices, which disclosed that approximately one-third of the participants expend between half to an entire workday per week solely in the pursuit of knowledge requisite for the fulfillment of their organizational duties (Nakash & Bouhnik, 2024).

The cost savings enabled by KM stem from several key mechanisms identified by the CKOs. Firstly, implementing shared practices and standardized processes across the organization ensures consistency and uniformity in operations. By aligning employees to follow established standards, the need for repeated training is reduced, and the likelihood of costly errors is minimized. This streamlining of processes contributes directly to cost savings within the organization. These benefits echo previous studies that have linked effective KM to decreased operational costs through streamlining and fostering organizational learning (Chiu & Chen, 2016; Rehman et al., 2015). The CKOs' insights extend this understanding by explicitly highlighting how minimizing redundant tasks through centralized access to existing knowledge can further boost OE within the organization.

The findings underscore the instrumental role of KM in curbing redundant work efforts and task duplication. The principle of avoiding "reinventing the wheel" is a core tenet of effective KM practices, as highlighted by the CKOs' insights. By ensuring that each worker focuses on tasks that add value rather than tasks that have already been performed or are unnecessary, organizations can foster improved OE. This aligns with the broader goal of KM to facilitate knowledge sharing and collaboration, enabling individuals and teams to build upon existing knowledge and leverage collective expertise (Bolisani & Scarso, 2021).

Another major theme was how KM optimizes training resources through accessible online repositories, process documentation, and enabling continuous peer learning. Minimizing extensive formal training reduces overhead while still ensuring employees have on-demand access to the knowledge they need. This aligns with the increasing shift towards just-in-time, self-directed learning facilitated by KM systems (Silamut & Petsangsri, 2020). Overall, the CKOs' observations resonate with the growing recognition that optimized KM infrastructure can dramatically streamline training costs and create more self-sustaining learning workflows, ultimately improving operational capabilities and efficiency.

The CKOs also highlighted KM's role in enhancing data-driven decision-making capabilities through integrating disparate information sources, leveraging AI to identify insights, and promoting knowledge sharing. Effective decisions, especially in turbulent times, are vital for operational agility and maintaining competitive positioning. These findings support prior work on KM's strategic value in environmental sensemaking and responsiveness (Litvaj et al., 2022). By facilitating informed and rapid decision-making, KM can enable organizations to respond quickly and efficiently to changes in the business environment, reduce risks, and seize opportunities, thereby enhancing overall OE.

Theoretical and practical implications

The findings demonstrate the multifaceted impact of KM in optimizing operational processes, resulting in substantial efficiency gains. This research holds significance on multiple levels, encompassing both theoretical and practical implications.

From a theoretical standpoint, the study contributes to the existing body of knowledge by providing a nuanced understanding of the pathways through which KM influences OE. By examining this relationship from the perspective of CKOs, the practical implementers of KM strategies, the research offers valuable insights into the real-world mechanisms through which KM practices can be leveraged to optimize operational processes. Furthermore, the research enriches the theoretical foundations of KM by proposing a comprehensive model that delineates the specific pathways through which KM influences OE.

From a practical standpoint, this research illuminates the path for organizations seeking to harness their "invisible assets"—the collective knowledge and expertise embedded within their workforce—to drive operational excellence and achieve long-term success. By highlighting the approaches employed by CKOs to facilitate efficient KM, this study sketches a roadmap for organizations to refine their KM initiatives and foster a culture of continuous improvement and innovation. Additionally, the findings can inform the development of targeted KM interventions within organizations tailored to address specific operational challenges and efficiency bottlenecks. Organizations can prioritize and allocate resources effectively by aligning their KM efforts with the identified mechanisms, maximizing the impact on OE.

Limitations and future research avenues

The data collected in this study relied on the retrospective accounts and experiences of the CKOs. While their expertise and real-world experiences lend credibility to the findings, retrospective data may be subject to potential recall biases or selective memory, which could influence the accuracy and completeness of the reported information. Moreover, while focusing on OE is crucial, it's equally essential to recognize that effective knowledge creation often entails exploratory processes, which may appear inefficient in the short term but can yield substantial long-term benefits. For example, research and development activities, despite their initial inefficiencies, have the potential to catalyze innovation and open new avenues for business growth. Embracing these dispersive processes alongside efficiency-oriented approaches is vital for organizations seeking to foster innovation and adaptability in dynamic market environments.

While this study provides valuable insights into the relationship between KM and OE, several avenues for future research emerge:

(1) Longitudinal studies: Conducting longitudinal studies to examine the long-term effects of KM on OE would provide a more comprehensive understanding of its impact over time. Such studies could track the implementation of KM practices and their sustained influence on operational processes, enabling a deeper appreciation of the dynamic interplay between KM and OE.

(2) Technological advancements in KM: As emerging technologies such as AI, machine learning, and big data analytics continue to evolve, their integration with KM systems may unlock new avenues for optimizing operational processes and driving efficiency gains. Future research should explore the role of these technological advancements in KM and their potential to enhance OE further.

(3) Quantitative and Economic Measurement Approaches: Introducing methods to quantitatively or economically measure the impact of KM on the identified OE dimensions is crucial for advancing research in this domain. By developing robust measurement approaches, CKOs can systematically evaluate the effectiveness of KM activities in enhancing different aspects of operational excellence highlighted in the study. They also will enable CKOs to prioritize and allocate resources to those activities that yield the most significant impact on OE.

(4) Integration with other organizational practices: Investigating the interplay between KM and other organizational practices, such as lean management, continuous improvement initiatives, or digital transformation efforts, could shed light on potential synergies and complementarities that could further amplify the impact on OE.

By addressing these future research directions, scholars and practitioners can deepen their understanding of the intricate relationship between KM and OE, leading to more effective strategies for leveraging knowledge as a catalyst for operational excellence and sustained organizational success.

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