E-ISSN: 3108-4176

APSSHS

Academic Publications of Social Sciences and Humanities Studies
2021, Volume 2, Page No: 161-176
Available online at: https://apsshs.com/

Annals of Organizational Culture, Leadership and External Engagement Journal

# Assessing How Excellence Practices Influence Organizational Performance: The Mediating Role of Knowledge Management in Mobile Network Operators

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**Abstract**

This research seeks to examine how the EFQM excellence model—specifically through its direction and execution dimensions, referred to as directional excellence practices (DEPs) and executional excellence practices (EEPs)—influences organizational performance (OP). Additionally, it explores the mediating effect of knowledge management processes (KMPs) in the links between these excellence practices and OP. Data were gathered via a questionnaire distributed to middle and senior managers in four mobile network operators (MNOs) operating in Yemen, yielding 219 usable responses for analysis. The hypothesized model was tested using the disjoint two-stage structural equation modeling (SEM) method in SmartPLS software. Empirical evidence revealed partial complementary mediation by KMPs in the association between DEPs and OP, alongside complete mediation by KMPs in the connection between EEPs and OP. These outcomes suggest that KMPs enhance the positive effects of DEPs on OP but diminish the direct effects of EEPs on OP. To the authors' best knowledge, this work offers a novel exploration of the interplay among DEPs, EEPs, and OP, with KMPs serving as a mediator, within the context of MNOs, thereby enriching the limited body of research on these interrelated concepts.

**Keywords:** Organizational excellence practices, EFQM, Knowledge management processes, Organizational performance, Partial Least Squares-Structural Equation Modelling

**How to cite this article:** De Santis M, Romano GF, Conti P. Assessing how excellence practices influence organizational performance: The mediating role of knowledge management in mobile network operators. Ann Organ Cult Leadersh Extern Engagem J. 2021;2:161-76. https://doi.org/10.51847/X0VrLV9TBK

**Received:** 16 January 2021; **Revised:** 08 April 2021; **Accepted:** 12 April 2021
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## Introduction

Amid volatile business conditions, companies pursue superior performance and sustained competitive edges by developing vital strategic assets [1]. Increasingly, they move away from heavy dependence on tangible assets toward greater reliance on intellectual capital [2]. This shift is grounded in the knowledge-based view (KBV) theory, which positions knowledge as a primary strategic resource [3] capable of boosting competitiveness [4] and enhancing overall organizational performance (OP) [5]. Realizing these benefits requires effective handling and deployment of knowledge assets.

Knowledge management (KM) functions as a valuable intangible resource essential for securing competitive advantages [6]. It encompasses structured activities such as generating, disseminating, and utilizing knowledge across individuals, groups, and the broader organization to optimize knowledge resources [5, 7]. Such activities enable firms to meet strategic objectives [2] and foster competitive superiority [8]. Numerous studies highlight the adverse consequences of inadequate knowledge management processes on value generation and long-term success [5, 9]. To fully grasp knowledge flows within firms, it is essential to construct a robust KM framework that incorporates varied processes [2]. These frameworks and activities align with the pursuit of excellence outlined by Peters and Waterman [10]. As defined by the American Society for Quality [11], organizational excellence (OE) involves delivering sustained superior results that surpass stakeholder expectations. OE

approaches include the strategies organizations employ to attain exceptional outcomes. The updated European Foundation for Quality Management Excellence Model (EFQM-EM) adopts a holistic perspective, notably emphasizing direction and execution aspects [12]. The direction aspect establishes foundational guidance for navigating toward success via directional excellence practices (DEPs) [12]. In contrast, executional excellence practices (EEPs) address the practical realization of strategies, focusing on how organizations plan to achieve their goals [12]. Prior research underscores the synergy between excellence initiatives and knowledge management as key enablers of enduring competitive benefits and performance [13, 14]. Combining DEPs and EEPs from the EFQM framework offers an integrated pathway to excellence, harmonizing strategic aims with operational strengths, and advancing scholarship in strategic and organizational theory.

Although synergies exist in combining excellence approaches and KMPs to drive exceptional performance [14], scholarship lacks robust connections between the updated EFQM-EM dimensions (post-2020) and OP, particularly via KMPs. Earlier works primarily examined either the effects of KMPs on OP [5, 9, 15] or relied on outdated EFQM versions to assess impacts on OP [16, 17]. Theoretically, further investigation is warranted into how these dimensions operate in MNOs, especially in emerging markets such as Yemen, considering their role in national economies.

MNOs contribute substantially to economic growth, generating $4.5 trillion globally in 2021 [18] (GSMA, 2022) and averaging 7% of Yemen's GDP from 2015 to 2018 [19]. Yet, Yemen's MNO sector faces performance hurdles, with subscription rates falling below regional norms and declining 11% since 2015, leading to reduced telecom access for the population (International Telecom Union [20]; Fadhl & Sacchetto [19]). This reflects gaps in strategic alignment and stakeholder value delivery. Integrating excellence practices—emphasizing strategic direction (via EFQM DEPs) and stakeholder-focused execution (via EFQM EEPs)—with KMPs emerges as critical for sustainable advantages and performance [13, 14]. This combination, as proposed here, is supported by knowledge exchange among stakeholders to foster collaborative progress toward shared goals and elevated excellence in MNOs.

Although existing works explore links between excellence practices and knowledge management in varied ways, including EFQM-KM interactions and OP [13, 14], this research stands out by integrating the two core enabler dimensions from the latest EFQM iteration—namely, directional excellence practices (DEPs) and executional excellence practices (EEPs) [21]—with KMPs and OP in a unified framework. In particular, it addresses these research questions (RQs):

RQ1. Do EFQM-EM DEPs and/or EEPs affect KMPs?

RQ2. Does KMPs affect OP?

RQ3. Do EFQM-EM DEPs and/or EEPs affect OP?

RQ4. Does KMPs mediate the associations between EFQM-EM dimensions and OP?

The paper begins with a review of relevant theory to clarify variable relationships and formulate hypotheses. The methodology section details the approach and measurement tools. Findings are then presented, illustrating how EFQM-EM dimensions shape OP via KMPs, advancing empirical work in knowledge management. The conclusion addresses implications, constraints, and avenues for further inquiry, highlighting at least four key theoretical and practical advancements. It delivers initial empirical insights into how KM mechanisms mediate ties between the EFQM enablers (DEPs and EEPs) and OP, building on prior efforts [13, 22] and addressing underexamined aspects. The work also answers appeals for deeper examination of varied knowledge processes' effects on performance [5, 23]. Moreover, it responds to suggestions for distinguishing soft and hard EFQM elements [24] and exploring advanced performance models [25]. Practically, the results offer MNOs guidance on leveraging KMPs to refine OE initiatives.

## *Theoretical foundation and hypotheses development*

### *Theoretical underpinnings*

The relationships among the study variables are elucidated through an integration of the resource-based view (RBV) theory [4], the knowledge-based view (KBV) theory [3], and contingency theory [26]. Within the RBV framework, directional excellence practices (DEPs) and executional excellence practices (EEPs) are regarded as critical resources and capabilities that enhance organizational performance [27, 28]. Elements of DEPs, including strategy formulation, cultural alignment, and leadership, combined with EEPs such as stakeholder involvement, sustainable value generation, and performance-driven transformation [12], collectively build strategic advantages. The unique strategic and operational knowledge embedded in these excellence practices—knowledge that rivals find hard to imitate—drives competitive superiority and elevated organizational performance [4].

DEPs draw heavily on strategic knowledge to establish organizational pathways, whereas EEPs leverage operational knowledge to implement those pathways. Extending the RBV, the KBV theory underscores the role of knowledge management processes in converting and adapting knowledge into core capabilities [2]. DEPs cultivate an environment oriented toward knowledge by promoting ongoing scanning and dissemination of market trends and shifts. To realize these strategies, EEPs necessitate the deployment of operational knowledge through stakeholder collaboration, value enhancement,

and organizational change initiatives [12]. Thus, under KBV, both DEPs and EEPs serve as pivotal resources that support knowledge generation, dissemination, and utilization.

Knowledge management processes enable organizational resources and capabilities (namely DEPs and EEPs) to adjust to external dynamics [3]. Contingency theory, as articulated by Donaldson [26], posits that firms must align their structures with environmental contingencies to optimize performance. Such adaptability is particularly crucial for maintaining superior results in volatile sectors like mobile telecommunications. Knowledge management processes act as mediators between excellence practices and performance by mobilizing knowledge resources to address environmental demands, thereby facilitating efficient knowledge creation, acquisition, storage, sharing, and application to boost organizational outcomes [5, 29].

By synthesizing these theories, a comprehensive foundation emerges for examining how DEPs and EEPs, through the mediation of knowledge management processes, affect organizational performance. RBV emphasizes the value of resources for performance gains [4], KBV highlights the primacy of knowledge assets [3], and contingency theory advocates for adaptive resource alignment to sustain excellence [26]. This integrated lens not only clarifies inter-variable dynamics but also provides guidance on leveraging excellence practices alongside knowledge management to achieve outstanding performance.

### *Organizational excellence practices and knowledge management processes*

Organizational excellence represents a strategic approach encompassing decision-making, customer orientation, quality commitment, ethical standards, cultural strength, social accountability, and long-term sustainability [30]. Since its inception in 1991, the EFQM Excellence Model (EFQM-EM) has become a widely recognized tool for advancing quality and performance worldwide [30]. The 2020 iteration of the EFQM-EM features a holistic structure with distinct direction and execution dimensions [12]. The direction dimension, comprising strategy, culture, and leadership elements, steers organizations toward success via directional excellence practices (DEPs) [12]. The execution dimension, encompassing stakeholder engagement, sustainable value creation, and performance/transformation drivers, is embodied in executional excellence practices (EEPs) [12]. Excellence frameworks play a key role in embedding knowledge management efforts [2].

The notion of knowledge management, pioneered by Nonaka and Takeuchi [31], centers on harnessing knowledge resources. It has been examined through multiple lenses [2, 6, 7]. As a hard-to-imitate intangible asset, KM provides a potent source of competitive edge [6]. Although definitions of knowledge management processes vary, this study adopts five core processes identified in prior work: knowledge creation, acquisition, storage, sharing, and application [9, 29, 32-34].

Effective knowledge management, similar to other systems, demands an overarching structure that unites varied processes [2]. This research proposes that DEPs serve as antecedents to knowledge management processes. Existing evidence reveals linkages and complementarities between KMPs and DEP components, including strategic planning [35] as well as culture and leadership [36, 37]. Comparable alignments exist between KM and EEP aspects, such as stakeholder involvement [38].

Prior investigations have identified interconnections between EFQM elements and knowledge management processes [13, 14]. The EFQM-EM encourages knowledge handling, with studies showing that certified quality organizations exhibit stronger knowledge practices [39]. From a KBV perspective—as an outgrowth of RBV—excellence practices (DEPs and EEPs) constitute essential internal assets reliant on knowledge, connecting to KMPs to convert knowledge into strategic strengths [3] that bolster competitiveness and performance [4].

DEPs can markedly shape KMPs; for example, a knowledge-valuing culture promotes robust management [5]. Similarly, EEPs influence KMPs via stakeholder interactions that stimulate knowledge generation and exchange, enriching ties with customers, suppliers, or partners and strengthening the overall knowledge infrastructure. Accordingly, the hypotheses are proposed as follows:

H1. DEPs have a significant effect on KMPs.

H2. EEPs have a significant effect on KMPs.

### *The relationship between knowledge management processes and organizational performance*

Within the context of competitive market environments, the connection between knowledge management processes (KMPs) and organizational performance (OP) holds a central position. Drawing from the knowledge-based view of the firm, these processes leverage converted internal assets [3] to foster enhanced OP [5].

Empirical investigations indicate a linkage between KMPs and OP [29]. For example, knowledge management strengthens workforce abilities for collaborative learning through the sharing of both internal and external knowledge, which in turn boosts operational effectiveness and elevates overall organizational performance [40]. Earlier research has substantiated positive associations between KMPs and OP [5, 9]. In contrast, Obeso *et al.* [34] found that knowledge storage does not exert a direct effect on performance. Considering these contrasting findings along with the supporting data, the hypothesis below was formulated:

H3. There is a significant impact of KMPs on OP.

### *Excellence practices in organizations and their effects on performance*

The EFQM Excellence Model (EFQM-EM) is designed to facilitate the attainment of superior performance outcomes [16, 17, 28, 41, 42]. The association between organizational excellence practices—specifically directional excellence practices (DEPs) and executional excellence practices (EEPs)—and OP is examined through multiple theoretical lenses.

From the perspective of the resource-based view, DEPs are regarded as mechanisms that configure resources to establish enduring competitive edges [4], particularly in areas such as organizational strategy [16, 43, 44], culture [45, 46], and leadership [16, 47]. Similarly, under the resource-based view, EEPs represent critical competencies that enable organizations to optimize resources for achieving exceptional performance.

Moreover, informed by resource-based theory, EEPs play a vital role in deploying organizational resources effectively to deliver outstanding results. Organizations accomplish this by involving key stakeholders [48], generating lasting value [16, 49], and promoting performance improvement and organizational change [50, 51]. In addition, stakeholder theory [52] offers an explanation for the connections among DEPs, EEPs, and OP by emphasizing stakeholder participation and value generation.

Exploring these interactions is crucial for clarifying how DEPs and EEPs relate to OP, providing insights into strategic coherence, stakeholder integration, and holistic methods for value generation that support present performance while paving the way for ongoing transformation.

In light of these diverse theoretical angles and empirical support, the hypotheses listed below were developed to test the associations between the specified excellence practices (DEPs and EEPs) and OP:

H4. Directional excellence practices significantly affect organizational performance.

H5. Executional excellence practices significantly affect organizational performance.

Knowledge Management Processes as a Mediator in the Relationships Between Directional and Executional Excellence Practices and Organizational Performance

A substantial body of research has established a robust association between organizational excellence (OE) and organizational performance (OP), consistently demonstrating that greater adoption of excellence practices leads to superior performance outcomes [16, 17, 41, 42]. Prior investigations have further identified connections and complementary effects between knowledge management processes (KMPs) and excellence practices [13, 14, 33]. Moreover, knowledge management has been acknowledged as a key driver in elevating organizational performance [5, 9].

This research examines the strategic importance of resources (specifically directional excellence practices, or DEPs) and capabilities (specifically executional excellence practices, or EEPs), exploring how they foster organizational performance and sustained competitive advantage by leveraging the firm's critical asset of knowledge. The resource-based view (RBV) theory provides a robust framework for understanding how excellence practices (DEPs and EEPs) affect KMPs as a mediating mechanism, ultimately influencing OP. Both DEPs and EEPs are viewed as essential resources and capabilities capable of positively shaping organizational performance [16, 17, 41]. Well-implemented KMPs amplify the effectiveness and application of these resources [29].

Positioned as a mediator, KMPs align closely with the core tenets of RBV theory, which emphasize the integration and deployment of resources and capabilities to achieve superior performance and competitive edge. Additionally, through the lens of contingency theory [26], KMPs play a vital role in dynamically reconfiguring organizational resources and capabilities to adapt to environmental shifts, thereby influencing performance outcomes. KMPs facilitate the seamless alignment of strategic direction and cultural elements (from the DEPs standpoint) with effective strategy implementation (from the EEPs standpoint) [40]. This alignment occurs through the dissemination of shared goals, enabling stakeholders to collaborate effectively toward a common vision and strategic objectives, which ultimately enhances service quality and risk mitigation in challenging sectors, such as mobile network operators (MNOs).

To fill this identified gap in the literature, the present study aims to explore the mediating function of KMPs in the relationships between DEPs, EEPs, and OP. The conceptual framework guiding this investigation is depicted in **Figure 1**. Accordingly, the hypotheses below are proposed to integrate these constructs:

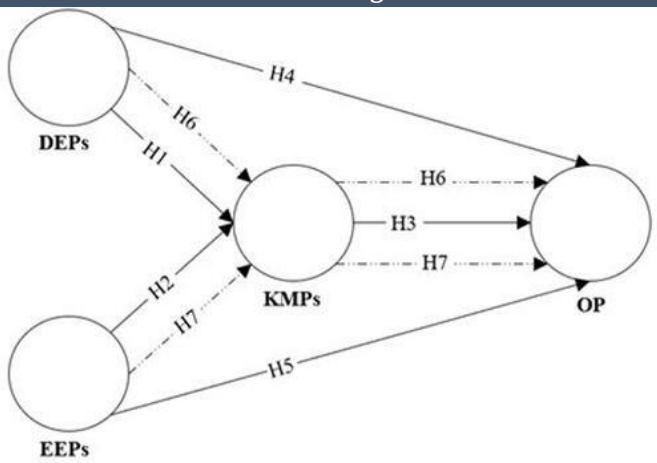


**Figure 1.** Conceptual Framework

H6: Knowledge management processes (KMPs) play a significant mediating role in the relationship between directional excellence practices (DEPs) and organizational performance (OP).
H7: Knowledge management processes (KMPs) play a significant mediating role in the relationship between executional excellence practices (EEPs) and organizational performance (OP).

## Materials and Methods

### *Research approach*

This investigation adopts a quantitative methodology to investigate and elucidate the interconnections among the variables [53], relying on numerical data collection [54]. Before proceeding to primary data analysis, essential preparatory procedures were implemented, including checks for data standard deviation [27] and evaluations for common method variance [55]. These measures were undertaken to guarantee the data's precision, integrity, and suitability for subsequent examination [54]. Various analytical techniques were applied via the Statistical Package for the Social Sciences (SPSS®) and Smart Partial Least Squares (SmartPLS®) programs. The Partial Least Squares Structural Equation Modeling (SEM-PLS) approach facilitates concurrent mediation analysis through a two-step procedure that evaluates both direct and indirect effects [53]. This two-step method serves as an option to the repeated-indicator technique [56]. Here, the disjoint modeling strategy was employed.
For validating the research framework and hypotheses, a dual-phase protocol was executed in SmartPLS®. Phase one focused on evaluating the measurement model, beginning with tests for reliability and convergent validity of the first-order constructs. Subsequently, higher-order constructs underwent scrutiny to confirm their validity. Phase two centered on the structural model evaluation, incorporating metrics such as explanatory capacity, predictive relevance, and the statistical significance of path coefficients. Leveraging the outcomes from these path coefficients, empirical tests were conducted on the hypotheses, encompassing direct effects and mediation analyses.
Ethical clearance for this research was obtained from the Institutional Review Committee (IRC) at the Center of Business Administration (Ref. No.: 000-164, dated 14 November 2022). All participants received comprehensive information regarding the study's protocols, data privacy measures, and other relevant aspects prior to involvement. Inclusion was restricted to those who provided explicit voluntary consent.

### *Target population and data gathering*

The organizational entity served as the primary unit of analysis in this study. Primary data were gathered from employees at middle and senior management tiers across four mobile network operators (MNOs) in Yemen, positions typically accountable for oversight of management systems and overall performance metrics. The accessible population comprised 256 such employees from these four Yemeni MNOs. A comprehensive census sampling technique was utilized [54]. Accordingly, 256 survey instruments were distributed, yielding 236 fully completed returns from the organizations. Researcher involvement was kept to a minimum, limited mainly to questionnaire dissemination to firms or individuals and clarification of any participant queries.
To detect potential response inconsistencies or straight-lining, an auxiliary check on data standard deviation was performed. As outlined by Collier [27], cases exhibiting a standard deviation under 0.25 warrant exclusion owing to insufficient response variability across the instrument. In this instance, 17 such cases were identified among the 236 returns. Thus, 219 questionnaires remained viable for advanced analysis, equating to 86% of the original target population.

### *Measurement instruments*

The survey instrument was constructed by adapting established scales from prior scholarly works, subjected to validation by a panel comprising 11 academic specialists. Revisions were made based on the panel's recommendations. A seven-point Likert-type response format was employed across 66 items **(Table 1)**. Directional excellence practices (DEPs) were assessed via 16 items, and executional excellence practices (EEPs) via 19 items, both drawn from the EFQM [12] criteria for direction and execution dimensions [57]. Knowledge management processes were gauged with 21 items sourced and modified from extant literature [9, 29, 32, 33]. Organizational performance (OP) was evaluated using 10 items adapted from the EFQM (2021) results dimension criteria [57].

**Table 1.** Results for Factor Loadings, Outer Weights, Reliability, and Convergent Validity

| Constructs (HOCs) | Items (Reworded) | Dimensions (LOCs) | Loadings | Outer Weights | AVE | *α* | CR |
|---|---|---|---|---|---|---|---|
| **Directional Excellence Practices** | Organizational strategy | Organizational Strategy | 0.987 | 0.786 | 0.607 | 0.895 | 0.892 |
| | The organization operates with a clearly articulated long-term vision. | OS1 | 0.783 | | | | |
| | The organization routinely gathers information on the expectations of its key stakeholders. | OS2 | 0.792 | | | | |
| | Priority is given to addressing the needs and expectations of major stakeholders. | OS3 | 0.776 | | | | |
| | The organization consistently collects information about its ecosystem and external environment. | OS4 | 0.754 | | | | |
| | Diverse data sources are analyzed when developing scenarios related to market trends and challenges. | OS5 | 0.778 | | | | |
| | Strategic options are designed to align with market developments and address critical challenges. | OS6 | 0.761 | | | | |
| | Objectives and key performance indicators related to change and development are continuously updated. | OS7 | 0.806 | | | | |
| | Organizational culture | Organizational Culture | 0.834 | 0.058 | 0.643 | 0.869 | 0.861 |
| | The organization establishes and promotes core values and principles that guide its culture. | OC1 | 0.822 | | | | |
| | Organizational values and principles are reflected in employees' interactions with customers. | OC2 | 0.699 | | | | |
| | A supportive environment is created that encourages learning from past experiences without blame. | OC3 | 0.843 | | | | |
| | Creativity and innovation are embedded within the organizational culture to support strategic goals. | OC4 | 0.842 | | | | |
| | Goals and objectives motivate individuals and teams to think creatively and innovatively. | OC5 | 0.796 | | | | |
| | Organizational leadership | Organizational Leadership | 0.840 | 0.209 | 0.712 | 0.869 | 0.865 |
| | Management clearly communicates the organization's vision and strategy to stakeholders. | OL1 | 0.821 | | | | |
| | Stakeholder contributions are recognized to sustain their active involvement. | OL2 | 0.880 | | | | |
| | Leaders involve stakeholders in celebrating achievements to reinforce positive behaviors. | OL3 | 0.869 | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Leadership inspires employees to maintain continuous commitment and high performance. | OL4 | 0.803 | | | | |
| **Executional Excellence Practices** | Engaging stakeholders | Engaging Stakeholders | 0.913 | 0.352 | 0.649 | 0.868 | 0.865 |
| | Long-term relationships with customers are built through effective communication channels. | ESs1 | 0.843 | | | | |
| | The organization proactively responds to the reasonable needs and expectations of employees. | ESs2 | 0.791 | | | | |
| | Relationships with key stakeholders are maintained on the basis of mutual benefit. | ESs3 | 0.806 | | | | |
| | Financial resources are allocated to support community development and social responsibility. | ESs4 | 0.781 | | | | |
| | Relationships with strategic partners are characterized by trust and reciprocal value. | ESs5 | 0.807 | | | | |
| | Creating sustainable value | Creating Sustainable Value | 0.929 | 0.385 | 0.687 | 0.916 | 0.909 |
| | Services are developed in line with both current and anticipated customer needs. | CSV1 | 0.857 | | | | |
| | Competitive differentiators are clearly identified and integrated into the value offered. | CSV2 | 0.823 | | | | |
| | Differentiators are communicated through effective and targeted marketing messages. | CSV3 | 0.811 | | | | |
| | Advanced strategies are employed to market differentiated services effectively. | CSV4 | 0.886 | | | | |
| | Social and environmental impacts are considered to ensure long-term value creation. | CSV5 | 0.784 | | | | |
| | Service delivery consistently meets the expectations of targeted customer groups. | CSV6 | 0.810 | | | | |
| | Driving performance and transformation | Driving Performance and Transformation | 0.928 | 0.346 | 0.630 | 0.920 | 0.916 |
| | A robust performance management system supports the achievement of organizational goals. | DPT1 | 0.788 | | | | |
| | Comprehensive risk management plans (e.g., technological and cybersecurity risks) are in place. | DPT2 | 0.799 | | | | |
| | Transformation and change requirements are periodically identified to anticipate future challenges. | DPT3 | 0.795 | | | | |
| | Innovations are leveraged to improve current operations and enable future transformation. | DPT4 | 0.854 | | | | |
| | Modern technological capabilities support service delivery. | DPT5 | 0.713 | | | | |
| | Technological resources are effectively utilized to generate sustainable value. | DPT6 | 0.790 | | | | |
| | Financial resources are managed in a balanced manner to ensure strong performance. | DPT7 | 0.803 | | | | |
| | Critical assets and resources are managed efficiently. | DPT8 | 0.799 | | | | |
| **Organizational Performance** | Stakeholder perceptions | Stakeholders Perceptions | 0.888 | 0.335 | 0.618 | 0.856 | 0.846 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Customer satisfaction regarding service quality shows continuous improvement. | SPs1 | 0.803 | | | | |
| | The organization experiences ongoing growth in market share. | SPs2 | 0.830 | | | | |
| | Employees' job satisfaction levels steadily improve. | SPs3 | 0.714 | | | | |
| | Stakeholder confidence in risk management practices increases over time. | SPs4 | 0.776 | | | | |
| | Community members report high satisfaction with the organization's social responsibility efforts. | SPs5 | 0.803 | | | | |
| | Strategic and operational performance | Strategic and Operational Performance | 0.977 | 0.719 | 0.603 | 0.843 | 0.835 |
| | Performance outcomes align with the expectations of key stakeholders. | SOP1 | 0.810 | | | | |
| | Financial results are consistent with organizational expectations and ambitions. | SOP2 | 0.792 | | | | |
| | Strategic objectives are achieved according to plan. | SOP3 | 0.760 | | | | |
| | Change and transformation initiatives meet stakeholder expectations. | SOP4 | 0.696 | | | | |
| | Past and current performance results are systematically analyzed to forecast future outcomes. | SOP5 | 0.819 | | | | |
| **Knowledge Management Processes** | Knowledge creation | Knowledge Creation | 0.872 | 0.299 | 0.594 | 0.788 | 0.773 |
| | Knowledge creation is embedded within the organization's philosophy and culture. | KCr1 | 0.796 | | | | |
| | Insights from previous projects are used to enhance future initiatives. | KCr2 | 0.812 | | | | |
| | Formal internal processes support the creation of new knowledge. | KCr3 | 0.868 | | | | |
| | Management promotes dialogue and discussion to stimulate knowledge generation. | KCr4 | 0.710 | | | | |
| | Development-oriented research activities are undertaken to create knowledge. | KCr5 | 0.735 | | | | |
| | Knowledge acquisition | Knowledge Acquisition | 0.885 | 0.396 | 0.594 | 0.788 | 0.773 |
| | Employees are provided with external information sources to acquire new knowledge. | KAc1 | 0.818 | | | | |
| | Comparable organizations and market trends serve as key sources of acquired knowledge. | KAc2 | 0.752 | | | | |
| | Experts and research institutions are important channels for knowledge acquisition. | KAc3 | 0.794 | | | | |
| | Employees receive regular training to support knowledge acquisition. | KAc4 | 0.713 | | | | |
| | Knowledge storage | Knowledge Storage | 0.844 | 0.378 | 0.615 | 0.793 | 0.791 |
| | Modern and suitable archiving systems are used to document knowledge. | KSt1 | 0.757 | | | | |
| | Databases enable employees to access stored knowledge when needed. | KSt2 | 0.753 | | | | |
| | Knowledge repositories on internal networks meet user requirements. | KSt3 | 0.808 | | | | |
| | Knowledge databases are updated regularly. | KSt4 | 0.817 | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Knowledge sharing | Knowledge Sharing | 0.750 | −0.020 | 0.565 | 0.752 | 0.743 |
| | Digital applications facilitate timely access to and exchange of knowledge. | KSh1 | 0.663 | | | | |
| | Employees who share innovative ideas and information are rewarded. | KSh2 | 0.735 | | | | |
| | Dedicated teams and projects are established to support knowledge exchange. | KSh3 | 0.799 | | | | |
| | Up-to-date knowledge and market trends are regularly shared through multiple channels. | KSh4 | 0.800 | | | | |
| | Knowledge application | Knowledge Application | 0.709 | 0.119 | 0.572 | 0.757 | 0.753 |
| | Newly created or acquired knowledge is routinely applied to address operational issues. | KAp1 | 0.721 | | | | |
| | Acquired knowledge is utilized to develop new services. | KAp2 | 0.732 | | | | |
| | Experiential knowledge from employees is used to enhance operational and financial performance. | KAp3 | 0.804 | | | | |
| | Knowledge is applied in the formulation and development of organizational strategies. | KAp4 | 0.765 | | | | |

**Note:** OS: organizational strategy; OC: organizational culture; OL: organizational leadership; ESs: engaging stakeholders; CSV: creating sustainable value; DPT: driving performance and transformation; SPs: stakeholder perceptions; SOP: strategic and operational performance; KCr: knowledge creation; KAc: knowledge acquisition; KSt: knowledge storage; KSh: knowledge sharing; KAp: knowledge application; HOC: higher-order construct; LOC: lower-order construct.

### *Common method bias*

Common method bias (CMB) represents a potential issue where systematic error variance arises among measured items due to the shared data collection approach [55]. To evaluate the presence of CMB, Harman's single-factor test was applied. The analysis revealed that a single factor accounted for 37.13% of the total variance. As noted by Podsakoff *et al.* [55], when no single factor explains 50% or more of the variance, this indicates that CMB does not substantially affect the findings. Accordingly, common method bias is not a concern in this research.

## Results and Discussion

### *Evaluation of the measurement model for first-order constructs*

### *Reliability of constructs and convergent validity*

The majority of item loadings surpassed 0.708 **(Table 1)**, with the exceptions being KSh1 (0.663), SOP4 (0.696), and OC2 (0.699). These loadings still surpass the minimum acceptable level of 0.50 [53], reflecting adequate linkages between each construct and its indicators [53]. **Table 1** presents the measurement model evaluation details for the first-order reflective constructs. Composite reliability (CR) scores varied between 0.838 and 0.931, while Cronbach's alpha (α) scores ranged from 0.743 to 0.916. Such figures demonstrate strong internal consistency reliability across all first-order reflective constructs.

In addition, the average variance extracted (AVE) for each first-order construct was above the established cutoff of 0.50. This confirms that the items associated with each construct exhibit sufficient shared variance, thereby supporting adequate convergent validity for all first-order constructs.

### *Assessment of discriminant validity*

Examination of the Fornell-Larcker criterion through the square roots of AVEs **(Table 2)** showed that these values generally surpassed the correlations with other constructs, with one minor exception involving CSV relative to DPT (0.793 compared to 0.800). Nevertheless, the Heterotrait-Monotrait (HTMT) ratios **(Table 3)** remained below the strict cutoff of 0.90. Given that the Fornell-Larcker criterion is frequently inadequate for detecting discriminant validity concerns [58], the results affirm that discriminant validity is satisfactorily established.

**Table 2**. Discriminant validity – first-order constructs (Fornell and Larcker)

| | SPS | SOP | OS | OL | OC | KSt | KSh | KCr | KAp | KAc | ESs | DPT | CSV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CSV | | | | | | | | | | | | | **0.829** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DPT | | | | | | | | | | | | **0.793** | 0.800 |
| ESs | | | | | | | | | | | **0.806** | 0.776 | 0.758 |
| Kac | | | | | | | | | | **0.770** | 0.565 | 0.615 | 0.576 |
| KAp | | | | | | | | | **0.756** | 0.557 | 0.504 | 0.444 | 0.473 |
| KCr | | | | | | | | **0.786** | 0.577 | 0.719 | 0.578 | 0.621 | 0.586 |
| KSh | | | | | | | **0.751** | 0.624 | 0.675 | 0.635 | 0.530 | 0.533 | 0.519 |
| KSt | | | | | | **0.784** | 0.664 | 0.613 | 0.556 | 0.582 | 0.510 | 0.572 | 0.559 |
| OC | | | | | **0.802** | 0.530 | 0.461 | 0.496 | 0.398 | 0.515 | 0.640 | 0.623 | 0.637 |
| OL | | | | **0.844** | 0.778 | 0.499 | 0.478 | 0.534 | 0.402 | 0.483 | 0.665 | 0.653 | 0.627 |
| OS | | | **0.779** | 0.745 | 0.781 | 0.532 | 0.444 | 0.557 | 0.426 | 0.560 | 0.661 | 0.684 | 0.654 |
| SOP | | **0.777** | 0.606 | 0.476 | 0.454 | 0.480 | 0.388 | 0.473 | 0.378 | 0.510 | 0.520 | 0.489 | 0.533 |
| SPS | **0.786** | 0.770 | 0.553 | 0.426 | 0.413 | 0.450 | 0.381 | 0.418 | 0.419 | 0.435 | 0.501 | 0.451 | 0.464 |

**Table 3**. Discriminant validity – First-order constructs (HTMT)

| | SPs | SOP | OS | OL | OC | KSt | KSh | KCr | KAp | KAc | ESs | DPT | CSV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CSV | | | | | | | | | | | | | |
| DPT | | | | | | | | | | | | | 0.875 |
| ESs | | | | | | | | | | | | 0.866 | 0.849 |
| KAc | | | | | | | | | | | 0.677 | 0.725 | 0.676 |
| KAp | | | | | | | | | | 0.708 | 0.608 | 0.513 | 0.556 |
| KCr | | | | | | | | | 0.707 | 0.877 | 0.665 | 0.695 | 0.660 |
| KSh | | | | | | | | 0.774 | 0.890 | 0.818 | 0.649 | 0.623 | 0.613 |
| KSt | | | | | | | 0.845 | 0.747 | 0.710 | 0.741 | 0.609 | 0.665 | 0.649 |
| OC | | | | | | 0.636 | 0.565 | 0.574 | 0.490 | 0.616 | 0.739 | 0.696 | 0.718 |
| OL | | | | | 0.895 | 0.600 | 0.591 | 0.617 | 0.489 | 0.583 | 0.767 | 0.729 | 0.702 |
| OS | | | | 0.849 | 0.893 | 0.631 | 0.537 | 0.634 | 0.516 | 0.661 | 0.746 | 0.748 | 0.720 |
| SOP | | | 0.689 | 0.555 | 0.527 | 0.590 | 0.477 | 0.560 | 0.455 | 0.621 | 0.600 | 0.549 | 0.600 |
| SPs | | 0.900 | 0.617 | 0.485 | 0.467 | 0.541 | 0.459 | 0.479 | 0.494 | 0.506 | 0.573 | 0.492 | 0.516 |

### *Evaluation of the measurement model for second-order constructs*

To evaluate the validity of the higher-order formative constructs, which are composed of thirteen lower-order constructs as depicted in **Figure 2**, an analysis of collinearity issues, outer weights, and loadings of the lower-order constructs (LOCs) onto the higher-order constructs (HOCs) was conducted **(Table 1)**.

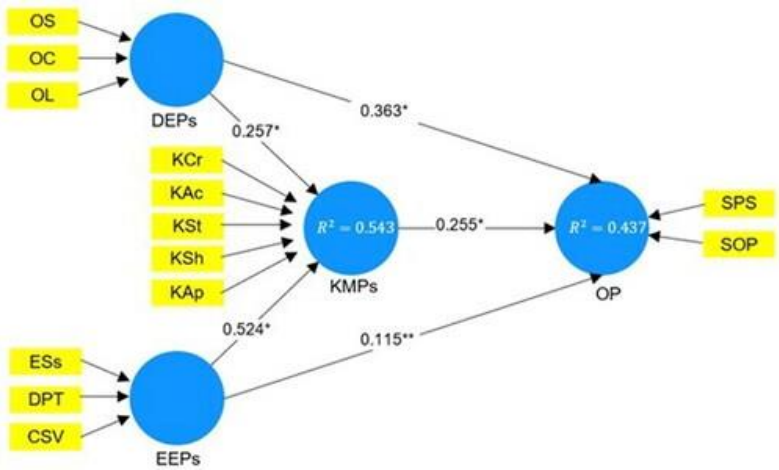


**Figure 2**. Second-order measurement constructs

The VIF values were all below the threshold of 5 [56], falling within the acceptable limits and signifying the absence of notable multicollinearity problems among the dimensions in the model. Thus, the results verify that collinearity does not pose an issue [56].

### *Evaluation of outer weights and loadings for lower-order constructs on higher-order constructs*

Reviewing the validation results for the higher-order constructs presented in **Table 4**, most outer weights of the lower-order components (LOCs) contributing to the higher-order constructs (HOCs) were statistically significant, with the exceptions of OL, OC, KSh, and KAp. Nonetheless, examination of the outer loadings in **Table 4** reveals that all exceeded the 0.5 cutoff and achieved statistical significance. As recommended by Hair *et al.* [56], indicators should be retained when their outer

weights lack significance but their outer loadings are both significant and substantial (≥ 0.50). Since these conditions were fully satisfied, the higher-order constructs were deemed valid.

**Table 4**. Higher order construct validation

| Variables | Dimensions | VIF | Outer weights | T Statistics | *p* Values | Outer loadings | *p* Values |
|---|---|---|---|---|---|---|---|
| DEPs | OS | 2.921 | 0.786 | 5.411 | 0.000 | 0.987 | 0.000 |
| | OC | 3.291 | 0.058 | 0.392 | **0.347** | 0.834 | 0.000 |
| | OL | 2.888 | 0.209 | 1.567 | **0.059** | 0.840 | 0.000 |
| EEPs | ESs | 2.894 | 0.352 | 2.780 | 0.003 | 0.913 | 0.000 |
| | CSV | 3.199 | 0.385 | 2.987 | 0.001 | 0.929 | 0.000 |
| | DPT | 3.431 | 0.346 | 2.664 | 0.004 | 0.928 | 0.000 |
| OP | SPs | 2.453 | 0.335 | 2.628 | 0.004 | 0.888 | 0.000 |
| | SOP | 2.453 | 0.719 | 6.236 | 0.000 | 0.977 | 0.000 |
| KMPs | KCr | 2.490 | 0.299 | 2.874 | 0.002 | 0.872 | 0.000 |
| | KAc | 2.400 | 0.396 | 3.826 | 0.000 | 0.885 | 0.000 |
| | KSt | 2.073 | 0.378 | 3.576 | 0.000 | 0.844 | 0.000 |
| | KSh | 2.611 | −0.020 | 0.196 | **0.422** | 0.750 | 0.000 |
| | KAp | 2.023 | 0.119 | 1.358 | **0.087** | 0.709 | 0.000 |

Following confirmation that the reliability and validity requirements for the measurement model were satisfied for both lower-order constructs (LOCs) and higher-order constructs (HOCs), the subsequent phase focused on evaluating the structural model.

### *Structural model*

The coefficient of determination ($R^2$) value for knowledge management processes (KMPs) stood at 0.543, meaning that directional excellence practices (DEPs) and executional excellence practices (EEPs) together accounted for 54.3% of the variance, a level regarded as substantial. For organizational performance (OP), the corresponding $R^2$ value was 0.437, indicating that DEPs, EEPs, and KMPs jointly explained 43.7% of the variance.

The effect size ($f^2$) analysis revealed that DEPs had a small impact (0.062), while EEPs exhibited a large effect (0.260) [56]. Furthermore, the model demonstrated predictive relevance, with $Q^2$ values above zero, reflecting moderate to high predictive power. Lastly, the Root Mean Squared Error (RMSE) was employed to assess PLS predict performance against the naive linear regression model (LM) benchmark for the endogenous variables KMPs and OP. Findings showed that RMSE values for all indicators except one (SPs) were lower in the PLS model than in the LM benchmark.

Bootstrapping results, detailed in **Table 5** and illustrated in **Figure 2**, displayed path coefficients, t-statistics, and p-values. The majority of paths achieved statistical significance at the 0.001 or 0.05 levels, with the exception of the path from EEPs to OP. These outcomes affirmed the strength and soundness of the structural model, lending support to the precision and dependability of the underlying theoretical framework.

**Table 5**. Correlation between second-order constructs.

| Hypotheses | Relationship | *β* | SD | *p*-values | T-value | Decision |
|---|---|---|---|---|---|---|
| H1 | DEPs → KMPs | 0.257 | 0.088 | 0.002 | 2.908* | Supported |
| H2 | EEPs → KMPs | 0.524 | 0.086 | 0.000 | 6.123* | Supported |
| H3 | KMPs → OP | 0.255 | 0.091 | 0.002 | 2.822* | Supported |
| H4 | DEPs → OP | 0.363 | 0.109 | 0.000 | 3.345* | Supported |
| H5 | EEPs → OP | 0.115 | 0.106 | 0.138 | 1.089 | Not Supported |

Note: *Significant with $p < 0.01$.

### *Evaluation of the structural model – direct relationships*

The examination of structural paths focuses on determining the strength and significance of the relationships among the constructs in the model. According to the findings presented in **Table 5** and **Figure 2**:

- H1: Digital entrepreneurial practices (DEPs) exert a significant positive influence on knowledge management practices (KMPs) ($\beta = 0.257$, $t = 2.908$, $p < 0.002$).
- H2: EEPs show a significant positive effect on organizational performance (OP) ($\beta = 0.524$, $t = 6.123$, $p < 0.001$).
- H3: Digital entrepreneurial practices (DEPs) demonstrate a significant positive impact on organizational performance (OP) ($\beta = 0.255$, $t = 2.822$, $p < 0.002$).
- H4: Digital entrepreneurial practices (DEPs) exhibit a significant positive influence on organizational performance (OP) ($\beta = 0.363$, $t = 3.345$, $p < 0.000$).
- H5: EEPs reveal a non-significant effect on organizational performance (OP) ($\beta = 0.115$, $t = 1.089$).

Consequently, hypotheses H1, H2, H3, and H4 are confirmed, whereas H5 is not supported.

### *Evaluation of the structural model – mediation analysis*

The mediation test examining the role of knowledge management practices (KMPs) in the link between digital entrepreneurial practices (DEPs) and organizational performance (OP), as detailed in **Table 6**, showed a significant indirect effect through bootstrapping ($\beta = 0.066$, $t = 2.034$, $p < 0.001$). This confirms that KMPs channel the influence of DEPs onto OP.

The overall effect of DEPs on OP was significant ($\beta = 0.429$, $t = 4.261$, $p < 0.001$). Even after introducing the mediator, the direct effect of DEPs on OP remained significant ($\beta = 0.363$, $t = 3.345$, $p < 0.001$). Both the direct and indirect paths are positive ($0.363 + 0.066 = 0.429$ for total effect; indirect contribution $= 0.363 \times 0.066 = 0.024$).

These results indicate complementary partial mediation by KMPs in the association between DEPs and OP. Therefore, the study's sixth hypothesis, H6—stating that KMPs play a significant mediating role in the relationship between DEPs and OP—is accepted.

**Table 6.** Mediation Analysis Examining the Role of KMPs in the Relationship between DEPs and OP

| Path | Description | T-Statistic | Beta Coefficient | p-Value | Percentile Bootstrap 95% Confidence Interval |
|---|---|---|---|---|---|
| | | | | | Lower Bound |
| Specific indirect effect | P1*P2: DEPs → KMPs → OP | 2.034*** | 0.066 | 0.021 | 0.022 |
| Total effect (without mediation) | P3a: DEPs → OP | 4.261*** | 0.429 | 0.000 | |
| Direct effects (with mediation) | P1: DEPs → KMPs | 2.908*** | 0.257 | 0.002 | |
| | P2: KMPs → OP | 2.822*** | 0.255 | 0.002 | |
| | P3b: DEPs → OP | 3.345*** | 0.363 | 0.000 | |

Note: *** Indicates significance at $p < 0.001$.

The mediation analysis exploring the role of knowledge management practices (KMPs) in the association between EEPs and organizational performance (OP), as reported in **Table 7**, indicated a significant indirect effect via bootstrapping (H7: $\beta = 0.134$, $t = 2.330$, $p < 0.001$). This suggests that KMPs effectively channel the influence of EEPs onto OP.

The overall effect of EEPs on OP (P3a) was significant ($\beta = 0.249$, $t = 2.638$, $p < 0.001$). However, upon incorporating the mediator, the direct effect of EEPs on OP (P3b) became non-significant ($\beta = 0.115$, $t = 1.089$).

In line with the mediation classification proposed by Zhao *et al.* [59], these findings point to full mediation by KMPs in the relationship between EEPs and OP. Accordingly, the seventh hypothesis of the study, H7—positing a significant mediating effect of KMPs in the link between EEPs and OP—is confirmed.

**Table 7.** Mediation Analysis Examining the Role of KMPs in the Relationship between EEPs and OP

| Path | Description | T-Statistic | Beta Coefficient | p-Value | Percentile Bootstrap 95% Confidence Interval |
|---|---|---|---|---|---|
| | | | | | Lower Bound |
| Specific indirect effect | P1*P2: EEPs → KMPs → OP | 2.330* | 0.134 | 0.010 | 0.053 |
| Total effect (without mediation) | P3a: EEPs → OP | 2.638* | 0.249 | 0.004 | |
| Direct effects (with mediation) | P1: EEPs → KMPs | 6.123* | 0.524 | 0.000 | |
| | P2: KMPs → OP | 2.822* | 0.255 | 0.002 | |
| | P3b: EEPs → OP | 1.089 | 0.115 | 0.138 | |

Note: * Indicates significance at $p < 0.01$.

This research highlights the mediating function of knowledge management processes (KMPs) in the connection between directional excellence practices (DEPs), executional excellence practices (EEPs), and organizational performance (OP) among mobile network operators (MNOs). The conceptual framework was interpreted through the integration of several theoretical perspectives, including the resource-based view (RBV) theory [4], the knowledge-based view (KBV) [3], and contingency theory [26]. The empirical findings confirm that KMPs serve as a significant positive mediator in the association between organizational excellence practices and OP, while also shedding light on the differing influences of DEPs and EEPs on both KMPs and OP.

The study demonstrates that both directional and executional excellence practices exert a notable influence on KMPs. Specifically, DEPs were found to positively and significantly affect KMPs, contributing to the scarce body of literature on this linkage and introducing a novel context by examining the DEPs–KMPs relationship within MNOs. These outcomes reinforce prior evidence that EFQM enablers create synergies with knowledge management processes [13, 14, 33]. DEPs encompass elements such as strategy, culture, and leadership [12]. The results are consistent with KBV theory, which posits knowledge as a key intangible resource for sustained competitive advantage [4]. Firms that prioritize knowledge align their

strategies accordingly [35], cultivate a supportive culture, and promote leadership that emphasizes knowledge management [37, 40, 60], ultimately enhancing performance [61]. Thus, DEPs are instrumental in establishing knowledge-oriented strategic priorities.

Additionally, EEPs exhibited a strong positive effect on KMPs, aligning with existing studies that highlight synergies between these practices and knowledge management [13, 14, 33]. EEPs include stakeholder involvement, sustainable value creation, and performance-driven transformation [12]. The path coefficients indicated a stronger influence from EEPs compared to DEPs, suggesting that executional practices demand a solid knowledge management infrastructure to facilitate information exchange and cross-functional collaboration. In the challenging and volatile Yemeni telecommunications sector, robust KMPs become particularly vital to underpin effective EEPs. This analysis addresses the study's first research question.

The findings also established a significant positive relationship between KMPs and OP, echoing prior work [5, 9] and broader evidence linking knowledge management to superior performance [29]. In the MNO industry, effective knowledge management mitigates regulatory and legal risks by enabling the dissemination of compliance updates. From a KBV perspective [3], these results illustrate how leveraging distinctive knowledge assets provides MNOs with a competitive edge in the telecommunications market. This addresses the second research question.

Moreover, DEPs were shown to directly and significantly enhance OP in MNOs, supporting earlier research on the performance implications of EFQM enablers [16, 17, 41, 42]. Stakeholder theory [52] explains this link by underscoring the importance of incorporating stakeholder expectations into strategic processes. In contrast, the direct effect of EEPs on OP proved non-significant, highlighting the execution-oriented character of these practices and their dependence on intervening mechanisms to influence performance. This responds to the third research question.

### *The mediating role of knowledge management processes in the link between excellence practices and organizational performance*

Beyond direct effects, the analysis uncovered nuanced mediating effects of KMPs. For DEPs and OP, KMPs exhibited complementary partial mediation. This indicates that while DEPs directly contribute to performance, their full potential is amplified through effective KMPs. Knowledge management facilitates the application, dissemination, and organizational learning derived from directional practices, thereby boosting OP. Absent strong KMPs, the benefits of DEPs may remain unrealized [5, 9]. The partial complementary nature suggests that superior KMPs strengthen the positive influence of DEPs on performance, positioning knowledge processes as enablers that help MNOs address market challenges and seize opportunities.

In the case of EEPs, KMPs fully mediated the relationship with OP. This full mediation underscores that executional practices rely entirely on knowledge mechanisms to translate into performance gains [2, 40]. The operational focus of EEPs requires knowledge-enabled coordination to yield tangible outcomes. Consequently, investing in KMPs is crucial for MNOs seeking enhanced performance through excellence practices.

These mediation patterns align with RBV theory, viewing knowledge as a core resource for competitive advantage, and with contingency theory, where KMPs enhance alignment and adaptability of excellence practices to organizational contexts [26]. Overall, the distinct mediation roles identified offer critical insights for MNOs, emphasizing the strategic priority of integrating DEPs, EEPs, and KMPs to elevate OP. This discussion addresses the fourth research question.

## Conclusion

This research examined the interplay among directional excellence practices (DEPs), executional excellence practices (EEPs), knowledge management processes (KMPs), and organizational performance (OP) within Yemen's mobile network operators (MNOs). Data analysis was conducted using the partial least squares structural equation modeling (PLS-SEM) approach via SmartPLS software.

The results indicate that both DEPs and EEPs significantly and positively influence KMPs, while KMPs, in turn, exert a significant positive effect on OP. Notably, whereas DEPs maintain a significant direct impact on OP even in the presence of the mediator, the direct link between EEPs and OP becomes non-significant when KMPs are included. The mediation analysis revealed complementary partial mediation by KMPs in the DEPs–OP relationship and full mediation in the EEPs–OP relationship. These patterns imply that the otherwise insignificant direct influence of EEPs on OP is entirely channeled through KMPs. This underscores knowledge as a vital strategic resource—central to the resource-based view (RBV) [4, 62]—that allows firms to build and maintain competitive advantages [3]. Relying exclusively on EEPs without robust knowledge management may prove inadequate for driving performance improvements.

The study advances quantitative understanding of KMPs by demonstrating their dual mediating roles—complementary partial and full—consistent with established mediation guidelines [56, 59]. Complementary partial mediation highlights how KMPs amplify the benefits of DEPs for OP, while full mediation shows that KMPs are indispensable for translating EEPs into

performance gains. Such distinctions, combined with predictive modeling, aid strategic foresight and organizational transformation [63].

Contextually, the results underscore the need to account for industry-specific and environmental factors. All examined constructs contribute meaningfully to MNO performance. Although prior work has recognized the value of knowledge management in telecommunications [64], the mediating function of KMPs between excellence practices and OP has remained underexplored. By filling this gap, the study offers practical guidance for Yemeni MNOs, advocating the seamless integration of DEPs and EEPs with KMPs to strengthen stakeholder relationships, streamline decision-making, and optimize resource use in a volatile sector.

In particular, KMPs emerge as essential enablers for EEPs to positively affect OP. Leaders in the MNO industry should prioritize knowledge management to bridge current performance with future transformation goals. Becoming a learning organization represents a key strategic recommendation, with MNOs encouraged to embed knowledge management goals within human capital initiatives. Implementing these measures can help firms capitalize on excellence practices and knowledge processes to achieve superior performance.

### *Limitations and directions for future research*

Like all studies, this research has certain limitations that open avenues for future investigation. The sample size (256 respondents) and contextual elements—such as cultural influences and economic conditions in Yemen—may constrain the broader applicability of the results. Additionally, convergent validity was not assessed using a global single-item measure, representing another potential limitation that subsequent work could address. Expanding the study to larger and more diverse samples across different regions or countries would enhance generalizability.

The focus here was restricted to knowledge management processes (one dimension of knowledge management); future studies could incorporate other aspects, such as knowledge management infrastructure or enablers. Given the insights derived from the current data, several research opportunities arise. First, building on the complementary mediating role of KMPs in the DEPs–OP linkage, deeper exploration of specific KMPs dimensions or related constructs—like organizational learning—would be valuable. Second, although higher-order constructs were employed in this analysis, future investigations could examine second-order models in alternative settings to refine and extend the findings.

**Acknowledgments:** None

**Conflict of interest:** None

**Financial support:** None

**Ethics statement:** None

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