

SUSTAINABLE E-LEADERSHIP AND ORGANIZATIONAL TRANSFORMATION: THE ROLES OF FLEXIBILITY, DIGITALIZATION, AND CULTURE IN ENHANCING OPERATIONAL EFFICIENCY

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Abstract: The given paper analyzes the contribution of sustainable e-leadership (SEL) to the efficiency of operations with the help of the mediating variables, such as organizational flexibility (OF) and digitalization (DIG), and the moderating role of digital organizational culture (DOC). Based on the Resource-Based View (RBV), the conceptual framework of the study is sustainable e-leadership that is a crucial intangible asset that helps organizations transform flexible structures and digitalized operational processes to effective and reliable performance results in dynamic and highly regulated environments. Data were collected from 300 senior and middle managers across 15 Jordanian commercial banks—a highly regulated sector undergoing intensive digital pressure in an emerging-economy context—using an online survey. Partial Least Squares Structural Equation Modeling (PLS-SEM) provided by SmartPLS 4.0 was imposed on the proposed research model. The results indicate that sustainable e-leadership affects both flexibility and digitalization of organizations significantly in a positive manner that leads to improvement in operational efficiency. Besides, organizational flexibility and digitalization can work as independent and sequential mediators exposing a multistage process of capability development in which leadership initiatives are transformed into effective everyday operations. The findings show as well that digital organizational culture reinforces the effect of sustainable e-leadership on flexibility and digitalization, which determines the degree to which digital initiatives are institutionalized into consistent operating patterns, instead of being a solitary technological endeavor. Focusing on the organizational change as the process of increasing efficiency in operations under the leadership, flexibility, digitalization and cultural fit, this research adds the RBV knowledge to the operational segment of digital leadership. The paper makes theoretical contributions by explaining how e-leadership-facilitating capabilities contribute to efficiency-oriented change and offers practical implications to the banking managers looking to increase flexibility, instill digitalization in their operations, and promote a culture that encourages sustainable operational excellence.

Keywords: sustainable e-leadership, organization flexibility, digitalization, digital organization culture, operational efficiency, organizational change

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INTRODUCTION

With a rapidly growing digital disruption, and mounting operational demands, organizations are being forced to reconsider the ways leadership can facilitate effective and sustainable organizational change. With digital technologies becoming increasingly important in transforming competitive environments, digitalization has become a major avenue where companies are re-engineering their operations, improving coordination, and increasing efficiency.

In this study, digitalization can be understood as the integrated application of digital technologies to the fundamental operational processes in order to enhance reliability, speed, and cost-effectiveness as opposed to the fundamental change in business models (Alawamleh & Alkayed, 2025).

Digitalisation is increasingly being seen as a core process to the attainment of operational efficiency, meaning the capacity of the organisation to maximize resources, streamline processes, and provide the uniformity of operation in changing environments in highly regulated and efficiency-driven sectors such as banking. Notably, the digitalization-driven organizational change is not a technological project only. It needs a leadership that will be able to guide employees through the never-ending change, align the digital efforts with the operating priorities and make the performance improvement sustainable in the long term. Sustainable e-leadership (SEL), in this regard, is a key factor.

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Sustainable e-leadership is an aptitude of the leaders to use digital instruments and communication systems in leading, organizing, and sustaining the organization members in an environment that requires a lot of digitization, change, and efficiency. Leaders who have the capabilities of e-leadership are in a better position to facilitate process redesign, promote technology facilitated working practices and diminish operational inefficiencies that are related to the breakdown or weak coordination of digital undertakings. But leadership by itself is not necessarily going to be translated into better operational performance (Nasrun et al., 2025). Organizational flexibility (OF) is one of the key organizational aspects that the sustainable e-leadership manifests its impact. Organizational flexibilities are associated with the ability of the organization to change the structures, work flows and allocation of resources in line with the requirements of the changes in operations and technology. The flexible organizations can more easily internalize digital changes, redesign processes and facilitate gradual increases in efficiency without interfering with current operations.

In that regard, organizational flexibility is one of the main processes that associate leadership practices with successful digitalization and efficiency in operations. Simultaneously, digitalization is a procedural potential in the course of which leadership and adaptability are transformed into practical working consequences (Juknevičienė et al., 2025).

Organizations are able to provide the standard of processes, increase transparency and co-ordination across functional units by integrating digital technologies in the normal operations of the organizations. However, most previous studies have usually analyzed leadership, flexibility, or digitalization separately as factors in performance and little is known about how these three aspects followed one another as members of an efficiency-focused transformation process. It is still demanded to integrate models explaining how the flexibility that is enabled by leaders helps to facilitate the digitalization, which contributes to improving the efficiency of the operations. In addition, digital organizational culture (DOC) the common values, norms, and practices that promote the successful utilization of digital technologies, further learning, and collaboration determine the effectiveness of sustainable e-leadership. The positive digital culture increases employee acceptance of digitalized work practices as well as the capacity of the organization to ensure that flexibility and digitalization become part of its operational routine (Dafnis, 2025).

Although the theoretical topic of e-leadership and digital culture is of increasing importance, little of the available literature has explored the role of culture as a situational situation that mediates the dynamic of leadership-induced flexibility and digitalization, especially in efficiency-oriented models of change. Based on that, the proposed research paper fills a significant literature gap with the framework of organizational flexibility and digitalization as sequential mediators between sustainable e-leadership and operational efficiency, in addition to digital organizational culture as a condition (Li et al., 2016). This study describes how the capabilities of the organization, facilitated by the leadership, can be organized in a way that will facilitate efficiency-oriented transformation of the organization, owing to the process-oriented approach based on the Resource-Based View (RBV). By so doing, the study addresses the calls to more refined and operationally specific models of digital leadership and adds to a better comprehension of the ways in which the organizations attain sustainable gains in efficiency through the influence of leadership, flexibility, digitalization, and cultural alignment.

THEORETICAL FRAMEWORK

This paper builds on the Resource-Based View (RBV) to construct an integrated theory that seeks to establish the way in which sustainable e-leadership can create an organizational change that focuses on operational efficiency. In the same context, sustainable e-leadership is theory-constructed as tactical intangible ability whereby leaders organize, coordinate and redesign organizational resources to favor malleable arrangements and digitally responsive procedures. Instead of examining transformation as a large or abstract deliverable, the organization transformation in this study has been conceptualized as an ongoing process that seeks to enhance efficiency, reliability, and coordination in the daily operations. In particular, sustainable e-leadership brings about flexibility in organizations through facilitating adaptability in decision making, coordination across functions, and responsiveness to evolving operation's needs (Tworek, 2023). Greater flexibility, in its turn, allows better digitalization through converting leadership intent into digital process integration, structured and able to be scaled (Ahuja et al., 2023). Digitalization then leads to increased efficiency in operations due to better standardization of the processes, less redundancy and better management of the organizational resources. Notably, digital organizational culture is seen as a contextual moderator, which reinforces such relationships where there are shared values and norms which reinforce learning, collaboration, and digitally enabled work practices. Combining leadership, flexibility, digitalization, and culture, this framework builds upon the RBV as to how capabilities guided by leadership engage in the interaction based on cultural situations leading to the creation of efficiency-induced organizational change.

Resource-Based View Theory

Resource-Based View (RBV), which was initially expressed by Barney (1991) serves as a background to comprehending the manner in which organizations create and maintain competitive advantage through proper utilization of internal resources. The RBV suggests that resources bring enduring advantage in case they are valuable, rare, inimitable, and non-substitutable (VRIN) (Torre & Sarti, 2020). Those organisations that have these resources and can position them strategically are in a better place to enhance performance, especially in complex and highly technological environments. Within the context of this research, RBV is a theoretical prism through which one can consider the organizational change to the operational efficiency as the result of the coordination of resources that can be organized by the leaders instead of individual technological investments. As identified by scholars, tangible and intangible resources, including managerial expertise, organizational routines, digital competencies, and process knowledge are of central

importance in determining the organizational outcomes (Hussein et al., 2024; Abu-AlSondos, 2025). Whereas physical assets and financial capital can be easily copied, the deep-rooted capabilities linked to the practices of leadership, flexibility and integration of the digital processes are hard to replicate, and therefore there is more likelihood that they can create sustained value. Continuing on the RBV, the dynamic capabilities viewpoint accentuates how organizations can sense the changes, capture the opportunities, and realign the resources in the rapidly changing environments (Twum-Darko, 2020). This extension is especially applicable in digitally intensive situations, where a constant adjustment and necessary process realignment must be in place to ensure efficiency (Sacavém et al., 2025). In that regard, sustainable e-leadership is a driving force that triggers dynamic capabilities by matching the digital resources with the priorities in operations and promoting learning and adapting. Based on this, RBV presents a strong theoretical basis for explaining how the capabilities led by leadership aids efficiency-oriented transformation over time.

Sustainable E-Leadership (SEL)

E-leadership sustainability has become one of the most important leadership patterns in those organizations that became more dependent on digital technologies and virtual organization. In contrast to classical forms of leadership, sustainable e-leadership provides priority in utilizing digital communication tools and mediums so as to guide, organize, and support organizational members and provide continuity, flexibility, and efficiency in the digitally mediated work contexts (Pinto et al., 2025; Phakamach et al., 2023). This type of leadership is specifically applicable when considering an organization that aims at enhancing operational results without interfering with the current processes.

Sustainable e-leaders are defined as the one that is able to match the digital efforts to the operational objectives, promote operational work practices that are supported by technology, and promote long-term productivity instead of temporary technological trials of the technology. They promote coordinated digital adoption that improves process reliability and coordination, sharing of knowledge, and collaboration. Sustainable e-leadership contributes to the ongoing enhancement of efficiency-oriented transformation by balancing technological progress and business stability (Mardikaningsih & Hariani, 2025). In the RBV perspective, sustainable e-leadership is an intangible higher-order capacity that coordinates organizational resources in the direction of adaptable and digitalized operations (Surya et al., 2025; Ardi et al., 2020). E-leaders drive organizations to use digital tools to help organizations apply them to routine practices that facilitate effectiveness and resilience through constant guidance and digitally-enabled coordination.

In line with this, this paper defines sustainable e-leadership as the driving force in a chain of processes that is mediated by the flexibility of organizations and digitalization to affect the efficiency of operations.

Organizational Flexibility (OF)

Organizational flexibility has gained prominence as an essential capability that empowers organizations to change structures, workflow, and resource and allocation of resources according to the changing operation and technological needs. Organizational flexibility is defined as the ability to reorganize the processes within the organization without much disturbance making it to be effective in adapting well to dynamic environments. In the framework of efficiency-driven change, flexibility is a sign of how an organization is flexible to dealing with digital changes without impacting the continuity in its operations (Gutu & Medeleanu, 2023). Researchers have defined organizational flexibility in various aspects such as structural flexibility, process flexibility and workforce flexibility. Structural flexibility is the capacity of the organization to change functions and processes of coordination whereas process flexibility is the capacity to redesign work processes and operational patterns. Collectively, these dimensions indicate why flexibility is a significant process that can connect leadership practices with successful digitalization. Flexible organizations have an advantage in digitally intensive settings, where they are more able to include the digital technologies in the work processes and allow smooth changeover and less inefficiency in the work related to the rigid structure. Organizational flexibility is therefore an intermediating capacity in which sustainable e-leadership enables digitalization and greater efficiency in operations. The flexibility enables organizations to make improvements in efficiency without affecting reliability since it enables them to make incremental adaptations (Qiao et al., 2024).

Digitalization (DIG)

Digitalization is the process of systematic introduction of digital technologies into the work of organizations to enhance their efficiency, co-ordination, and the flow of information. In contrast to large-scale digital transformation projects that target the fundamentals of business model redefinition, digitalization in the given case study is an operation-level transformation that helps standardize processes, improve transparency and speed. Digitalization can help organizations to integrate technology into daily operations thus facilitating efficiency-based change (Cheshmishi et al., 2025). Cloud-based systems, data analytics, and automation tools are among the technologies that are in the center of digitalization as they simplify the workflow and minimize manual interventions. In the most strictly regulated industries, such as the banking industry, digitalization helps to comply with all the norms, minimize operational errors, and increase the reliability of services. Nevertheless, digitalization does not bring efficiency gains in new vacuo, its efficiency requires previous organizational flexibility and support by the leadership. Based on this, digitalization has been placed as a mediating factor in this research where sustainable e-leadership and organizational flexibility are transformed into enhanced operational efficiency. Organizations can enable lasting and scalable improvements in efficiency through the institutionalization of digital tools to flexible frameworks (Sutono et al., 2024).

Digital Organizational Culture (DOC)

Digital organizational culture refers to the values, norms and practices that management uses to promote successful utilization of digital technologies, constant learning and teamwork. Digital culture as an intangible contextual resource according to the RBV perspective adds value to other organizational capabilities instead of generating results on its own. A positive digital culture boosts the willingness to change, experimentation within the boundaries of operation, as well as sharing of knowledge among digital platforms (Alzubi, 2025). The digitally supportive cultures lower the opposition to the work practices that are supported by technology and reinforce the willingness of the employees to take advantage of the digitalized processes. They are especially vital cultures that allow sustainable e-leadership to transform intention to action since they strengthen disciplined digital usage and shared accountability of efficiency effects. Digital organizational culture in this research is also conceptualized as a moderating condition that enhances the effects of sustainable e-leadership on organizational flexibility and digitalization. In line with RBV, leadership and flexibility capabilities are only valued when there is cultural congruency and hence digital culture is a crucial boundary condition in efficiency-based transformation (Ketchen et al., 2001).

Operational Efficiency (OE)

Operational efficiency is the capacity of the organization to use its resources effectively when it is attaining reliable, timely and cost-efficient operational results. It includes process optimization, waste minimization, service consistency and effectiveness in coordination. Within the framework used in this study, conceptualization of operational efficiency operates as the main product of organizational transformation and not a performance measure. Digitalization also helps in efficiency of operations through accuracy of information, transparency of processes, as well as quicker decision-making (Teece et al., 1997). Simultaneously, organizational flexibility enables firms to continuously modify the process of operation so that efficiency increments can be maintained in the ever-changing conditions. Such capabilities are set and synchronized using the sustainability of e-leadership that provides consistency between the digital agenda and operational priorities. Combined, operational efficiency is considered a cumulative phenomenon of the capability development, which is facilitated by leadership and influenced by organizational flexibility and digitalization, supported by an enabling digital organizational culture (de Paula Pereira et al., 2024). The point of view emphasizes efficiency as an active and sustainable product of coordinated leadership and organizational abilities and not the consequence of individual technological investment.

HYPOTHESES DEVELOPMENT

Based on the conceptual framework and the theoretical arguments that have been made in the Theoretical Framework section, this section will build the hypotheses of the study by taking the identified research gaps explicitly into the testable relationships. Instead of positing a direct and linear relationship between leadership and operational results, the offered model follows a process-based logic according to which sustainable e-leadership (SEL) increases operational efficiency (OE) with the help of the intermediary organizational capabilities and the contextual situations (Jasim et al., 2024). In this regard, the hypotheses are formulated in a way that they capture four interrelated logics. First, the model dictates the capability development which is driven by the leadership, and it suggests that SEL has a positive impact on organizational flexibility (OF) and digitalization (DIG). Second, it promotes a logic of capability-efficiency, according to which OE is promoted by OF and DIG. Third, it presents parallel and sequential mediation to discuss how the effects of leadership are realized when the processes of flexibility and digitalization are taken into consideration. Lastly, the model introduces the digital organizational culture (DOC) as a contextual moderator that determines the prowess of the ability to be formed by the leadership. These direct, mediating, sequential, and moderating relationships all combine to create a comprehensive explanatory model as opposed to being separated relationships (Hariyani et al., 2025; Nielsen et al., 2024).

SEL and OE

Sustainable e-leadership has been seen to be very essential in digitally intensive environments as they portray the capacity of leaders to organize, lead, and supervise employees using digital means and systems and yet ensure continuity and disciplines in the implementation process. SEL leaders are able to bring digital efforts in line with business priorities, enable cross-functional collaborations and minimize inefficiencies generated by disjointed digital work practices. Nevertheless, although the evidence base is increasingly supporting the association between digital leadership strategies and positive operational performance, previous researchers have tended to characterize the relationship between them directly, which has given insufficient evidence on organizational mechanisms through which leadership impacts are transformed into efficiency gains. In addition to the implementation of technologies, SEL promotes a work environment with digitally enforced cooperation, continuous learning, and systematic problem-solving. All these factors may lead to the improvement of the operational performance, yet they do not necessarily result in the efficiency improvements unless they are incorporated into the tangible organizational capabilities that restructure the routines and workflows (Alqarah et al., 2025; Marcel et al., 2024). One of the weaknesses of the literature is the lack of focus on explanations in terms of processes. Although e-leadership is often linked with the improvement of organizational performance, how the mechanism generates efficiency, especially via the organizational flexibility and digitalization, are still disjointed among the different channels of research. Even numerous researches consider leadership, flexibility, or digitalization separately, and fail to see their interplay as a sequence of capability formation. Regarding the RBV, leadership is not an operation result in itself, but more of a strategic facilitator which coordinates complementary capabilities. In this regard, this research paper is not intended to establish a direct hypothesis between SEL and operational efficiency. In its turn, it theorizes the enhancement of OE as

arising indirectly, via leadership-facilitated creation of organizational flexibility and digitalization, and thus offering a more robust process-based elucidation of efficiency-oriented organizational change (Yang & Zhou, 2023).

SEL and DIG

Sustainable e-leadership is one of the core tools enabling the digitalization process, as it determines the ways in which organizations can match digital tools to the organizational goals and make them a part of the everyday routine. SELE assists in transforming digital initiatives scattered around into organized and scalable operational digitalization with digitally mediated coordination, effective communication, and technology-facilitated monitoring and support. In addition, SEL facilitates digitalization through enhancing the willingness of employees to embrace digitalization, as well as encouraging them to use digital systems regularly in the execution of workflow (Schiuma et al., 2022). Digital discipline offered by the leaders can reduce the gaps in implementation and make sure that digital tools can help to improve the operations instead of complicating them. In RBV terms, SEL helps in digitalization by coordinating the firm-specific intangible resources which include digital knowledge, managerial skills, and routinized processes into combined operational practices that are hard to replicate. In line with this, this paper understands digitalization as a product of reconfiguration of resources through the influence of leadership and not entirely as a technological investment choice (Lu & Ramamurthy, 2011).

H1. Sustainable e-leadership has a positive effect on digitalization.

SEL and OF

Sustainable e-leadership should also increase the flexibility of organizations especially with the constant organizational adaptations in regard to digital work practices and digitally enabled processes. The flexibility that is thrived with the help of SEL ensures the quickening of the coordination process, distributed decision-making, and adaptive reaction to the arising operational demands using digital platforms. One of the main contributions of SEL is the fact that it helps activate dynamic capabilities on which flexibility is based. Digitally enabled communication between leaders that ensure resources are coordinated can assist organizations in reconfiguring workflows, role structures, and moving resources around with fewer disruptions (Li et al., 2020). This places flexibility as an initial capability that goes before and that facilitates more broad digitalization undertakings. In the RBV perspective, SEL is an intangible leadership asset that drives internal resources, including the exchange of skills, knowledge sharing patterns, and cross-functional cooperation, to flexibility as a firm-specific resource. This paper also contributes to an explanation of the initiation of efficiency-oriented transformation trajectories by SEL that is process-based by framing it as a leadership-enabled capability (Gonçalves et al., 2022).

H2. Sustainable e-leadership has a positive effect on organizational flexibility.

DIG and OE

Digitalization has emerged as the key process of improving the work efficiency through introducing digital tools to the working process and increasing the consistency of the working process. Digitization of operations helps in enhancing accuracy of information, speed, and coordination that in turn lead to efficiency measures like reduction of costs, reduction of errors and increase in reliability of the service. In addition to direct process improvements, digitalization can benefit organizational learning by making data more accessible and transparent, allowing more evidence-based operational decisions and constant improvement (Schneider & Kokshagina, 2021). Nevertheless, the degree of efficiency enhancement by digitalization can be judged by the fact that it should be institutionalized in established routines and not introduced as a single technological intervention. Digitization enhances the capacity of an organization to implement special and non-replicable process capabilities by the use of data-driven routines, standardized workflows, and integrated operational systems (RBV perspective). Based on this fact, this paper frames digitalization as a potential of ability that boosts the efficiency of operations by providing internal process renewal (Porfirio et al., 2024).

H3. Digitalization has a positive effect on operational efficiency.

OF and OE

The flexibility of organizations is likely to increase the operational efficiency levels since organizations can be able to alter workflows, resource commitments, and process structures in reaction to the emerging demands of operation without interfering with continuity. Flexible organizations have the ability to redesign task, redistribute capacity and alter coordination mechanisms, by which they can eliminate bottlenecks and enhance throughput. Flexibility is the interface between the intent of operation and an implementation because it allows operational disturbances to be adjusted in time and operational requirements to be changed accordingly. This makes flexibility not an active feature, but a preemptive ability which maintains efficiency in the way everything is in operation and realigns itself. Regarding the RBV standpoint, organizational flexibility is a dynamic strength that enables companies to remodel internal asset to the changing demand effectively. Flexibility facilitates operational effectiveness since it provides sustenance and cumulative benefits of the operational process instead of a temporary benefit (Morakanyane et al., 2020; Zhen et al., 2021; Al-Maaitah et al., 2026).

H4. Organizational flexibility has a positive effect on operational efficiency.

The Mediating Role of Organizational Flexibility

Organizational flexibility is considered as one of the primary mechanisms by which sustainable e-leadership could affect the efficiency of operations. Instead of generating efficiency effects directly, SEL initially triggers flexibility by

engendering adaptive coordination and making introduction of operational routines to change progressively. Flexibility in this scenario is a medium, which assists in transforming the impact of leadership into operational change in the form of process adaptation, resource reallocation, and rigidity reduction (Abbas et al., 2026; Proksch et al., 2024).

Flexibility further encourages the success of digitalization efforts to prepare the organization to handle the digitalized processes, redistribute roles, and streamline operations throughout the implementation process. This competency-developing position levels OF as a fundamental working mechanism that facilitates efficiency gain to be maintained as operational requirements change. In terms of RBV, OF is an intangible organizational competence whose value is enhanced by using resource orchestration made possible through leadership. The flexibility facilitates transformation of the initiatives of leadership to efficiency results, which are stable in the long run through the process of constant reconfiguring as required by the operations (Alqudah et al., 2025b).

H5. Organizational flexibility mediates the positive relationship between sustainable e-leadership and operational efficiency.

The Mediating Role of Digitalization

Digitalization also serves as an instrumental mediating factor in which sustainable e-leadership increases the efficiency in operations. SEL aids in the institutionalization of the use of digital tools into daily operational activities through the advice of adoption, coordination, and unit-wide consistency of usage. Nevertheless, the impact of leadership becomes tangible as efficiency results just in cases when the digital initiatives are incorporated into the formal operations. The aspect of digitalization facilitates efficiency through facilitation of workflow, minimization of manual processing, making work more transparent, and faster decision-making with facilitation of information flow (Alqudah et al., 2025c, 2025d). As digitalization is steered and supported by leadership practices then it stands a higher chance of generating sustainable operational changes as opposed to short-term technological boosts. In an RBV perspective, the digitalization mediates the relationship between leadership and efficiency by transforming the intangible resources, such as leadership competence, digital knowledge, and collaborative routines, into the embedded operational capabilities that enhance efficiency and are hard to imitate.

H6. Digitalization mediates the positive relationship between sustainable e-leadership and operational efficiency.

The Sequential Mediation Effect

The way in which sustainable e-leadership may boost operational efficiency can be conceived as a multiphase process whereby the flexibility of the organization and digitalization act in a series of effect and not parallel. SEL offers the direction and computer-facilitated organization required to develop adjustive behaviors and amorphous frameworks. Flexibility is the first preparedness mechanism within the organization that allows the organization to change the process and rearrange the resources with minimum disturbance. Organizational flexibility, on its part, provides desirable circumstances of successful digitalization because it enables digital tools and systems to be incorporated into workflow with ease and regularity (Alqudah et al., 2025a). Devoid of flexibility, the digitalization efforts are bound to be disjointed, which results in operational complexity as opposed to efficiency. Digitalization established on flexibility has a higher chance of becoming institutionalized in form of dependable routines that are more efficient in operations. This cascading mediation indicates an effect of capability layering: SEL leads to OF, OF leads to DIG and DIG leads to better OE. The cascading process elaborates how the capabilities spearheaded by leaders are converted into sustainable efficiency profits by gradual transformation of an organization (Benitez et al., 2022).

H7. Organizational flexibility and digitalization sequentially mediate the positive relationship between sustainable e-leadership and operational efficiency.

The Moderating Effect of Digital Organizational Culture

Digital organizational culture should level the efficacy of sustainable e-leadership in building the organizational flexibility and digitalization. The culture that encourages digital learning, teamwork, and responsible usage of systems and openness to process modification reinforces the transfer of the leadership will to the competence building. On the other hand, in the case of weak digital norms, leadership-led efforts might face opposition, irregular acceptance, and de-institutionalization. The digital organizational culture is also a potential contextual resource, viewed through the RBV prism, which intensifies the efficiency of SEL because it will allow experimenting with the operational limits and solidify the collective responsibility in digitalized work practices. It is through this cultural congruence that the transformation of leadership influence into flexibility is enhanced by aiding the adaptive coordination and through process redesign. Digital organizational culture is also a strong connection between SEL and digitalization since it enhances preparedness to digitalized operations and spiritualized the constant use of digital tools. Without favorable cultural norms, digitalization programs can be a solitary phenomenon that will bring minimal productivity (Wang & Zhang, 2025).

H8. Digital organizational culture moderates the positive relationship between sustainable e-leadership and organizational flexibility.

H9. Digital organizational culture moderates the positive relationship between sustainable e-leadership and digitalization.

To represent the theoretical rationale of the study visually, the conceptual framework of the hypothesized interrelations between SEL, OF, DIG, DOC and OE were drawn in Figure 1. It combines the direct, mediating, sequential mediating, and the moderating relationships that have been established in the Theoretical Framework and Hypotheses Development sections, and thus gives a consistent picture of the process in which leadership-based capabilities are converted into

efficiency-focused organizational change. This graphic design helps to support the analytical framework of the hypotheses and explain the location of organizational flexibility and digitalization as the mechanism of core processes, and digital organizational culture, in turn, serves as a contextual boundary condition (Chatterjee et al., 2023).

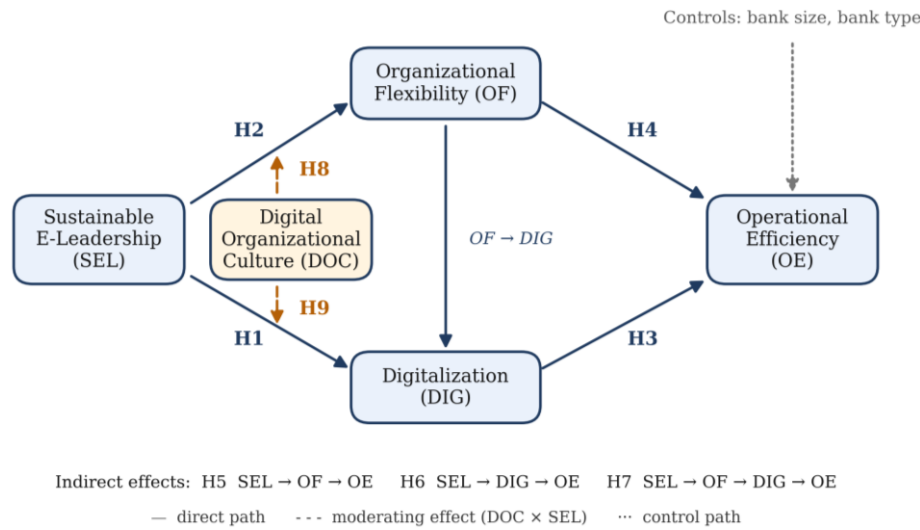


Figure 1. Conceptual Framework of the Study

MATERIALS AND METHODS

Sample and Data Collection

The banking industry offers a theoretically adequate setting when analyzing the sustainability of e-leadership since it is a highly regulated and risk-sensitive and data-driven industry, with operational continuity, compliance needs, and data security making digitalization not only inevitable but also strategically essential. Over the past few years, the Jordanian commercial banks have had to deal with increasing operational pressure due to fintech competition, the fast pace of technological growth, and the growing customer demands of efficient and reliable online services. These circumstances precondition the fact that the sector is especially appropriate to examine the issue of leadership-based organizational change aimed at the operational efficiency. The target respondents chosen included the senior and middle-level managers since they are in strategic coordination and conduct of operations intersectional position. The major roles of senior managers are to develop digital priorities, distribute resources, and develop leadership strategies to digitally mediated work, with the middle managers assuming a central role in converting leadership directives into operations and coordinating the process of digitalization and maintaining the continuity of the workflow within functional units.

Taken together, these management tiers would directly and knowledgeably expose themselves to sustainable e-leadership behaviours, organizational agility, digitalization endeavours, and efficiency-based results. Jordanian commercial banking business provides a valuable emerging-economy setting where digitalization is sought in the environment of regulatory strictness, cost pressure and changing institutional expectations. All these traits increase the importance of leadership, flexibility, and the digital organizational culture as the factors that define the integration of digital initiatives into operational patterns. The analysis of this setting is relevant to the literature as it broadens the theories of the developed economies and emphasizes the process of transformation which is efficiency-based and occurs in the conditions of the regulated financial markets. To test the proposed hypotheses of the relationships between sustainable e-leadership (SEL), organizational flexibility (OF), digitalization (DIG), digital organizational culture (DOC), and operational efficiency (OE) empirically, the current study relied on the quantitative, cross-sectional research design through a structured survey tool. The sample size was set at senior and middle-level managers working in the Jordanian commercial banks since they are the ones who are directly involved in the control, implementation of digitalized operations processes or supporting the same. Stratified purposive sampling method was used to have sufficient representation at the different managerial levels.

The hierarchical level stratified managerial positions (senior and middle management) and questionnaires were allocated proportionately. An online survey was implemented as the method of data collection in order to provide maximum accessibility and respondent rates as well as anonymity of respondents. The questionnaires were sent to 500 candidates out of which 300 respondents returned them; this gives the response rate of 60 per cent. A total of 300 valid questionnaires were finally obtained after eliminating 16 non-complete responses. This is a sufficient sample size; it is larger than the minimum of 215 respondents, calculated as per G*Power 3.1 (statistical power = 0.90; effect size = 0.10; α = 0.01), and meets the recommended criteria of a Partial Least Squares Structural Equation Modeling (PLS-SEM) with multiple latent constructs. The research was conducted in an ethical manner. The involvement was voluntary with no personal or sensitive information being gathered and the respondents were made aware of their right to pull out at any point in time without repercussions. Participation was informed and collected electronically and all these responses were anonymized and stored safely. Procedural remedies were also used to counter the possible Common Method Bias (CMB), such as psychological separation of constructs, neutral wording of items and guarantees of confidentiality.

Measurement

To test the postulated model, a structured questionnaire was used in this study, which consisted of validated multi-item scales based on the existing literature and relevant to the Jordanian banking industry. The five-point Likert scales (1 strongly disagree; 5 strongly agree) were used to measure all constructs. The last instrument was made of 31 measurement items that illustrated five latent constructs which include SEL, OF, DIG, DOC and OE. A translation and a back-translation process were conducted in order to guarantee the linguistic precision and cultural suitability of the questionnaire.

The initial English tool was translated into Arabic and it was back-translated by experts versed in both languages so as to have semantic equivalence. To determine the clarity and content validity, a pilot study using academic experts and top banking managers was conducted. The pilot outcomes also reported excellent reliability with Cronbach's alpha value of all constructs higher than the suggested value of 0.70. The six-item measurement of sustainable e-leadership (SEL) was based on previous research in e-leadership and digital leadership that included six questions that assessed the capability of leaders to organize the digital mediated work, guide on digital platforms, and ensure continuity and efficiency in online settings. There are six items that measured organizational flexibility (OF) that indicated the ability of the organization to adapt workflow, structures, and resource distributions when adapting to changes in operations and technology.

Digitalization (DIG) was measured based on five questions that measured the levels of integration of digital technologies into operational processes, information flows, and routine work practices. The operationalization of digital organizational culture (DOC) was performed based on five items that reflected common values that contribute to digital learning, collaboration, disciplined use of technologies, and openness to process change. The operational efficiency (OE) was assessed with the help of nine items that concentrate on process efficiency, cost control, service reliability, speed of operations, and minimizing operational errors. There were two control variables that were used to ensure that there was a consideration of structural differences among organizations. The size of the firm was measured on the count of the employees whereas the industry type was used to differentiate between conventional and Islamic commercial banks. These controls were added to separate the impacts of leadership and organizational capabilities on the efficiency of operation. To be transparent and replicable, all the measurement items are presented in Table 4.

Common Method Bias

Since the data were self-reported and cross-sectional, procedure and statistical remedies were used to reduce the threat of Common Method Bias (CMB). Procedurally, the respondent anonymity was guaranteed, evaluation apprehension was kept at the minimal level, and the wording of the items was formulated in such a way as to eliminate ambiguity. The questionnaire also psychologically segregated constructs to minimize the priming effects. Statistically, Harman's single-factor test and a full collinearity variance inflation factor (VIF) assessment were performed. The unrotated factor analysis revealed that the variance of the majority was not explained by single factor, which indicated that CMB was not a serious issue. Moreover, any full collinearity VIF values were not greater than the conservative value of 3.3, which means that there were no problems of multicollinearity and common method variance. All these checks indicate that the relationships between the constructs as observed could not have been due to the method bias.

RESULTS

Analytical Procedure

This research paper has used the Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0 to test the hypothesized relationships among the constructs and to test the measurement and structural models. PLS-SEM was chosen because it is suitable to both complex research models that are prediction oriented and is also robust enough to deal with non-normal data distributions, which is typical of behavioral and management research setting.

Because the focus of the study is on explaining and forecasting operational efficiency without necessarily verifying the existing theory, PLS-SEM is a suitable method of analysis. The analysis followed a Confirmatory Composite Analysis (CCA) under the PLS framework in accordance with the recent approach of methodology. CCA is specially most appropriate in those studies that theoreticize their constructs through composite concepts and seek to test theoretically based measurement models, but with a high degree of predictive interest.

The given approach is quite suitable to the aims of the current research, which aims to demonstrate how sustainable e-leadership is translated into efficiency-driven organizational change via organizational flexibility, digitalization, and digital organizational culture. The two-step analytical process which is usually advised in PLS-SEM studies, the initial step was the measurement model evaluation to determine the reliability of the indicators and their internal consistency, convergent, and discriminant validity. The second step was to test the structural model to test the hypothesised relationships, assess the explanatory power (R^2) and predict relevance (Q^2) of the model.

This methodic process guaranteed analytical rigor and strength of researching the role of the capabilities of organizations based on leadership in operational efficiency in the Jordanian banking industry.

Measurement Model Assessment

The measurement model was tested in terms of reliability and validity as recommended by the existing PLS-SEM principles. The first reliability of the indicators was to measure outer loadings. According to Table 1, the items used to measure all the measurement appeared to have an outer loading much higher than the suggested threshold of 0.70, which means that all the indicators had a significant contribution to their latent construct.

Table 1. Measurement Model Assessment

Construct / Item Code	Outer Loading	Cronbach's Alpha	Composite Reliability (CR)	AVE
Digital Organizational Culture (DOC)		0.82	0.87	0.57
DOC1	0.78			
DOC2	0.82			
DOC3	0.76			
DOC4	0.74			
DOC5	0.76			
Digitalization (DIG)		0.92	0.94	0.75
DIG1	0.87			
DIG2	0.78			
DIG3	0.88			
DIG4	0.91			
DIG5	0.85			
Sustainable E-Leadership (SEL)		0.96	0.97	0.82
SEL1	0.91			
SEL2	0.91			
SEL3	0.92			
SEL4	0.93			
SEL5	0.87			
SEL6	0.89			
Organizational Flexibility (OF)		0.91	0.93	0.69
OF1	0.79			
OF2	0.75			
OF3	0.88			
OF4	0.89			
OF5	0.88			
OF6	0.77			
Operational Efficiency (OE)		0.94	0.95	0.67
OE1	0.73			
OE2	0.75			
OE3	0.73			
OE4	0.84			
OE5	0.89			
OE6	0.86			
OE7	0.89			
OE8	0.82			
OE9	0.85			

Cronbach's alpha and Composite Reliability (CR) were used in determining internal consistency reliability. The alpha coefficients of the Cronbach were between 0.82 and 0.96, whereas the CR coefficients were between 0.87 and 0.963, which are above the stipulated minimum level of 0.70. There is strong internal consistency between all constructs, such as sustainable e-leadership, organizational flexibility, digitalization, digital organization culture, and operational efficiency, which is confirmed by these results. The convergent validity was measured in terms of Average Variance Extracted (AVE) where each and every construct had an AVE value bigger than 0.50 threshold. This means that the constructs account more than half of the variance in their related indicators thus establishing sufficient convergent validity. Taken together, these results prove that the measurement items are reliable and valid to reflect the theoretical constructs underlying it and to give a solid foundation on the further analysis of the structural model.

Convergent validity was also established since the Average Variance Extracted (AVE) of all the constructs, was greater than the recommended value of 0.50, which indicated that all constructs measurement indicators had significant overlap with respective latent constructs. The result above implies that these constructs were well defined and could explain a good percentage of the variance of their indicators, which supports the conceptual and theoretical validity of the measurement model. In order to evaluate the discriminant validity, Heterotrait–Monotrait (HTMT) ratio was taken based on the recommendations by Henseler et al. (2015). According to Table 2, none of the HTMT values exceeded the conservative level, which is 0.90, meaning that sustainable e-leadership, organizational flexibility, digitalization, digital organization culture, and operational efficiency are empirically discriminating constructs.

Table 2. Discriminant Validity Assessment (HTMT Ratio)

Construct	DOC	DIG	SEL	OF	OE	DOC × SEL
DOC	—					
DIG	0.72	—				
SEL	0.58	0.71	—			
OF	0.62	0.76	0.58	—		
OE	0.74	0.74	0.55	0.61	—	
DOC × SEL	0.22	0.37	0.22	0.29	0.26	—

These findings also indicate that there is no issue of multicollinearity and there is sufficient discriminant validity. Altogether, the measurement model reports good reliability, convergent and discriminant validity, therefore, offering a sound and stable basis to the next round of structural model execution.

Structural Model Assessment

After ensuring reliability and validity of the measurement model, the structural model was tested to test the hypothesis of the relationship of the study constructs in regard to H1 through H9 using Partial Least Squares Structural Equation Modeling (PLS-SEM). The explanatory power and prediction relevance of the model were assessed by analysis of path coefficients (b), t -statistics and p -values, and were obtained in a bootstrapping process with 5000 resamples. This method guarantees a strong level of statistical inference and is aligned with the best patterns of PLS-SEM analysis.

According to the results provided in Table 3, all the hypothesized relationships are statistically significant at $p < 0.05$, which gives solid empirical evidence on the proposed model. In particular, sustainable e-leadership (SEL) had a strong positive impact on digitalization (DIG) ($b = 0.32$, $t = 9.17$, $p < 0.001$) and organizational flexibility (OF) ($b = 0.35$, $t = 6.18$, $p < 0.001$), which helped to prove H1 and H2. The results obtained confirm that digitally mediated leadership practices based on sustainability-focused guidance are vital to developing not only flexible organizational frameworks but also an effective incorporation of digitalized processes.

Moreover, H3 and H4 are supported by the fact that both digitalization (DIG) ($b = 0.58$, $t = 10.98$, $p < 0.001$) and organizational flexibility (OF) ($b = 0.18$, $t = 3.28$, $p = 0.003$) had significant positive effects on operational efficiency (OE). Such outcomes suggest that the integrated effect of the embedded digital processes and the ability of the organization to change workflows and resource distributions due to the needs of the work will lead to efficiency-oriented organizational change. Concerning the control variables, the influence of firm size and the type of the bank were not statistically significant in turn on the operational efficiency, and it may be inferred that the identified patterns do not depend on the organizational size or the banking specialization. This also supports the strength of the suggested model and highlights the pivotal role played by sustainable e-leadership, organizational flexibility, and digitalization in increasing the effectiveness of operations in the banking environment.

Table 3. Structural Model Results

Path	β	S.E.	t-Statistics	p-Values	Result
Direct effects					
SEL $\rightarrow$ DIG	0.32	0.04	9.17	0.000	Supported (H1)
SEL $\rightarrow$ OF	0.35	0.06	6.18	0.000	Supported (H2)
DIG $\rightarrow$ OE	0.58	0.05	10.98	0.000	Supported (H3)
OF $\rightarrow$ OE	0.18	0.05	3.28	0.003	Supported (H4)
Indirect effects					
SEL $\rightarrow$ OF $\rightarrow$ OE	0.05	0.02	2.96	0.007	Supported (H5)
SEL $\rightarrow$ DIG $\rightarrow$ OE	0.19	0.02	8.38	0.000	Supported (H6)
SEL $\rightarrow$ OF $\rightarrow$ DIG $\rightarrow$ OE	0.06	0.017	4.36	0.000	Supported (H7)
Interaction effects					
DOC $\times$ SEL $\rightarrow$ OF	-0.108	0.038	2.88	0.004	Supported (H8)
DOC $\times$ SEL $\rightarrow$ DIG	-0.12	0.03	4.52	0.000	Supported (H9)
Control variables					
Bank size $\rightarrow$ OE	0.06	0.05	1.38	0.164	Not significant
Bank type $\rightarrow$ OE	-0.05	0.09	0.51	0.612	Not significant

Note: Bootstrapping testing with 5000 resamples of SmartPLS 4.0 was used to test all hypotheses. The statistical significance at $p < 0.05$ was used that gives strong evidence to the proposed hypotheses.

Control variables such as firm size and bank type were also added, but neither of the control variables had a statistically significant impact on the operational efficiency, which means that the relationships under consideration are not predetermined by the organizational scale and the banking specialization. This analysis also found out that there were strong indirect impacts, which validated that organizational flexibility (OF) and digitalization (DIG) played the intermediation functions in the relationship between sustainable e-leadership (SEL) and operational efficiency (OE).

Namely, the mediation effect of organizational flexibility between sustainable e-leadership and operational efficiency was high ($\beta = 0.05$, $t = 2.96$, $p = 0.007$), so did the mediation effect of digitalization ($b = 0.19$, $t = 8.38$, $p < 0.001$), thus corroborating H5 and H6, respectively. Moreover, the argument based on sequential mediation, whereby sustainable e-leadership contributes to the flexibility of the organization, which then contributes to the digitalization of the organization resulting in greater operational efficiency, was statistically significant ($\beta = 0.06$, $t = 4.36$, $p < 0.001$), which was a significant empirical support in H7. The results align with the Resource-Based View (RBV), which assumes that the flexibility, and digitalization facilitated by leaders are strategic organizational capabilities that mutually lead to the efficiency-oriented organizational change. In addition, the moderating impacts of digital organizational culture (DOC) were established. Digital organizational culture also played a crucial role of modulating the relationships between sustainable e-leadership and organizational flexibility ($\beta = -0.108$, $t = 2.88$, $p = 0.004$) and between sustainable e-leadership and digitalization ($\beta = -0.12$, $t = 4.52$, $p < 0.001$), thus justifying H8 and H9. The negative interaction

coefficients indicate that a strong digital organizational culture decreases the marginal dependence on direct leadership intervention. The predictive accuracy and explanatory power of the structural model were then assessed the predictive accuracy and explanatory power of the structural model with the help of coefficient of determination (R^2), predictive relevance (Q^2), and effect size (f^2), and that is in accordance with the established PLS-SEM guidelines.

The findings show that the model accounts for 41.2%, 66.6% and 50.7% of the variance in the organizational flexibility, digitalization and operational efficiency and this explains that it has moderate to strong explanatory power. Furthermore, the Q^2 of the items of organizational flexibility, which is 0.396, the digitalization, which is 0.59, and the operational efficiency, which is 0.442, are all above zero, which proves the strong predictive relevance and, consequently, implies that the model can also predict the endogenous constructs accurately.

The effect size (f^2) analysis also proves that the e-leadership sustainability has the medium effects on the flexibility of the organization ($f^2 = 0.15$) and digitalization ($f^2 = 0.19$), and operational efficiency depends on the organization flexibility and digitalization ($f^2 = 0.14$ and $f^2 = 0.34$, respectively).

Also, the interaction effects of digital organizational culture $\times$ sustainable e-leadership have small-to-medium effect sizes on organizational flexibility ($f^2 = 0.13$) and digitalization ($f^2 = 0.16$), also supporting the moderating effect of the digital organizational culture. On the whole, these results can be discussed as good evidence of the strength and forecasting capabilities of the offered model and the significant empirical support of the argument, based on the RBV, that sustainable e-leadership, as the ability to create organizational flexibility and digitalization, is a significant factor of the operational efficiency in the digitally intensive organizational setting.

Figure 2 depicts the entire structural model with standardized coefficients of path, which shows the direct and indirect and sequencing mediating and moderating relationships that are empirically supported observed between the study variables. The figure supplements table 3 by graphically illustrating the strength and significance of each of the hypothesized paths, the R^2 (explained variance) of the endogenous constructs, and the interaction effects of digital organizational culture, which strengthens the interpretation of the PLS-SEM results.

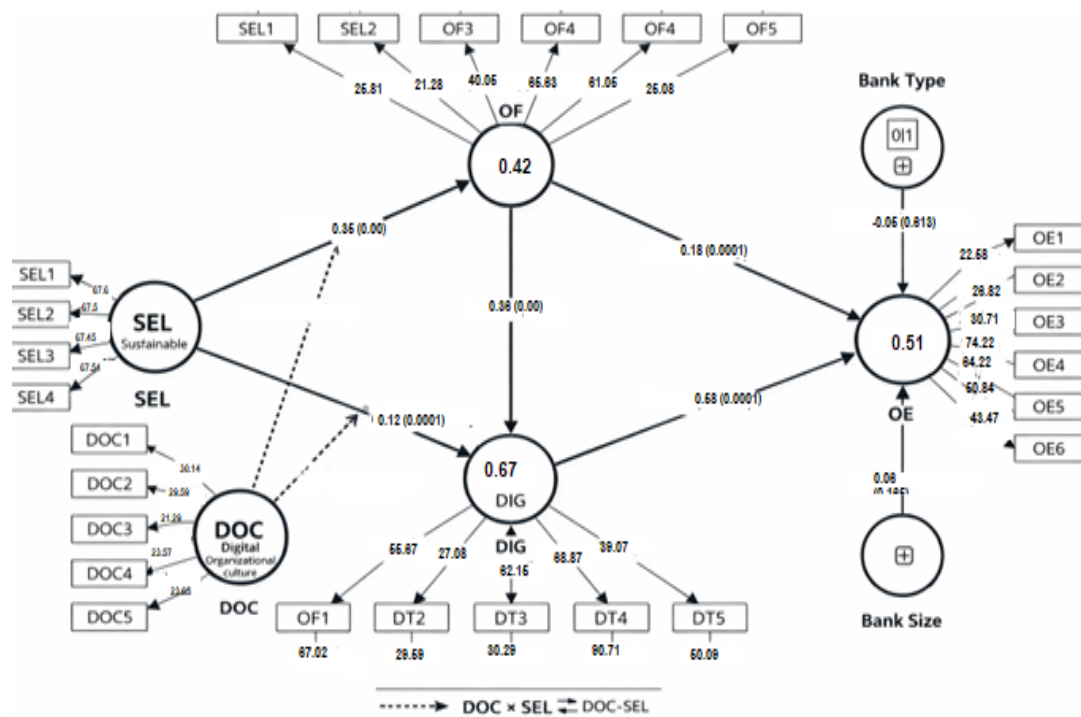


Figure 2. Structural Model of the Study

DISCUSSION

The results of this study highlight the critical contribution of sustainable e-leadership (SEL) to the operational efficiency (OE) facilitated by the mediating effect of organizational flexibility (OF) and digitalization (DIG) with the contingent role played by digital organizational culture (DOC). As a block, these relationships describe the processes through which organizations can attain sustainable organization change and in this paper the ability to be efficient, resilient as well as flexible in digitally turbulent worlds, rather than an outcome associated with a limited conception of ESG.

The considerable impacts of sustainable e-leadership on organizational flexibility and digitalization demonstrate that those leaders who can organize digitally mediated work, establish a clear direction in digitalization, and enable learning-oriented practices can create adaptive organizational structures and accelerate the pace of digitalized processes amalgamation. The identification is consistent with the results of earlier studies that e-leadership is an important factor in converting the digital potential into operationally relevant results by making the application of technology relevant to organizational goals. Using the Resource-Based View (RBV) approach, sustainable e-leadership is an intangible strategic

ability that draws on complementary organizational resources such as technological, human and structural resources to facilitate long-term performance, and sustainability as opposed to temporary performance enhancement.

The fact that organizational flexibility and digitalization have a positive impact on operational efficiency also proves that the capabilities are interdependent and complementary mechanisms. Organizational flexibility allows companies to feel operational disruptions and reorganize the workflow, and digitalization guarantees that such changes are incorporated into scalable technology-based processes. These abilities combined constitute the backbone of sustainable organizational change in that it enables organizations to be flexible and revamp their operational grounding as time goes by. This observation is in line with the Dynamic Capabilities Theory, which highlights the value of sensing, seizing, and reconfiguring capabilities in those environments marked by high rates of technological change.

Noteworthy, the important sequential mediation route (SEL - OF - DIG - OE) indicates a sequential logic of capability building. Organizational flexibility also develops as the requirement that preconditions the success of the digitalization process, and it implies that digital transformation projects will be more likely to bring efficiency improvement in case they are preceded by flexible organizational structures, adaptive routines and decentralized decision-making. This finding supports the perception that sustainable change does not occur after occasional digital projects but as an ongoing process whereby the presence of flexibility by the leadership facilitates successful digitalization. The moderation analysis also indicates that the importance of digital organizational culture is a contingent one vital to transforming how sustainable e-leadership is converted into an organizational flexibility and digitalization. Organizations with high levels of digital cultures, which can be identified by shared values of digital, teamwork, and receptive to change, are in a better place to habitualize leadership initiatives to long-term practices.

The negative interaction effects but, however, indicate that the highly institutionalized digital norms, under specific circumstances, can diminish the marginal role of leadership by restricting experimentation or adaptive variation. This subtle observation underscores the fact that not only the alignment of culture but also continuous recalibration between the structure, the flexibility, and the innovation is necessary to achieve a sustainable transformation, that is, to ensure the success of the novel approach. In general, the findings suggest that sustainable e-leadership improves resilience in organizations as it allows companies, especially banks that are in highly regulated and uncertain environments, to predict, absorb, and react to digital disruption. In line with RBV, sustainable competitive advantage is created when the leadership coordinates organizational flexibility and digitalization into a set of renewal and adaptation.

Sustainable transformation can therefore be explained as a process of constant capacity building where flexibility comes first and then preconditions efficient digitalization, and eventually results in better efficiency of operations.

CONCLUSION

This study examined how sustainable e-leadership (SEL) enhances operational efficiency (OE) in Jordanian commercial banks through organizational flexibility (OF) and digitalization (DIG), and how digital organizational culture (DOC) conditions these relationships. Drawing on the Resource-Based View and PLS-SEM analysis of survey data from 300 senior and middle managers, the results show that SEL has significant positive effects on both OF and DIG, and that both capabilities, in turn, improve OE. OF and DIG each mediate the effect of SEL on OE, and the sequential path SEL → OF → DIG → OE is also significant.

DOC significantly moderates the effects of SEL on OF and DIG; the negative interaction terms indicate that, where digital culture is strong, flexibility and digitalization depend less on direct leadership intervention.

Theoretically, the study extends the RBV by showing that e-leadership creates value not directly but by orchestrating complementary organizational capabilities in a sequence, in which flexibility precedes and enables digitalization. It also identifies digital organizational culture as a boundary condition that shapes how much leadership effort is required to build these capabilities, and it moves e-leadership research from general performance outcomes toward a process-based, efficiency-focused explanation in a highly regulated emerging-economy sector.

For bank managers, the findings suggest that digital investments yield efficiency gains when they are preceded by flexible structures, workflows and resource allocation routines. Leadership effort should also be calibrated to cultural maturity: in units with a weaker digital culture, active e-leadership is essential, whereas in digitally mature units leaders can shift from direct steering to enabling self-organized digital work. Regulators and policymakers can support efficiency by encouraging leadership development and flexible operating models alongside technology adoption.

The study has limitations. Its cross-sectional and self-reported design limits causal inference; future research should use longitudinal or multi-source data, including objective efficiency indicators.

The sample is restricted to Jordanian commercial banks, so replication in other sectors and countries is needed. Future studies could also examine further mechanisms, such as absorptive capacity or employees' digital skills, and test whether the moderating role of digital culture is non-linear.

Table 4. Measurement Items (Note: items OE8 and OE9 (nine OE items are reported in the Measurement section and Table 1) are missing from Table 4 – item wording to be supplied by the authors)

Construct	Item Code	Measurement Item
Sustainable E-Leadership (SEL)	SEL1	Leaders in our bank encourage employees to actively contribute to sustainable digital transformation initiatives.
	SEL2	Leaders in our bank consider employees' concerns and perspectives when implementing digital and sustainability-oriented changes.

	SEL3	Leaders in our bank promote the responsible use of digital technologies to enhance long-term operational efficiency.
	SEL4	Leaders in our bank support continuous learning related to digital skills and sustainable banking practices.
	SEL5	Leaders in our bank communicate a clear vision linking digital transformation with operational sustainability.
	SEL6	Leaders in our bank motivate employees to propose innovative and sustainable digital solutions.
Organizational Flexibility (OF)	OF1	Our bank can quickly adjust its operations to respond to changes in customer and regulatory requirements.
	OF2	Our bank adapts internal procedures and workflows efficiently in response to market and environmental changes.
	OF3	Our bank can flexibly resolve operational issues arising from partners, vendors, or service providers.
	OF4	Strategic and operational decisions in our bank are implemented promptly when conditions change.
	OF5	Our bank continuously revises and improves organizational processes to maintain efficiency.
	OF6	Our bank views regulatory and market changes as opportunities to enhance operational performance.
Digitalization (DIG)	DIG1	Our bank systematically digitalizes banking services and internal processes wherever feasible.
	DIG2	Our bank effectively collects and analyzes data from multiple internal and external sources to support operations.
	DIG3	Digital technologies in our bank integrate and coordinate different banking functions and processes.
	DIG4	Our bank uses digital platforms to enhance customer interaction and service delivery efficiency.
	DIG5	Digital systems in our bank facilitate timely and accurate information sharing across departments.
Digital Organizational Culture (DOC)	DOC1	Employees in our bank openly discuss mistakes related to digital initiatives to support learning and improvement.
	DOC2	Decisions related to digital initiatives in our bank are made collaboratively rather than by a single authority.
	DOC3	Our bank encourages cross-functional collaboration among departments (e.g., IT, operations, risk, marketing).
	DOC4	Our bank minimizes rigid hierarchies when working on digital transformation projects.
	DOC5	Employees in our bank are encouraged to propose ideas for sustainable and innovative digital banking solutions.
Operational Efficiency (OE)	OE1	Our bank has improved the efficiency of its operational processes compared to industry competitors.
	OE2	Our bank delivers banking services faster than in previous years.
	OE3	Our bank effectively utilizes resources to reduce operational costs.
	OE4	Over the past three years, our bank has improved the speed of launching new banking services.
	OE5	Over the past three years, our bank has enhanced service quality while maintaining cost efficiency.
	OE6	Digital transformation initiatives in our bank have led to measurable improvements in operational productivity.
	OE7	Our bank has achieved higher operational reliability through digitalized and flexible processes.

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Abbreviations: AVE – Average Variance Extracted; CCA – Confirmatory Composite Analysis; CMB – Common Method Bias; CR – Composite Reliability; DIG – Digitalization; DOC – Digital Organizational Culture; HTMT – Heterotrait–Monotrait ratio; OE – Operational Efficiency; OF – Organizational Flexibility; PLS-SEM – Partial Least Squares Structural Equation Modeling; RBV – Resource-Based View; SEL – Sustainable E-Leadership; VIF – Variance Inflation Factor; VRIN – Valuable, Rare, Inimitable and Non-substitutable.

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