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ECONOMICS
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STAFFING CHALLENGES AND EMPLOYEE STABILITY IN HOTEL OPERATIONS

Purpose. This study explores staffing challenges in hotel operations and analyzes how workforce pressures affect employee stability and corporate social responsibility practices

Design/methodology/approach. A mixed-method design was used for the study. Quantitative data were collected through a survey of 56 hotel managers representing several hospitality markets, while qualitative interviews were conducted to provide additional managerial insights. The analysis focuses on workforce conditions in major operational departments, including housekeeping, kitchen, food and beverage service, and front office operations.

Findings. The results indicate that labor-intensive departments face the strongest staffing pressure. Burnout, lack of qualified employees, and wage-related concerns were identified as interconnected factors contributing to workforce instability. Hotels mainly respond through salary adjustments, migrant labor, and digital technologies, although these measures appear to provide mostly short-term operational support.

Originality. The study contributes to hospitality workforce research by showing that staffing instability develops through several interconnected organizational pressures rather than through a single labor-related problem. It also highlights the role of employee well-being and workforce sustainability within corporate social responsibility practices

Keywords: Corporate social responsibility, Workforce management, Hospitality industry, Labor shortages, Employee well-being

Introduction

Hospitality businesses in many countries continue to experience difficulties in attracting and retaining operational employees. The problem is especially visible in hotel departments where employees work under intensive schedules, handle physically demanding tasks, and interact directly with guests on a daily basis. In recent years, labor shortages in hospitality have become more noticeable due to changing employee expectations, workforce mobility, and the long-term effects of the pandemic on service industries (Baum, 2015; Baum et al., 2020; Gursoy et al., 2023).

Corporate social responsibility discussions in hospitality now increasingly focus on internal organizational practices, including employee well-being and working conditions. Researchers have pointed out that socially responsible management is not limited to external initiatives but also involves employee well-being, fair compensation, and sustainable workforce policies (Baum, 2015; Davenport & Ronanki, 2018; Huang & Rust, 2021). For hotels, maintaining

workforce stability has therefore become both an operational challenge and an important management responsibility.

Several studies discussing hospitality employment point to burnout, skill shortages, wage competitiveness, and labor mobility as important sources of workforce instability (Bakker & Demerouti, 2007; De Witte, 2005). High workload intensity and emotional labor are often associated with employee exhaustion and stronger turnover intentions in hospitality organizations (Gursoy et al., 2023). Such problems are particularly visible in housekeeping, kitchen operations, and food and beverage departments where workload intensity is usually higher.

The problem is particularly noticeable in emerging hospitality markets, where rapid industry expansion and limited training capacity place additional pressure on hotel workforce systems (Acemoglu & Restrepo, 2020; Bessen, 2024). Hotels operating in such environments often experience several overlapping challenges at the same time, including staff shortages, retention difficulties, and increasing workload intensity. Many organizations have started using

digital technologies and operational automation to support everyday activities, although the long-term effect of these measures on workforce stability remains uncertain (Benbya et al., 2023; Davenport & Ronanki, 2018).

Although workforce challenges in hospitality have been widely discussed in previous studies, many researchers focus on individual factors separately rather than examining how different pressures interact within hotel operations (Bakker & Demerouti, 2007; De Witte, 2005). As a result, there is still limited understanding of how workforce shortages develop across departments and how different operational pressures reinforce one another.

This paper therefore examines workforce pressure from a department-level perspective and focuses on how staffing challenges develop across core hotel operations. Using survey data collected from hotel managers and supported by qualitative insights, the study explores the interaction between burnout, staffing shortages, and skill-related constraints in hotel departments. The concept of workforce pressure complementarity is used to explain how several organizational pressures may intensify operational instability.

By connecting workforce management with corporate social responsibility, the study contributes to current discussions on sustainable management practices in hospitality organizations. The results may also be useful for hotel managers and policymakers working on employee retention and workforce sustainability in hospitality operations.

Literature Review

Workforce instability in hospitality operations

Hospitality organizations traditionally experience high employee turnover and ongoing retention difficulties, especially in operational positions that require intensive customer interaction and physically demanding work (Baum, 2015; Baum et al., 2020). Because hotels rely heavily on frontline employees, workforce stability plays a major role in maintaining service quality and operational continuity. Staffing shortages are particularly common in departments such as housekeeping, kitchen operations, and food and beverage service, where workload intensity is generally higher.

Researchers have linked workforce instability in hospitality to several factors, including wage competitiveness, working conditions, burnout, and limited opportunities for professional development (Bakker & Demerouti, 2007; De Witte, 2005). More recent studies also note that changing employee ex-

pectations, concerns about work-life balance, and job insecurity increasingly influence turnover intentions in service industries (Gursoy et al., 2023). However, workforce pressure does not affect all hotel departments equally. In practice, some operational units experience substantially higher staffing pressure than others, which makes department-level analysis particularly important.

Burnout and workforce pressure

Burnout is widely discussed in hospitality research as one of the major factors contributing to employee turnover and workforce instability (Bakker & Demerouti, 2007). Hotel employees often work under demanding conditions that involve irregular schedules, emotional labor, and continuous interaction with guests. Over time, these conditions may increase physical and emotional exhaustion, especially in departments with intensive operational workloads.

The Job Demands–Resources (JD–R) framework explains that burnout tends to develop when job demands consistently exceed the resources available to employees (Bakker & Demerouti, 2007). In hotel operations, staffing shortages frequently increase workload pressure and reduce opportunities for recovery, which can negatively affect employee motivation and retention. Labor-intensive departments are particularly exposed to such conditions, making burnout an important factor in understanding workforce instability in hospitality organizations.

Previous studies also suggest that employees experiencing high levels of exhaustion are more likely to leave hospitality jobs or search for alternative employment opportunities (Gursoy et al., 2023). As a result, burnout not only affects employee well-being but may also create additional operational pressure for hotels already dealing with staffing shortages.

Interacting workforce pressures

In practice, workforce shortages in hospitality are usually caused by several overlapping problems rather than by one isolated factor. In many hotel operations, staffing difficulties are shaped by several interconnected pressures, including burnout, skill shortages, wage dissatisfaction, and employee turnover (De Witte, 2005; Bessen, 2024). These factors often reinforce one another and create additional strain within operational departments.

For example, understaffing usually increases workload intensity for existing employees. As workload pressure grows, employees may experience higher levels of exhaustion and job dissatisfaction, which can eventually lead to turnover. This process further deepens staffing shortages and increases op-

erational instability. Skill gaps may intensify these difficulties because inexperienced employees often require additional supervision and training, placing extra pressure on experienced staff members.

Such interaction effects suggest that workforce instability should not be viewed as an isolated organizational issue. Instead, staffing pressure develops through the combined influence of several operational and human resource challenges that affect one another over time (Bessen, 2024). This perspective helps explain why many hospitality organizations continue to experience workforce instability even when individual management measures are introduced.

Management responses and research gap

Hotels experiencing staffing shortages typically rely on several short-term management responses, including wage increases, recruitment campaigns, migrant labor, and the use of digital technologies to support operational activities (Acemoglu & Restrepo, 2020; Davenport & Ronanki, 2018). These measures often help organizations maintain service continuity during periods of workforce pressure, although their long-term effectiveness remains uncertain.

Higher wages may temporarily improve employee retention, while migrant labor is frequently used to address immediate staffing gaps in labor-intensive departments. At the same time, hotels increasingly adopt digital tools and automation to reduce operational workload and improve efficiency. However, technology alone cannot fully replace the need for qualified employees in service-oriented environments (Benbya et al., 2023).

Despite the growing number of studies examining labor shortages in hospitality, much of the existing research focuses on separate workforce factors rather than their interaction within operational systems. Limited attention has been given to how staffing pressure develops simultaneously across hotel departments and how different workforce-related challenges reinforce one another. This creates a need for further research that combines department-level analysis with a broader understanding of interacting workforce pressures in hospitality organizations.

Research questions

To address the identified gap, the study focuses on the following research questions:

- **RQ1:** Which hotel departments experience the highest workforce shortage severity?
- **RQ2:** Which workforce pressures tend to co-occur in high-pressure departments?
- **RQ3:** How do managers respond to workforce pressure in hotel operations?

Methodology

This study uses a mixed-method approach to examine workforce pressures in hotel operations. Quantitative survey data were combined with qualitative interviews in order to obtain a broader understanding of workforce-related challenges in hospitality organizations. Combining both methods helped compare statistical patterns with practical managerial observations. (Creswell & Plano Clark, 2017).

Data collection involved hotel managers working in seven hospitality markets that experienced labor shortages during the post-pandemic period. The final sample included 56 respondents representing mid-scale and upscale hotels. Participants occupied managerial positions directly connected with staffing decisions and operational performance, including general managers, human resource specialists, and department supervisors. Similar respondent groups have frequently been used in hospitality workforce studies because of their practical involvement in operational management (Baum, 2015).

The survey examined workforce shortage severity across several operational hotel departments, including Front Office, Housekeeping, Food and Beverage, Kitchen, and Engineering. Respondents evaluated staffing pressure using a five-point Likert scale. Additional workforce-related factors such as burnout, skill shortages, wage competitiveness, migration, and seasonality were measured using the same scale format. Likert-based measurements are commonly applied in hospitality and organizational research to assess perceptions related to operational and employee-management issues (Bakker & Demerouti, 2007).

Managerial responses to staffing shortages were also assessed in the survey. The analysis focused on several commonly used practices, including wage increases, the use of digital technologies, recruitment of migrant labor, and reduction of service scope. These measures reflect typical organizational responses to labor shortages previously identified in hospitality and service-sector research (Acemoglu & Restrepo, 2020).

To support interpretation of the survey findings, six semi-structured interviews with senior hotel managers were conducted. The interviews helped clarify how managers experience workforce-related difficulties in everyday hotel operations.” Qualitative observations were used mainly to clarify recurring patterns identified in the quantitative analysis (Creswell & Plano Clark, 2017).

The data analysis relied primarily on descriptive statistics and comparison of department-level work-

force patterns. Interview materials were examined thematically and used to provide additional context for interpreting the survey results. This combination of methods allowed the study to examine workforce pressure from both operational and managerial perspectives.

Results

The analysis demonstrates noticeable differences in staffing pressure across hotel departments. Labor-intensive operational units reported higher shortage severity than technical functions. Housekeeping recorded the highest shortage level ($M = 3.67$), followed by Kitchen operations ($M = 3.33$). Food and Beverage service together with Front Office departments showed moderate staffing pressure ($M = 3.08$), while Engineering reported the lowest shortage severity ($M = 2.19$).

These patterns suggest that staffing difficulties are more common in departments characterized by intensive workloads and continuous guest interaction. The department-level comparison is presented in Table 1.

Table 1
Workforce shortage severity by department

Department	Mean shortage severity	Standard deviation	Rank
Housekeeping	3.67	1.11	1
Kitchen	3.33	1.28	2
Food & Beverage Service	3.08	1.26	3
Front Office	3.08	1.10	3
Engineering	2.19	1.15	5

Note: Values represent mean scores on a five-point Likert scale (1 = no shortage, 5 = severe shortage). $n = 56$.

Workforce shortages in hotels appear to be influenced by several interconnected factors. Among the surveyed managers, skill shortages received the highest average evaluation ($M = 3.72$), followed by burnout-related pressure ($M = 3.44$). Wage competitiveness showed a moderate influence on staffing conditions ($M = 3.08$), while seasonality ($M = 2.94$) and outward labor migration ($M = 2.86$) were considered less influential.

The findings indicate that staffing pressure in hospitality operations develops through the interaction of multiple workforce-related challenges. In many cases, burnout, lack of qualified personnel, and retention difficulties occur simultaneously, creating additional operational pressure across departments. The main workforce shortage drivers are presented in Table 2.

Table 2
Drivers of workforce shortages

Driver	Mean influence	Standard deviation	Rank
Skill gaps	3.72	0.94	1
Burnout	3.44	1.11	2
Wage competitiveness	3.08	1.34	3
Seasonality	2.94	1.13	4
Outward migration	2.86	1.28	5

Note: Values represent mean scores on a five-point Likert scale (1 = low influence, 5 = high influence). $n = 56$.

Managers used several approaches to deal with staffing shortages in hotel operations. Wage increases were mentioned most frequently ($M = 3.50$), while digital tools and automation were also used relatively often ($M = 3.08$). The use of migrant labor showed a moderate level ($M = 2.69$). Reduction of service scope was reported less frequently compared to other management responses ($M = 2.42$).

These results show that hotels generally rely on a combination of short-term operational measures to maintain service continuity during periods of staffing pressure. The main management responses are presented in Table 3.

Table 3
Management responses to workforce shortages

Management response	Mean frequency	Standard deviation	Rank
Wage increases	3.50	1.00	1
Automation / digital tools	3.08	1.18	2
Hiring migrant labor	2.69	1.21	3
Reduction of service scope	2.42	1.00	4

Note: Values represent mean scores on a five-point Likert scale (1 = never used, 5 = very frequently used). $n = 56$.

Discussion

The findings indicate that workforce pressure in hospitality operations is distributed unevenly across hotel departments. Labor-intensive units such as housekeeping, kitchen operations, and food and beverage service experience noticeably higher staffing strain compared to technical departments (Baum, 2015; Baum et al., 2020). These operational areas are usually associated with heavier workloads, direct guest interaction, and physically demanding tasks, all of which may contribute to higher turnover and retention difficulties.

The study also shows that workforce-related challenges are closely connected with employee well-being and working conditions. Burnout, workload intensity, and staffing shortages affect not only operational performance but also the sustainability of workforce management practices within hospitality organizations. Previous studies similarly report that emotional labor and excessive workload often increase employee stress and turnover intentions in service environments (Koc & Boz, 2019).

Another important observation is that workforce pressures rarely develop independently from

one another. Staffing shortages increase workload pressure for existing employees, while burnout and turnover further deepen operational instability. Skill shortages may intensify these difficulties because experienced staff members often spend additional time supervising and training less experienced employees (Bakker & Demerouti, 2007). Similar relationships between burnout and employee turnover have been discussed in earlier hospitality research (Karatepe, 2013).

Overall, workforce instability in hospitality appears to be a broader organizational problem rather than the result of one specific factor. From a managerial perspective, addressing only wages or recruitment is unlikely to ensure long-term workforce stability. Earlier studies on hospitality employment have also emphasized the structural nature of employee turnover and retention difficulties within the industry (Iverson & Deery, 1997).

The interaction between these workforce pressures is illustrated in Figure 1.

To further illustrate how workforce pressures differ across hotel departments, Table 4 presents a comparative overview of key operational characteristics and their relationship with workforce strain.

Figure 1

Workforce pressure complementarity in hospitality operations

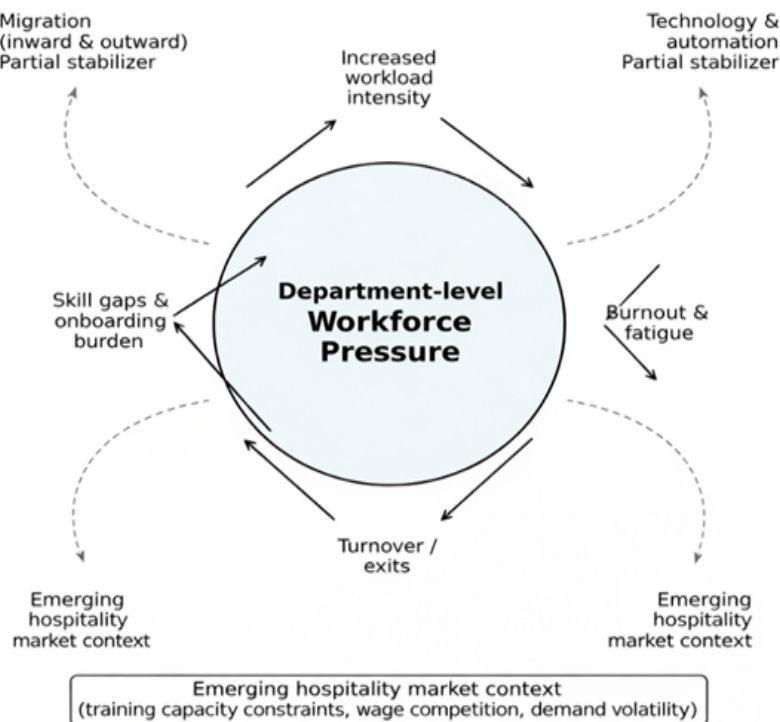


Table 4*Department-level characteristics and workforce pressure*

Department	Workload intensity	Skill level	Burnout risk	Shortage severity
Housekeeping	High	Low–Medium	High	Very high
Kitchen	High	High	High	High
Food & Beverage	Medium–High	Medium	Medium–High	Medium–High
Front Office	Medium	Medium	Medium	Medium
Engineering	Low	High	Low	Low

Note: The table presents a conceptual comparison of department-level characteristics based on survey findings and qualitative insights.

Hotels usually respond to staffing shortages through a combination of operational and managerial measures, including wage increases, recruitment of migrant workers, and the use of digital technologies (Acemoglu & Restrepo, 2020; Davenport & Ronanki, 2018). These strategies may help organizations maintain day-to-day operations during periods of workforce pressure, although their long-term impact appears limited.

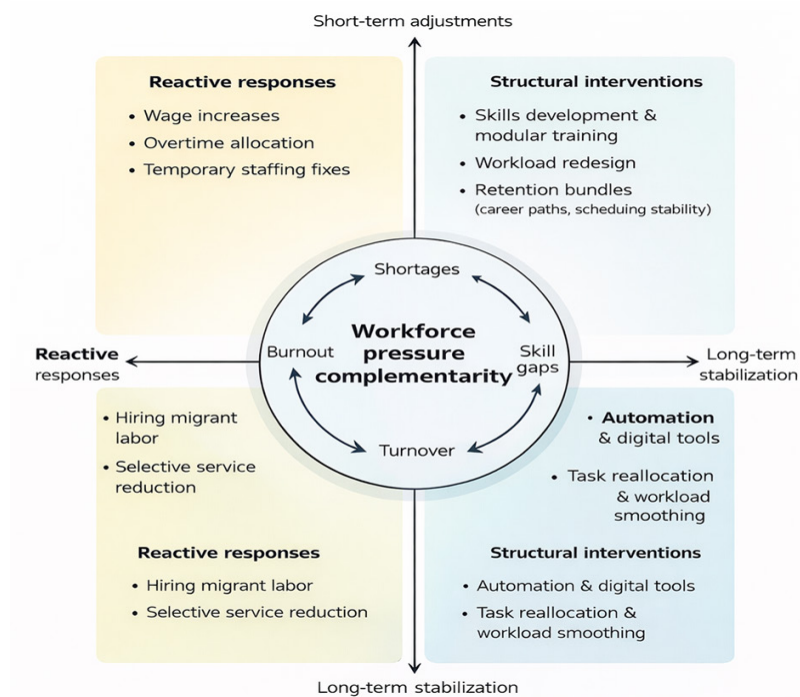
Migrant labor often provides temporary support in labor-intensive departments, while automation and digital tools can reduce part of the operational workload. At the same time, hospitality organizations still depend heavily on human interaction and qualified employees, which limits the ability of technology to

fully replace labor in service environments (Benbya et al., 2023). Questions related to working conditions, employee expectations, and career attractiveness therefore remain important challenges for the hospitality sector (Richardson & Butler, 2012).

From a corporate social responsibility perspective, workforce sustainability is closely connected with employee well-being and working conditions. Reducing burnout, improving workload distribution, and supporting employee development may contribute not only to better retention but also to more stable hotel operations over time.

Managerial responses to workforce pressure are summarized in Figure 2.

Figure 2
Managerial responses to workforce pressure



Note: The figure summarizes key managerial responses identified through survey and interview data.

To complement the quantitative findings, interviews with hotel managers provided additional insight into how staffing pressure affects everyday hotel operations. Managers frequently referred to workload intensity, employee exhaustion, and difficulties in retaining qualified staff as recurring operational con-

cerns. Several respondents also noted that short-term solutions often help maintain operations but do not fully resolve underlying workforce problems.

Selected managerial observations illustrating these workforce-related challenges are presented in Table 5.

Table 5

Managerial insights on workforce pressures in hotel operations

Workforce issue	Manager insight (illustrative)	Operational implication
Staff shortages	"We constantly operate with fewer employees than needed."	Increased workload and service pressure
Burnout	"Employees get exhausted quickly and leave after short periods."	High turnover and instability
Skill gaps	"New staff require significant training and supervision."	Reduced efficiency and higher supervision load
Wage competitiveness	"Higher wages help, but do not solve retention problems."	Temporary stabilization without long-term effect
Migration reliance	"Migrant workers fill gaps, but turnover remains high."	Short-term staffing support
Technology adoption	"Digital tools help, but cannot replace human labor."	Partial reduction of workload

Note: The table summarizes key insights derived from qualitative interviews with hotel managers.

Overall, this study demonstrates that workforce shortages in hospitality are shaped by interacting pressures that require coordinated managerial responses. A focus on employee well-being and sustainable workforce practices can contribute to more effective and responsible management in hospitality organizations.

Conclusion and Implications

The study examined workforce-related pressures in hotel operations and showed that staffing difficulties are shaped by several interconnected organizational challenges rather than a single isolated problem. Labor-intensive departments, particularly housekeeping and kitchen operations, reported the highest levels of staffing strain and employee pressure. These difficulties influence not only operational continuity but also employee well-being and service quality within hospitality organizations.

Burnout, skill shortages, and retention problems often develop at the same time and strengthen workforce pressure over time. In many hotels, staffing shortages increase workload intensity, while employee turnover creates additional operational pressure

for remaining staff members. This makes workforce instability a broader organizational issue that may affect multiple departments at the same time.

The analysis also indicates that commonly used management responses – including wage increases, migrant labor recruitment, and digital technologies – mainly provide short-term operational support. Although these measures may reduce immediate staffing pressure, they do not fully address long-term workforce sustainability or employee retention challenges.

From a managerial perspective, the results highlight the importance of improving working conditions, supporting employee development, and reducing excessive workload in labor-intensive departments. Workforce stability should therefore be considered not only an operational priority but also an important component of corporate social responsibility in hospitality management.

The study highlights the importance of employee well-being and stable staffing practices in hotel operations. The results suggest that long-term workforce stability in hospitality depends not only on recruitment efforts but also on working conditions, workload management, and employee retention.

Limitations and Future Research

Several limitations of the study should be acknowledged. First, the analysis is based mainly on managerial perceptions, which may reflect subjective evaluations of workforce conditions and operational challenges. Second, the study applies a cross-sectional design and therefore captures workforce-related issues at a specific period rather than over a longer timeframe. Changes in labor market conditions and organizational practices may influence workforce dynamics differently over time.

Another limitation is related to the sample structure. The research focuses primarily on emerging hospitality markets, which may limit the broader applicability of the findings to hotels operating in different institutional or economic environments. In addition, the study relies mostly on perceptual data rather than objective operational indicators such as turnover rates, absenteeism, or productivity measures.

Future research could expand this analysis by using longitudinal data to examine how workforce pres-

ures evolve over time in hospitality organizations. Comparative studies involving different countries and hotel categories may also provide a broader understanding of workforce instability across hospitality markets. Further research integrating operational performance indicators with employee-related data could help clarify the relationship between staffing pressure, employee well-being, and organizational sustainability in hotel operations.

Conflicts of Interest

The authors declare no conflict of interest.

Author Contributions

Conceptualization, A.T. and A.M.; Methodology, A.T. and A.M.; Software, M.P.; Validation, A.M.; Formal Analysis, A.T. and M.P.; Investigation, A.T.; Data Curation, A.T.; Writing – Original Draft Preparation, A.T.; Writing – Review & Editing, A.M. and M.P.; Visualization, M.P.; Supervision, A.M. and M.P.; Project Administration, M.P.

References

- Acemoglu, D., & Restrepo, P. (2020). Robots and jobs: Evidence from U.S. labor markets. *Journal of Political Economy*, 128(6), 2188–2244. <https://doi.org/10.1086/705716>
- Bakker, A. B., & Demerouti, E. (2007). The job demands–resources model: State of the art. *Journal of Managerial Psychology*, 22(3), 309–328. <https://doi.org/10.1108/02683940710733115>
- Baum, T. (2015). Human resources in tourism: Still waiting for change? *Tourism Management*, 50, 204–212. <https://doi.org/10.1016/j.tourman.2007.04.005>
- Baum, T., Mooney, S., Robinson, R., & Solnet, D. (2020). COVID-19's impact on the hospitality workforce. *International Journal of Contemporary Hospitality Management*, 32(9), 2813–2827. <http://dx.doi.org/10.2139/ssrn.3741983>
- Benbya, H., Davenport, T. H., & Pachidi, S. (2023). Artificial intelligence in organizations: Current state and future opportunities. *Journal of the Association for Information Systems*, 24(1), 1–21. <https://dx.doi.org/10.2139/ssrn.3741983>
- Bessen, J. (2024). AI and jobs: The role of demand. *ILR Review*.
- Creswell, J. W., & Plano Clark, V. L. (2017). *Designing and conducting mixed methods research* (3rd ed.). Sage.
- Davenport, T. H., & Ronanki, R. (2018). Artificial intelligence for the real world. *Harvard Business Review*, 96(1), 108–116.
- De Witte, H. (2005). Job insecurity: Review of the international literature. *SA Journal of Industrial Psychology*, 31(4), 1–6.
- Gursoy, D., Chi, O. H., Lu, L., & Nunkoo, R. (2023). Consumer acceptance of artificial intelligence in services. *International Journal of Information Management*, 68, 102657.
- Huang, M.-H., & Rust, R. T. (2021). A strategic framework for artificial intelligence in marketing. *Journal of the Academy of Marketing Science*, 49(1), 30–50. <https://doi.org/10.1007/s11747-020-00749-9>
- Iverson, R. D., & Deery, M. (1997). Turnover culture in the hospitality industry. *Human Resource Management Journal*, 7(4), 71–82. <https://doi.org/10.1111/j.1748-8583.1997.tb00290.x>
- Karatepe, O. M. (2013). High-performance work practices and hotel employee performance: The mediation of work engagement. *International Journal of Hospitality Management*, 32, 132–140. <https://doi.org/10.1016/j.ijhm.2012.05.003>
- Koc, E., & Boz, H. (2019). The dark side of emotional labor in the hospitality industry. *International Journal of Hospitality Management*, 76, 140–149. <https://doi.org/10.1080/19368623.2019.1537139>
- Rai, A., Constantinides, P., & Sarker, S. (2021). Next-generation digital platforms: Toward human–AI hybrids. *MIS Quarterly*, 45(1), 1–17.
- Richardson, S., & Butler, G. (2012). Attitudes of Malaysian tourism and hospitality students towards a career in the industry. *Asia Pacific Journal of Tourism Research*, 17(3), 262–276. <https://doi.org/10.1080/10941665.2011.625430>
- Tarafdar, M., Pullins, E. B., & Ragu-Nathan, T. S. (2015). Technostress: Negative effect on performance and possible mitigations. *Information Systems Journal*, 25(2), 103–132. <https://doi.org/10.1111/isj.12042>

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THE IMPACT OF DIGITAL TRANSFORMATION ON ORGANIZATIONAL RESILIENCE AND ECONOMIC PERFORMANCE

Purpose. This study develops and empirically tests an integrated model explaining how digital transformation enhances economic performance and organizational resilience through the mediating roles of digital transformation strategy, organizational agility, and capital resilience. It addresses the need to clarify the organizational mechanisms through which digitalization generates value under conditions of uncertainty.

Design/methodology/approach. Data were collected from 213 employees of a private enterprise in Kazakhstan. The proposed research model was analyzed using partial least squares structural equation modeling (PLS-SEM) in SmartPLS 4 with bootstrapping. The measurement model was assessed for reliability, convergent validity, and discriminant validity before testing the structural relationships.

Findings. The results demonstrate that digital transformation significantly strengthens digital transformation strategy, organizational agility, and capital resilience. Digital transformation strategy and organizational agility positively influence economic performance, while organizational agility and capital resilience positively affect organizational resilience. The mediation analysis confirms that digital transformation improves both economic performance and organizational resilience indirectly through strategic alignment, adaptive capability, and financial robustness. The model explains 57.8% of the variance in economic performance and 42.4% of the variance in organizational resilience.

Originality. This study contributes to the resource-based view and dynamic capabilities literature by proposing and validating an integrated framework linking digital transformation to both organizational performance and resilience. It extends existing research by simultaneously examining strategic, organizational, and financial mechanisms, offering practical guidance for organizations seeking to strengthen competitiveness and resilience through digital transformation.

Keywords: digital transformation, economic performance, organizational resilience, organizational agility, capital resilience.

Introduction

Digital transformation has become a major strategic concern for enterprises facing growing market pressure and technological disruption. Contemporary research conceptualizes digital transformation as a broad organizational change process involving strategy, structures, capabilities, and value creation, rather than the isolated adoption of digital tools (Vial, 2019; Verhoef et al., 2021). In this sense, digital transformation affects how firms create value and adapt to changing environments.

Although the performance implications of digital transformation have attracted substantial scholarly attention, the available evidence remains fragmented. One stream of research examines firm performance and shows that digitally transforming capability

can contribute to improved performance outcomes, particularly when supported by appropriate organizational capabilities and microfoundations (Sousa-Zomer et al., 2020). Another stream centers on resilience and suggests that digital transformation may enhance organizational resilience, with this effect being shaped by internal mechanisms such as organizational learning and ambidextrous innovation (Awad & Martín-Rojas, 2024; Zhang et al., 2021). However, these two streams are often examined separately, which leaves the joint organizational consequences of digital transformation insufficiently integrated.

Rather than functioning as opposing goals, economic performance and organizational resilience act as mutually reinforcing pillars. Economic performance reflects the organization's ability to convert resources and capabilities into value creation and

measurable results, whereas organizational resilience refers to the ability to anticipate, respond, recover, and continue functioning under adverse conditions. In practice, firms increasingly need both outcomes at the same time: performance without resilience may be short-lived, whereas resilience without performance may be financially unsustainable. This dual perspective is especially relevant in emerging-economy contexts, where firms may face higher volatility, tighter resource constraints, and uneven levels of digital maturity. Against this backdrop, examining digital transformation only through a performance lens or only through a resilience lens provides an incomplete account of its strategic value.

The unresolved issue is therefore not whether digital transformation matters, but how its effects are transmitted inside the organization. Prior research suggests that the organizational value of digital transformation is more convincingly explained through enabling capabilities and mediating mechanisms than through a purely direct-effect logic (Verhoef et al., 2021; Sousa-Zomer et al., 2020; Awad & Martín-Rojas, 2024; Zhang et al., 2021). Building on this logic, the present study develops an integrated model linking digital transformation to two organizational outcomes – economic performance and organizational resilience – through three mediating mechanisms: digital transformation strategy, organizational agility, and capital resilience.

The study makes three contributions. First, it integrates performance-oriented and resilience-oriented perspectives into a single explanatory framework. Second, it examines the mediating pathways through which digital transformation is translated into organizational outcomes, thereby extending resource-based and dynamic capabilities arguments. Third, it provides empirical evidence from a private enterprise in Kazakhstan, a context that remains underrepresented in the digital transformation literature despite the growing strategic importance of digitalization in emerging economies.

To test the proposed model, survey data were collected from 213 employees of a private company and analyzed using PLS-SEM. The results show that digital transformation significantly strengthens digital transformation strategy, organizational agility, and capital resilience. In turn, digital transformation strategy and organizational agility enhance economic performance, whereas organizational agility and capital resilience improve organizational resilience. The findings indicate that the organizational benefits of digital transformation arise primarily through mediating mechanisms and are shaped by the firm's

capacity for strategic alignment, financial resilience, and rapid adaptation.

Literature Review

Digital transformation and digital transformation strategy

Researchers generally describe digital transformation as an organization-wide change process enabled by the strategic deployment of digital technologies. Rather than representing the isolated adoption of digital tools, it affects structures, routines, managerial processes, and value creation, and therefore requires organization-wide alignment (Vial, 2019; Verhoef et al., 2021). In Matt et al. (2015), digital transformation is presented as requiring a clear strategic framework that connects coordination, prioritization, and implementation with broader changes in technology use, value creation, organizational structure, and financial logic. In a similar vein, Gurbaxani and Dunkle (2019) emphasize that firms need to rethink strategy and business models in order to manage digital transformation successfully. A digital transformation strategy performs several functions. It aligns technology investments with business objectives, reduces implementation ambiguity, clarifies priorities, and supports organization-wide coordination. In firms with growing digital intensity, the need for such alignment becomes stronger because technology deployment affects not only operational tools but also governance, business models, customer interaction, and cross-functional integration. For this reason, higher levels of digital transformation should be associated with a stronger and more formalized digital transformation strategy.

H1: Digital transformation positively influences digital transformation strategy.

Digital transformation strategy and economic performance

According to the resource-based view, organizational performance depends on a firm's ability to use and combine valuable resources and capabilities effectively (Barney, 1991). A digital transformation strategy can help firms orchestrate digital assets, managerial capabilities, and process redesign in ways that convert technological potential into measurable economic benefits. Rather than generating value automatically, digital investments become productive when they are aligned with business priorities and embedded in organizational processes.

The literature shows that digital transformation is linked to changes in organizational structures and

performance dimensions (Verhoef et al., 2021). At the same time, evidence from the capability perspective suggests that stronger digital transforming capability is associated with better firm performance (Sousa-Zomer et al., 2020). Accordingly, a well-articulated digital transformation strategy should positively affect economic performance.

H2: Digital transformation strategy positively affects economic performance.

Digital transformation and organizational agility

Dynamic capabilities theory explains competitive adaptation through the abilities to sense opportunities and threats, seize them through timely decisions, and reconfigure organizational resources accordingly (Teece, 2007). Digital transformation can enhance these adaptive capabilities by making organizational processes more connected, transparent, and responsive, while also improving the firm's ability to process information. In turn, digital technologies help firms access and interpret real-time data, coordinate activities across units, and adjust operations more quickly when external conditions shift.

In this sense, digital transformation is expected to enhance organizational agility by enabling faster responses, greater flexibility, and improved reconfiguration of internal processes.

H3: Digital transformation positively affects organizational agility.

Organizational agility and economic performance

Organizational agility denotes the capacity of an organization to adapt rapidly and effectively to shifting environmental conditions by reconfiguring resources, decision-making, and operations. In uncertain markets, agility can support performance by shortening response time, improving strategic fit, and helping firms exploit emerging opportunities before competitors do. Agile organizations are often better able to coordinate cross-functional action, absorb market signals, and adapt internal processes to changing demand conditions.

Prior empirical work identifies organizational agility as an important predictor of organizational performance and success (Nafei, 2016). Accordingly, organizational agility should positively affect economic performance.

H4: Organizational agility positively affects economic performance.

Digital transformation and capital resilience

Resilience is not sustained by operational flexibility alone. Organizations also need the ability to

preserve, mobilize, and restore financial resources under turbulent conditions. In line with Chen et al. (2021), this study treats capital resilience as one dimension of broader organizational resilience and defines it as the organization's capacity to maintain financial stability and support continuity under stress. Capital resilience, as a resource-based component of resilience, forms the financial basis that enables an organization to withstand shocks and sustain operations under pressure.

Prior research shows that digital transformation can strengthen organizational resilience more broadly by supporting learning, innovation, and resilience-enabling mechanisms (Awad & Martín-Rojas, 2024; Li et al., 2025). Extending this logic, digital systems may also improve planning accuracy, transparency, resource tracking, and managerial control over operational and financial flows. Therefore, digital transformation is expected to positively affect capital resilience.

H5: Digital transformation positively affects capital resilience.

Capital resilience and organizational resilience

Organizational resilience generally refers to an organization's capacity to cope with adversity, adapt to changing conditions, and sustain functioning over time (Hillmann & Guenther, 2021). Although resilience has behavioral, cultural, and strategic dimensions, its resource foundation remains essential. Organizations that can preserve cash flow, maintain investment capacity, and protect their financial buffer are better positioned to sustain operations and recover from disruption.

Chen et al. (2021) explicitly identify capital resilience as one of the dimensions of organizational resilience, which suggests that financial stability and reserve capacity form part of the broader resilience architecture of the firm. In this sense, capital resilience provides the material basis for organizational resilience: it supports continuity, enables rapid response, and reduces vulnerability during crises. Therefore, stronger capital resilience should enhance organizational resilience.

H6: Capital resilience positively affects organizational resilience.

Organizational agility and organizational resilience

Agility and resilience are conceptually distinct but closely connected. Whereas organizational agility reflects a firm's capacity for fast and flexible action in response to changing conditions, organizational resilience refers to its capacity to remain functional, adjust effectively, and recover when disruptions oc-

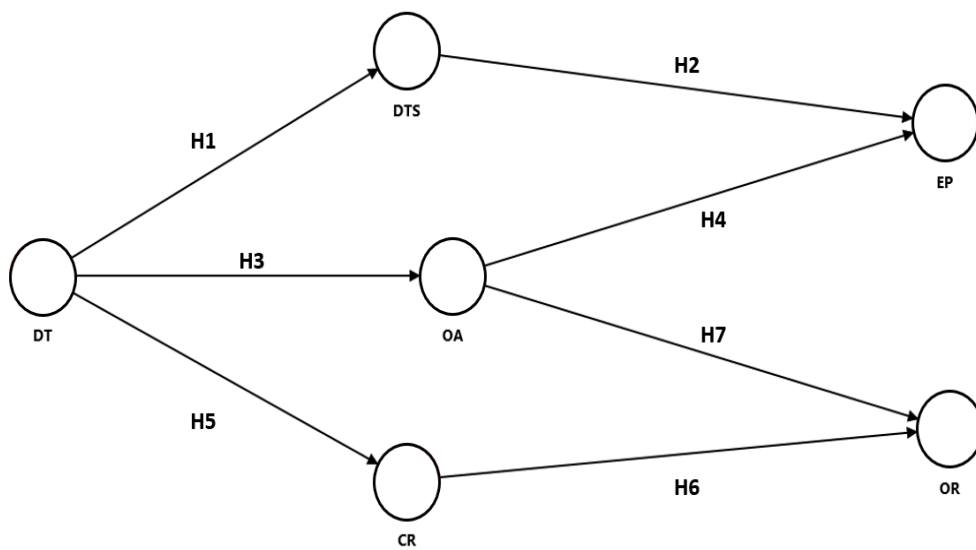
cur. Firms that detect shifts early, redesign routines when necessary, and make timely decisions are generally better able to cope with disturbances and continue adapting successfully.

Empirical evidence supports this relationship: Yağmur and Myrvang (2023) report a positive effect of organizational agility on organizational resilience in a crisis-sensitive context. Accordingly, organizational agility may be regarded as a key capability supporting organizational resilience.

H7: Organizational agility positively affects organizational resilience.

Based on the theoretical arguments and the hypotheses developed above, the study proposes the conceptual research model presented in Figure 1. The model links digital transformation to economic performance and organizational resilience through three mediating mechanisms: digital transformation strategy, organizational agility, and capital resilience.

Figure 1
Conceptual research model



Note: Compiled by the author

Methodology

The empirical analysis focused on the private sector entity “Bolashak Khimiya”. This specific organization was chosen due to its presence in a highly competitive market, where the adoption of digital solutions has become a vital requirement for maintaining operational excellence, streamlining coordination, and ensuring business continuity. A single-company design also makes it possible to examine the proposed mechanisms in a relatively homogeneous context and to reduce structural heterogeneity that often complicates cross-industry survey analysis.

The study employed a quantitative research design and convenience sampling. Data were collected through an online questionnaire distributed via Google Forms. In total, 213 valid responses were obtained. Of the respondents, 114 were women (53.5%) and 99 were men (46.5%). The largest age

group was 21–30 years (45.1%), followed by 31–40 years (28.2%), 41–50 years (18.8%), 14–20 years (5.2%), and 51–60 years (2.8%). In terms of education, 40.8% held a specialist or master’s degree, 40.4% held a bachelor’s degree, 16.0% had incomplete higher education, and 2.8% had secondary vocational education.

Table 1 summarizes the profile of the respondents. The sample size of 213 is adequate for PLS-SEM, given the moderate complexity of the model and the fact that the number of observations exceeds commonly used minimum sample size heuristics for variance-based structural equation modeling. The final model retained six reflective constructs and 24 indicators after measurement model purification.

The dependent variables were economic performance (EP) and organizational resilience (OR). Economic performance was measured with seven items adapted from Onubi et al. (2020) and reformu-

lated to fit the organizational context of the present study. Organizational resilience was measured with four items adapted from Zhang et al. (2021). The independent variable, digital transformation (DT), was measured with three items adapted from Teng et al. (2022). Three mediators were included: digital transformation strategy (DTS), measured with seven items adapted from Teng et al. (2022); organizational agility (OA), measured with seven items adapted from Nafei's (2016) operationalization of organizational agility; and capital resilience (CR), initially operationalized with seven author-adapted items capturing financial stability and continuity capacity and informed by the resilience dimensions identified by Chen et al. (2021). The questionnaire used Likert-type scales adapted from the source instruments and adjusted to the study context where necessary.

Data were analyzed in SmartPLS 4 (Ringle et al., 2024) using the PLS-SEM approach. The ana-

lytical procedure involved two stages. First, the measurement model was assessed in terms of outer loadings, internal consistency reliability, convergent validity, discriminant validity, and collinearity diagnostics, consistent with established PLS-SEM procedures (Hair et al., 2022). Second, the structural model was evaluated using path coefficients, bootstrapped t-statistics and p-values, coefficients of determination (R^2), and effect sizes (f^2). A bootstrapping procedure with 5,000 resamples was used to test the significance of the structural relationships and indirect effects.

During measurement model purification, indicators with insufficient loadings were removed, and one additional item (DTS2) was excluded at the preliminary stage because of collinearity concerns. After these refinements, the final model retained 24 indicators across six reflective constructs and demonstrated acceptable psychometric properties.

Table 1
Sample profile

Category	Group	n (%)
Gender	Women	114 (53.5)
Gender	Men	99 (46.5)
Age	14–20 years	11 (5.2)
Age	21–30 years	96 (45.1)
Age	31–40 years	60 (28.2)
Age	41–50 years	40 (18.8)
Age	51–60 years	6 (2.8)
Education	Specialist/Master's degree	87 (40.8)
Education	Bachelor's degree	86 (40.4)
Education	Incomplete higher education	34 (16.0)
Education	Secondary vocational education	6 (2.8)

Note: Compiled by the author based on the survey data (n = 213)

Results and discussion

The empirical analysis proceeded from the assessment of the measurement model to the testing of the structural model. After purification, the retained indicators showed outer loadings ranging from 0.702 to 0.910. One loading was marginally below the commonly recommended threshold, but the construct-level reliability and convergent validity statistics remained satisfactory. Outer VIF values did not exceed 2.616 and inner VIF values did not exceed

1.731, indicating that multicollinearity was not a serious concern in the final model.

Table 2 reports internal consistency and convergent validity. Cronbach's alpha values ranged from 0.772 to 0.873, rho_A values ranged from 0.775 to 0.875, composite reliability (rho_C) values ranged from 0.860 to 0.922. All AVE values were above 0.50, indicating satisfactory convergent validity and showing that the retained constructs explained an adequate share of variance in their indicators.

Table 2
Reliability and convergent validity of the constructs

Construct	Cronbach's alpha	rho_A	Composite reliability (rho_C)	AVE
CR	0.782	0.784	0.860	0.605
DT	0.873	0.875	0.922	0.798
DTS	0.804	0.808	0.872	0.630
EP	0.827	0.834	0.878	0.589
OA	0.820	0.829	0.874	0.583
OR	0.772	0.775	0.868	0.687

Note: Compiled by the author based on SmartPLS 4 output

Table 3
Discriminant validity (HTMT matrix)

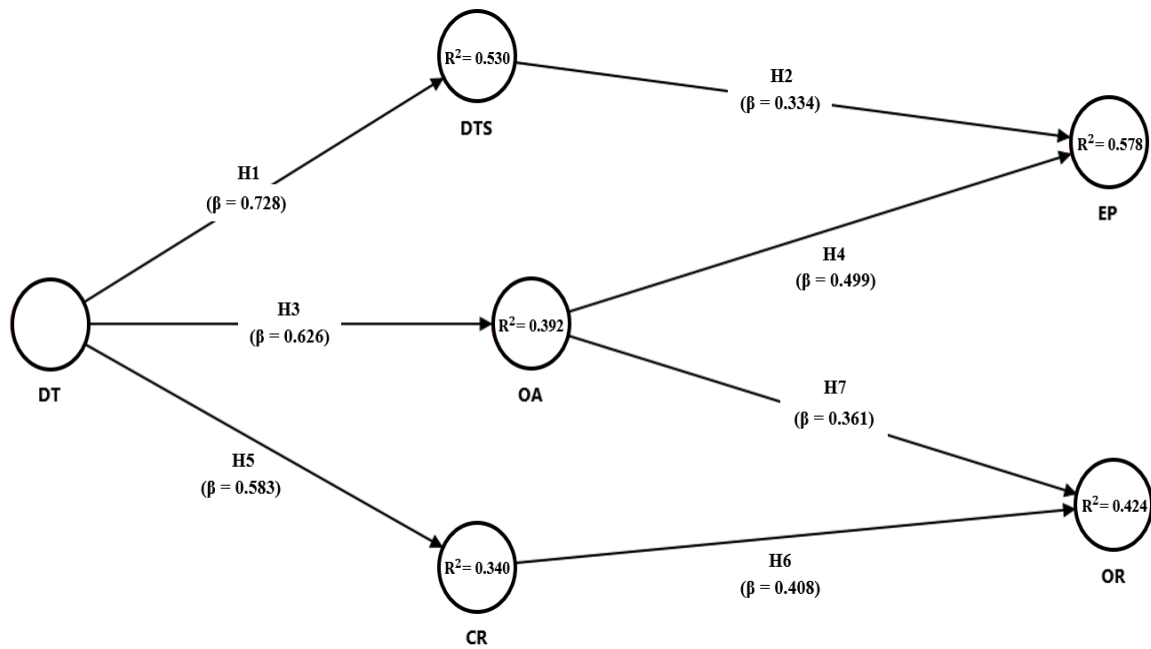
	CR	DT	DTS	EP	OA	OR
CR						
DT	0.705					
DTS	0.823	0.866				
EP	0.710	0.606	0.781			
OA	0.531	0.736	0.797	0.844		
OR	0.723	0.549	0.716	0.731	0.663	

Note: all HTMT ratios are below the commonly used threshold of 0.90; therefore, discriminant validity is supported

The HTMT criterion was used to assess discriminant validity. As shown in Table 3, all HTMT values were below 0.90, with the highest value equal to 0.866.

Figure 2 presents the structural model with standardized path coefficients and coefficients of determination (R^2). As shown in the figure, all hypothesized relationships are positive and statistically significant.

Figure 2
Structural model with standardized path coefficients and coefficients of determination (R^2)



Note: Compiled by the author based on SmartPLS 4 output

The detailed results of hypothesis testing are reported in Table 4. All hypothesized direct effects were positive and statistically significant. The results indicate that digital transformation had substantial positive effects on digital transformation strategy ($\beta = 0.728$), organizational agility ($\beta = 0.626$), and

capital resilience ($\beta = 0.583$). Digital transformation strategy and organizational agility positively affected economic performance, while organizational agility and capital resilience positively affected organizational resilience. Thus, all seven hypotheses were supported.

Table 4
Structural paths and hypothesis testing

Hyp.	Path	β	STDEV	t	p	Decision
H1	DT $\rightarrow$ DTS	0.728	0.034	21.503	<0.001	Supported
H2	DTS $\rightarrow$ EP	0.334	0.067	4.962	<0.001	Supported
H3	DT $\rightarrow$ OA	0.626	0.064	9.764	<0.001	Supported
H4	OA $\rightarrow$ EP	0.499	0.061	8.138	<0.001	Supported
H5	DT $\rightarrow$ CR	0.583	0.047	12.477	<0.001	Supported
H6	CR $\rightarrow$ OR	0.408	0.052	7.851	<0.001	Supported
H7	OA $\rightarrow$ OR	0.361	0.056	6.441	<0.001	Supported

Note: Compiled by the author based on SmartPLS 4 bootstrapping output (5,000 resamples)

The model also demonstrated meaningful explanatory power. Digital transformation explained 53.0% of the variance in digital transformation strategy, 39.2% of the variance in organizational agility, and 34.0% of the variance in capital resilience. Together, digital transformation strategy and organizational agility explained 57.8% of the vari-

ance in economic performance, while organizational agility and capital resilience explained 42.4% of the variance in organizational resilience. Effect size estimates further indicate that digital transformation was the central driver in the model, with a particularly large effect on digital transformation strategy ($f^2 = 1.128$).

Table 5
Explanatory power and effect sizes

Construct / path	R ²	Adjusted R ²	f ² (where applicable)
CR	0.340	0.337	DT $\rightarrow$ CR = 0.516
DTS	0.530	0.528	DT $\rightarrow$ DTS = 1.128
EP	0.578	0.574	DTS $\rightarrow$ EP = 0.152; OA $\rightarrow$ EP = 0.341
OA	0.392	0.389	DT $\rightarrow$ OA = 0.646
OR	0.424	0.418	CR $\rightarrow$ OR = 0.235; OA $\rightarrow$ OR = 0.184

Note: f^2 values of 0.02, 0.15, and 0.35 are commonly interpreted as small, medium, and large effects, respectively

Mediation analysis further clarified the mechanism through which digital transformation affected the two outcome constructs. The total indirect effect of digital transformation on economic performance was 0.556, while the total indirect effect on organizational resilience was 0.464. As shown in Table 6, all

specific indirect effects were positive and statistically significant. This pattern indicates that digital transformation generates organizational value primarily through strategic alignment, adaptive capacity, and financial robustness rather than through a simple direct pathway.

Table 6
Specific indirect effects

Indirect path	β	STDEV	t	p
DT $\rightarrow$ DTS $\rightarrow$ EP	0.243	0.054	4.514	<0.001
DT $\rightarrow$ OA $\rightarrow$ EP	0.313	0.038	8.297	<0.001
DT $\rightarrow$ OA $\rightarrow$ OR	0.226	0.039	5.742	<0.001
DT $\rightarrow$ CR $\rightarrow$ OR	0.238	0.036	6.616	<0.001

Note: all indirect effects are statistically significant, confirming the mediating roles specified in the conceptual model

Model fit indices are reported in Table 7 for completeness. Because PLS-SEM primarily emphasizes explained variance and predictive relevance rather than global model fit, these indices should be interpreted as supplementary. The estimated-model SRMR was 0.125, which exceeds commonly used reference values and therefore does not indicate good approximate model fit. Nevertheless, the measurement model diagnostics, structural significance, and explanatory power provide sufficient support for the substantive interpretation of the model.

Table 7
Model fit indices

Index	Saturated model	Estimated model
SRMR	0.101	0.125
d_ULS	3.086	4.693
d_G	1.674	1.817
Chi-square	1659.817	1722.194
NFI	0.566	0.549

Note: supplementary fit indices from SmartPLS 4 output

The findings provide consistent support for the proposed framework and show that digital transformation contributes to both economic performance and organizational resilience through organizational rather than purely technological channels. This result is theoretically important because it indicates that digital transformation does not operate as an isolated exogenous force. Instead, its organizational value emerges when firms build strategy, agility, and financial robustness around digital change.

First, the strong relationship between digital transformation and digital transformation strategy suggests that growing digital intensity encourages organizations to formalize strategic alignment. Prior studies support this view from several angles: Matt et al. (2015) emphasize the coordinating role of digital transformation strategy, Verhoef et al. (2021) point to its implications for organizational structure and performance, and Gurbaxani and Dunkle (2019) highlight the broader organizational redesign required for successful digital transformation. The data reveals that digital transformation strategy experiences the strongest influence during the transformation process. This underscores the strategic formation process as a critical pivot point, essential for converting digital initiatives into improved performance metrics.

Second, the positive effect of digital transformation strategy on economic performance indicates that strategic alignment helps organizations convert digital investments into measurable results. This finding is consistent with the resource-based view, according to which performance gains depend not on technology alone but on the effective orchestration of valuable organizational resources and capabilities (Barney, 1991). It also aligns with the broader digital transformation literature showing that digital transformation has important implications for organizational structures, capabilities, and performance metrics (Verhoef et al., 2021).

Third, the results show that digital transformation significantly strengthens organizational agility, and organizational agility in turn enhances both economic performance and organizational resilience. This dual role is one of the most important findings of the study. It suggests that agility is not merely an operational characteristic but a strategic capability through which digitalization generates both short-term effectiveness and longer-term adaptive strength. This interpretation is compatible with dynamic capabilities theory (Teece, 2007). It is also consistent with empirical evidence showing that organizational agility improves organizational performance (Nafei, 2016) and strengthens organizational resilience in crisis-sensitive contexts (Yağmur & Myrvang, 2023).

Fourth, the strong empirical link between digital transformation and capital resilience, combined with the subsequent effect on organizational viability, underscores the critical role that financial health plays in maintaining resilience. In many discussions, resilience is framed primarily in behavioral or cultural terms. The present results indicate that the preservation of a stable capital base is also important for organizational endurance. This interpretation is consistent with Chen et al. (2021), who identify capital resilience as one of the dimensions of organizational resilience. It also complements recent studies showing that digital transformation can strengthen organizational resilience more broadly through resilience-building mechanisms such as learning and innovation (Awad & Martín-Rojas, 2024) and through the development and enactment of resilience under adversity (Li et al., 2025).

The mediation results deepen the interpretation of the model. Digital transformation did not simply coexist with better outcomes; rather, its effects were transmitted through a sequence of organizational mechanisms. Economic performance improved through digital transformation strategy and organizational agility, while organizational resilience in-

creased through organizational agility and capital resilience. In practical terms, this means that organizations are unlikely to gain the full value of digitalization if they focus only on technology acquisition. Managers need to institutionalize digital priorities, redesign processes for speed and adaptability, and strengthen the financial foundations that enable continuity during disruption.

The practical implications are therefore more specific than a general call for digitalization. The results suggest that managers should approach digital transformation as a coordinated capability-building process: first by clarifying digital priorities and governance, then by redesigning routines for speed and cross-functional response, and finally by strengthening financial visibility and reserve discipline. In other words, digital transformation appears most valuable when technology adoption is accompanied by strategic, process, and capital-management changes. These findings are especially relevant for firms operating in uncertain and resource-constrained environments, where the conversion of digital initiatives into real organizational benefits may be more difficult. Evidence from this Kazakhstan-based company suggests that digital transformation can become a meaningful driver of competitiveness and resilience when it is mediated by internal strategic and organizational capabilities.

Conclusion

This study examined how digital transformation influences economic performance and organizational resilience through digital transformation strategy, organizational agility, and capital resilience. Using survey data from 213 employees and PLS-SEM analysis, the study found that all hypothesized paths were positive and statistically significant. The results show that digital transformation is a central antecedent, while strategy, agility, and capital resilience act as the immediate mechanisms through which digital initiatives are translated into organizational outcomes.

This research offers three contributions to existing literature. It links performance and resilience within one integrated model, demonstrates the mediating role of organizational mechanisms, and provides evidence from a Kazakhstan-based private enterprise. From a managerial perspective, the results suggest that firms should treat digital transformation as a coordinated organizational program rather than a purely technological project. A clear digital strategy, agile routines, and resilient capital management are necessary for turning digitalization into improved economic performance and stronger organizational resilience under disruption. The study is not without limitations. Because the data were obtained from a single company and a convenience sample, the generalizability of the findings is limited. In addition, the cross-sectional design does not capture how digital transformation and resilience unfold over time. Future research may test the model in multiple sectors and countries, use longitudinal designs, and examine additional mediators or moderators such as leadership, organizational culture, environmental turbulence, or firm size.

Overall, the findings indicate that digital transformation becomes strategically valuable when it is embedded in organizational strategy, translated into agility, and supported by financial resilience. Under these conditions, it can strengthen both economic performance and organizational resilience.

Conflict of Interest

The author declares no conflict of interest.

Author Contributions

Conceptualization, V.L. and Sh.N.; Methodology, V.L. and Sh.N.; Software, V.L.; Validation, V.L. and Sh.N.; Formal Analysis, V.L.; Investigation, V.L.; Resources, Sh.N.; Data Curation, V.L.; Writing – Original Draft Preparation, V.L.; Writing – Review & Editing, Z.S. and Sh.N.; Visualization, V.L.; Supervision, Sh.N.; Project Administration, Z.S. and Sh.N.

References

- Awad, J. A. R., & Martín-Rojas, R. (2024). Digital transformation influence on organisational resilience through organisational learning and innovation. *Journal of Innovation and Entrepreneurship*, 13, 69. <https://doi.org/10.1186/s13731-024-00405-4>
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
- Chen, R., Xie, Y., & Liu, Y. (2021). Defining, conceptualizing, and measuring organizational resilience: A multiple case study. *Sustainability*, 13(5), 2517. <https://doi.org/10.3390/su13052517>

- Gurbaxani, V., & Dunkle, D. (2019). Gearing up for successful digital transformation. *MIS Quarterly Executive*, 18(3), 209–220. <https://doi.org/10.17705/2msqe.00017>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (3rd ed.). Sage.
- Hillmann, J., & Guenther, E. (2021). Organizational resilience: A valuable construct for management research? *International Journal of Management Reviews*, 23(1), 7–44. <https://doi.org/10.1111/ijmr.12239>
- Li, G., Du, K., Liu, L., & Su, F. (2025). Digital transformation and organizational resilience: Unveiling the path to sustainable performance in adversity and crisis. *International Journal of Information Management*, 84, 102934. <https://doi.org/10.1016/j.ijinfomgt.2025.102934>
- Matt, C., Hess, T., & Benlian, A. (2015). Digital transformation strategies. *Business & Information Systems Engineering*, 57(5), 339–343. <https://doi.org/10.1007/s12599-015-0401-5>
- Nafei, W. A. (2016). Organizational agility: The key to organizational success. *International Journal of Business and Management*, 11(5), 296–309. <https://doi.org/10.5539/ijbm.v11n5p296>
- Onubi, H. O., Yusof, N. A., & Hassan, A. S. (2020). How environmental performance influence client satisfaction on projects that adopt green construction practices: The role of economic performance and client types. *Journal of Cleaner Production*, 272, 122763. <https://doi.org/10.1016/j.jclepro.2020.122763>
- Ringle, C. M., Wende, S., & Becker, J.-M. (2024). *SmartPLS 4*. Bönningstedt: SmartPLS. Retrieved from <https://www.smartpls.com>
- Sousa-Zomer, T. T., Neely, A., & Martinez, V. (2020). Digital transforming capability and performance: A microfoundational perspective. *International Journal of Operations & Production Management*, 40(7/8), 1095–1128. <https://doi.org/10.1108/IJOPM-06-2019-0444>
- Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350. <https://doi.org/10.1002/smj.640>
- Teng, X., Wu, Z., & Yang, F. (2022). Research on the relationship between digital transformation and performance of SMEs. *Sustainability*, 14(10), 6012. <https://doi.org/10.3390/su14106012>
- Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901. <https://doi.org/10.1016/j.jbusres.2019.09.022>
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144. <https://doi.org/10.1016/j.jsis.2019.01.003>
- Yağmur, Ö. B., & Myrvang, N. A. (2023). The effect of organizational agility on crisis management process and organizational resilience: Health sector example. *International Journal of Disaster Risk Reduction*, 96, 103955. <https://doi.org/10.1016/j.ijdrr.2023.103955>
- Zhang, J., Long, J., & von Schaewen, A. M. E. (2021). How does digital transformation improve organizational resilience? Findings from PLS-SEM and fsQCA. *Sustainability*, 13(20), 11487. <https://doi.org/10.3390/su132011487>

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THE IMPACT OF DIGITALIZATION ON ENHANCING THE EFFICIENCY OF HEALTHCARE ORGANIZATION MANAGEMENT

Purpose. This paper explores the role that digitalization plays in improving the efficiency of managing healthcare organizations. The focus is on the contributions of ICT support, employee digital competence, organizational innovation, and service quality in driving organizational performance.

Design/methodology/approach. Using a structured questionnaire, empirical data were obtained from a sample of 243 healthcare organization employees transitioning to a more digitalized state. The study used the PLS-SEM methodology (SmartPLS program) for mathematical and statistical processing of empirical data.

Findings. The empirical findings reveal that ICT support and employee digital competence play significant roles in facilitating organizational innovation, which ultimately contributes to service quality and overall organizational performance. The results of this study validate the proposed research model and clarify the interrelationship of technological, organizational, and human factors on managerial effectiveness in the healthcare context.

Originality. The current study brings novelty to the field through the inclusion of the relationship between ICT support, service quality, digital competence of employees, and organizational performance in a single framework for health organizations. Whereas earlier studies mostly focused on the investigation of each of these concepts separately or in contexts different from that of healthcare organizations, the current study shows how the digital competence of employees acts as a mediator of digitalization initiatives and contributes to greater management efficiency. In addition, this study adds to the scarce body of literature based on health organizations in Kazakhstan.

Key words: ICT Support, Service Quality, Digital Competence of Employees, Organizational Performance.

Introduction

The rapid evolution of digital tools today determines how all sorts of organisations evolve. Health services have been no strangers to this phenomenon. Care groups face escalating needs and pressed finances while trying to meet high demands for improved service and access. It is in this landscape where technology is not just about the acquisition of new gadgets, but a vehicle for improving leadership, enhancing collaboration and creating smoother systems. In health care, the application of digital tools has the potential to facilitate smoother operations by streamlining paperwork, aiding staff to make smarter decisions, and also supporting stronger connections between various departmental teams.

However, how digitalization is implemented strongly relates to where technology fits in every day work and a company's support. Here, one important

component is leaders' use of tools. Having technology is simply part of it – the real focus must be on actively demonstrating how to use technology tools effectively, in ways that align with employees' comfort and performance improvement is promoted (Zhang, van Eerde, Liu, & Chen, 2025). This is true for health care settings where more pressure and complicated tasks lie on staff, hence, guidance of digital platforms facilitates smoother access to the tools and reduces resistance against implementing new systems. In the absence of ICT support, digital tools often remain underutilized. They do not necessarily facilitate but create more tension and added workloads for employees to cope with.

Notwithstanding what managers can provide, employees' digital competence with digital tools influence how effective tech projects are in facilitating organisational performance. When working with technology – and it is far more than quick typ-

ing – employees must be able to tackle problems, share ideas, cooperate, inquire about outcomes. (Zervas & Triantari, 2025). This perspective aligns with earlier definitions, such as a 2006 guide provided by the European Parliament (2006/962/EC), which understood the use of digital tools as being calm, thoughtful, and many a time shared collaboratively in work, conversation, and in private life. (Kupczyk, 2021). In health care groups, well-versed employees with digital tools seem to adapt much more easily to updated technology systems. They also utilize online sources with a higher level of discretion during routine operations and are crucial for successful initiation of digital initiatives.

What occurs in the digital world can subtly redirect how groups cooperated. New technology tools may change how tasks spread, are completed, or resolved. In lieu of previous mechanisms, digital steps create new ways to spread information across departments. Particularly in health care, when updates travel faster among staff, benefits can emerge. Similarly, the process of recreating important procedures, like feedback loops or decision paths, is facilitated by connected systems. Structures that once appeared very rigid may now offer looser arrangements, without necessarily losing authority. Change does not just halt simply since systems look stable at the outset. Thus, intra-organization change serves as a connection, aligning technological progress with enhanced practices of organizing work.

When provider leaders contemplate how care is provided to customers, the quality of the service taken seriously represents a cornerstone of the service-centered mindset. This ethos often manifests through perceptions of comparative service quality, which has been first described by Zeithaml and his crew in 1985. It essentially revolves around whether individuals think they receive what they need, which was suggested by Santos (2003). For health-related care, what customers perceive often applies to something like reliability, rapid responses, trustworthiness, comprehension, and visible items, and when care comes and feels, plus how appropriately problems are solved (Singh, Sharma, & Jayapriya, 2023). Digital assistance aids in rendering information accessible swiftly, streamlining operations among cross-functioning teams, while enhancing communication with recipients in care processes. However, the advantages of digital-enabled transformations emerge only if the technology is de-

signed to complement organizational leadership decision-making and everyday operational tasks.

Upon successful implementation of these digital interventions, their benefits become apparent in organizational performance. An organization is seen as a synergistic assembly of individuals, resources, and finances – human energy bound to shared objectives (Alchian & Demsetz, 1972; Barney, 2001; Jensen & Meckling, 1976; Simon, 1976). Achieving goals and enhancing organization performance is not merely a measure of hitting benchmarks; it's governed by how actual outcomes matchups to what was envisaged by the group, taking into account expectations, resources, and possibilities (Cho & Dansereau, 2010). Measuring actual efforts against the organization's outlined aspirations, rather than just falling inside or outside the bounds of arbitrary markings, is what's important (Tomal & Jones, 2015). In health care contexts, the efficacy of all these operations seldom hinges solely on immediate adjustments by management, but furthermore, touches upon the everyday decisions made by leaders, care quality standards, etc. Nonetheless, it can also boil down to whether teams are agility to adapt as technology and external demands evolve.

While the academic focus on digital transformation has matured over the years, across most disciplines, there are few studies that explicitly evaluate how technology-enabled change can correlate with worker competence, organizational transformations, care standards, and end results – particularly in health care. A majority of research narrowly focuses on digitalization uptake, without considering various social and structural drivers that determine the success of such efforts. This omission cues to a larger focus on how digitalized transformation of operations can affect organizational leadership outcomes within the medical context. In this context, the present examination considers how digital-enabled interventions can affect how effectively a health care organization operates. Rather than general estimations, it narrows down to five specific parameters – ICT assistants, staff digital competence, novel organizational operational protocols, care quality standards, and end results. Enabled by actual data, which helps link these variables, a clearer perspective emerges regarding what may drive improved leadership outcomes and performance outcomes within medical contexts. Results could lead to a shift in thought on how health care leadership can be impacted by technology-enabled transformation. Meanwhile, this can also yield progress for leaders and planners as it equips them

with better understanding for the smarter ways forward with digital-assisted strategies.

Literature review

The impact of ICT support on Organizational Performance through Digital Competence of Employees

ICT support—defined as the behaviors supervisors exhibit to enhance employees' well-being through guidance and support in ICT use (Juncheng Zhang, Wendelien van Eerde, Fang Liu & Weiqi Chen, 2025).

Owing to the diversity of terms, frameworks, and research domains associated with digital competence, the literature lacks a unified definition of this concept. In organisational studies, the definition most frequently adopted is: «Digital competence is an individual capacity to use and combine one's knowledge (i.e., know-what), skills (i.e. know-how), and attitude (i.e. know-why) associated with three related competence areas, technological, cognitive, and social, to use new or existing ICT to analyse, select and critically evaluate information to investigate and solve work-related problems and develop a collaborative knowledge base...» (J. Norveel, R. Gonzalez, W. Presthus, 2022)

In general, the concept of organizational performance is based upon the idea that an organization is the voluntary association of productive assets, including human, physical, and capital resources, for the purpose of achieving a shared purpose (Alchian & Demsetz, 1972; Barney, 2001; Jensen & Meckling, 1976; Simon, 1976).

According to Surat Edaran Mensesneg No. 1/2020 states that the head of the organizational unit determines employees who can carry out remote service duties and rotating service duties by considering, among other things, the type of work and employee competence in the use of ICT (S Triyani, E Sutirno, A Widjayanti, 2025). This provision emphasizes the competence of employees in the use of information and communication technologies for effective organization of work and provision of services.

Empirical evidence further supports the link between ICT-related competence and organizational outcomes. For instance, Wasike, Ogollah and Mburu, on the other hand, examined the role of competence in information systems on the agility of supply chain in the service industry. IT service competence was found to have a direct impact on supply chain agility as well as on service management skills. Further-

more, implementation results demonstrated that restructuring of the supply chain by using information technologies has positive effects on business performance criteria like supply, production and distribution (MPK Kang'ethe, Garap Bor, B Tarus, 2021).

In addition, lack of effective training yields unqualified staff that mess the system or maintain outdated system which do not serve the current needs of the employees. This often leads to lack of the correct information favourable for management functions and hence ineffectiveness in management (JC Mui-kamba, D Nzuki, 2012). This study is grounded in the Resource-Based View (RBV), according to which the implementation of quality E-HR systems relies on proper allocation of resources to steer the process, which will subsequently affect the improvement of the organization's performance.

Employees' knowledge and ability to use information technology will increase individual confidence and creativity; through information technology, information delivery and coordination will be more readily accepted by other individuals or work teams. Individuals can move swiftly in various fields by maximizing digital competency capabilities and efficiently impacting company performance (AP Putra, F Nuraisah, MW Kuswantoro, 2024).

Conversely, the lack of adequate ICT support and effective training negatively affects the competence of employees. In turn, the low competence of employees leads to management inefficiency and a decrease in the Performance of the organization. In general, the existing literature indicates that ICT support plays a crucial role in developing the competence of employees in the field of information systems and digital technologies. Improving the competence of employees allows organizations to use ICT more effectively and achieve higher organizational performance. The following hypotheses are proposed in light of the research mentioned above:

H1: ICT support has a positive effect on Organizational Performance through Digital Competence of Employees

The impact of Service Quality on Organizational Performance through Digital Competence of Employees

By relying on the definition provided in Kritikos and Plexousakis [2009], which mainly applies to software services, service quality is defined as a set of nonfunctional attributes of those contextual entities that are considered relevant to the service-client interaction, including the service and the client, that

bear on the service ability to satisfy stated or implied needs (Kritikos, K., Pernici, B., Plebani, P., Capiello, C., Comuzzi, M., Benrernou, S., Brandic, I., Kertész, A., Parkin, M., & Carro, M. (2013)).

Previous research highlights competent employees always show smart thinking, work reliably, experienced, skilled and professional in producing optimal work, both in terms of the amount of work produced in quantity, the value of quality work, efficient use of working time, utilization of effective budget use and loyal to the organization (I Ibrahim, S Syarifuddin, H Haeruddin, I AR, 2023). The study is based on the service quality theory from Oldham (2019: 24) that every individual must be able to provide quality services to achieve work targets. This theoretical lens suggests that quality of public services observed in this study is determined by the application of a variety of skills, task identity, task significance, service autonomy and feedback.

Barrolly's theory of synergy (2018:62) states that synergy is a combination of competence, service quality and performance. From this perspective, developing an implementation of the main tasks and functions within an organization is inseparable from the synergy of organizational members who have competent and professional human resources in providing quality services to achieve optimal work results (I Ibrahim, S Syarifuddin, H Haeruddin, I AR, 2023).

Empirical evidence provided by Zebua et al. (2025) demonstrates that employee mastery of skills, knowledge, and professional attitudes plays a crucial role in driving the quality and effectiveness. These results reinforce the theory that quality service can increase customer satisfaction and support the effectiveness of organizational policies.

Research in the hospitality industry demonstrates that employees' perception of training benefits, training support, training accessibility and service quality in the hospitality industry. Thus, this study implies that organizations can use training to improve customer service quality by supporting training interventions that enhance individual skills, service quality and overall organizational performance (M Waqanimaravu, CN Arasanmi, 2020).

Research by I Ibrahim, S Syarifuddin, H Haeruddin, I AR (2023) shows that developing an imple-

mentation of the main tasks and functions within an organization is inseparable from the synergy of organizational members who have competent and professional human resources in providing quality services to achieve optimal work results. This suggests that employee competence serves as a critical mechanism through which service quality is translated into tangible organizational results.

Furthermore, Research by Aenkly Banamax (2018), Khairul Anuar (2016) and Any Isvandiari (2019) shows similarities, namely competence and service quality simultaneously affect performance. These findings imply that employee competencies play a critical role in converting service quality into improved organizational performance.

As a result, all these studies show that the Service Quality increases the competence of employees, especially in the use of digital products. In turn, this enhances the performance of the organization. Thus, Digital Competence of Employees plays a mediating role between Service Quality and Organizational Performance:

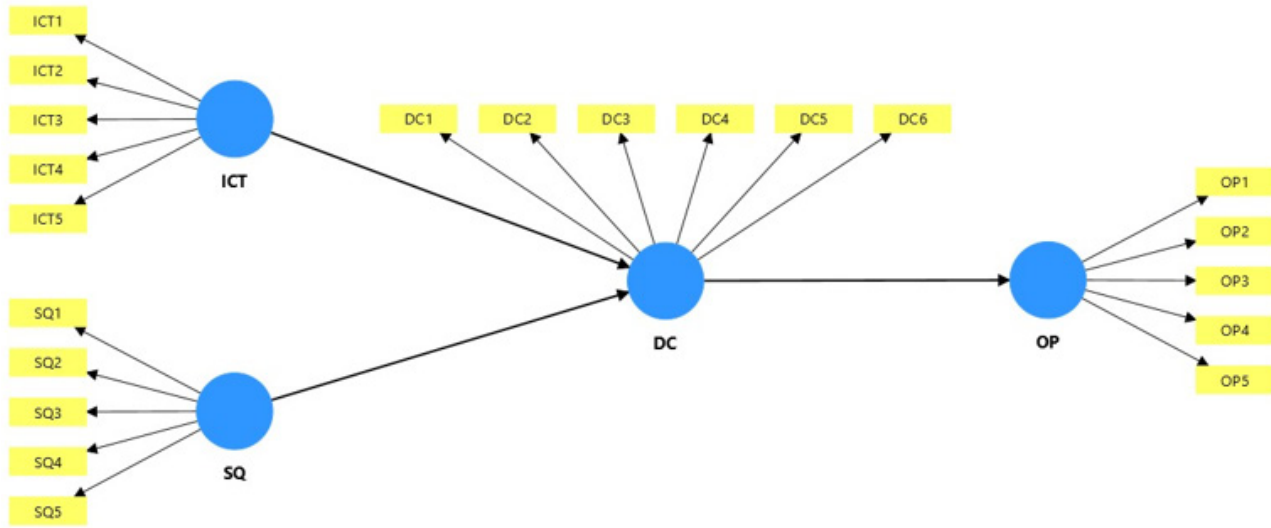
H2: Service quality has a positive effect on Organizational Performance through the Digital Competence of Employees.

Methodology

This study adopts a quantitative research approach to empirically examine the impact of digitalization on the efficiency of healthcare organization management. Data were collected using a structured questionnaire distributed to 350 employees of healthcare organizations located in the city of Almaty. Almaty was selected as the research setting due to its status as one of the major metropolitan areas in the country, hosting a large concentration of key healthcare institutions.

A total of 258 valid responses were obtained and included in the final sample. The demographic profile of the respondents indicates that 68.3% were female, while 31.7% were male. With regard to age distribution, 70 respondents were aged 18–25 years, 78 respondents were aged 26–35 years, 70 respondents were aged 36–45 years, and 25 respondents were aged 46 years and above. The majority of the participants were employed in private healthcare clinics.

Figure 1
Conceptual Research Model



Note: Compiled by the author

Measures

The measurement instruments used in this study were adapted from previously validated scales. All the points of the questionnaire were formulated in such a way as to reflect the respondents' perception of digitalization and its consequences for the effectiveness of management in healthcare institutions.

ICT support was measured by assessing employees' perceptions of the availability and adequacy of information and communication technology. ICT support was measured by five items: two items of Saleem et al. (2017), two items of Majchrzak et al. (2005), and one item of Drent and Meelissen (2008). A sample item of ICT support was: "I can access the information system at any time from anywhere". Responses of all the measurement items were collected on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree) (Kaniz Marium Akter, Swee Mei Tang & Zurina Adnan, 2023). The Cronbach's alpha for this scale was 0.71.

Digital Competence of Employees was developed by adapting scale developed by King and Zeithaml (2001). The scales measured in a five-point Likert-scale format from "strongly disagree" (1) to "strongly agree" (5) (Thuy Thanh Thi DOAN, 2021). An example question is: "The company mission is clear and coherent". The Cronbach's alpha for this scale was 0.78.

The indicators for calculating **Service Quality** are **drawn from** previous studies. Each item is measured by a 5-point Likert scale type (1 = **strongly**

disagree to 5 = strongly agree). An example question is: "Medical staff are knowledgeable when answering my questions". The Cronbach's alpha for this scale was 0.80.

The questions for **Organizational Performance** were adapted from H Lee, B Choi (2003) and each item was based on a six-point Likert scale, from "very low" to "very high." Likert scales as generally used tend to underestimate the extreme positions. For example: "Our company is more successful". The Cronbach's alpha for this scale was 0.86.

Data were analyzed using SmartPLS 4.0 and the PLS-SEM technique, which was selected due to its wide application in structural equation modeling studies. Descriptive statistics, including mean values and standard deviations, were calculated for all measurement items. The reliability of the constructs was confirmed, as Cronbach's alpha coefficients for all variables exceeded the recommended threshold of 0.70, while the mean values were above 0.60.

Results

Fit of Measurement Model

The fit of the measurement model was assessed via SmartPLS 4.0, examining the reliability, convergent validity, and discriminant validity. Internal consistency reliability was examined using Cronbach's alpha and composite reliability (CR). According to results, Cronbach's alpha values for all constructs ranged from 0.712 to 0.858, suggesting the internal

consistency over all constructs was satisfactorily stable. The composite reliability quantities for each construct rose again the designated threshold of 0.70, 0.812 to 0.897 respectively, reinforcing reliability over measurement scales (see table 1).

Table 1
Reliability and convergent validity of the constructs

Construct	Cronbach's alpha	rho_A	Composite reliability (rho_C)	AVE
ICT	0.712	0.714	0.708	0.464
DC	0.786	0.815	0.812	0.476
SQ	0.804	0.823	0.897	0.557
OP	0.863	0.843	0.867	0.636

Note: Compiled by the author based on SmartPLS 4 output.

The convergent validity was evaluated via the average variance extracted (AVE) criterion. The AVE values for Organizational Performance (0.636) and Service Quality (0.557) surpassed the proposed threshold of 0.50, suggesting appropriate convergent validity of these constructs. The AVE figures for Digital Competence (0.476) and ICT support (0.464) fell marginally below the accepted threshold. Yet, as composite reliability figures for both constructs soared above 0.70, convergent validity can be taken to be satisfactory for the exploratory research and consistent with recommendations within the PLS-SEM literature.

Discriminant validity was evaluated by both the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT). The square root of the AVE for each construct exceeded the respective inter-construct correlations, providing evidence of discriminant validity. Further, all HTMT values were below the suggested threshold of 0.85, implying that the constructs are empirically distinct from each other. All levels of indicators' VIF revealed that the collinearity is not worrying for the purposes of this analytic approach.

Collinearity was measured in terms of the variance inflation factor (VIF) values. All indicators' VIF levels were below 2.0, which indicated multicollinearity is not a problem for our measurement model.

The structural model underwent analysis using PLS-SEM with bootstrapping to evaluate the statistical significance of the hypothesized paths. The findings show that all paths are positive and statistically significant (see table 2).

Table 2
Structural paths and hypothesis testing

Path	β	t	p	Decision
ICT $\rightarrow$ DC	0.369	5.713	<0.001	Supported
SQ $\rightarrow$ DC	0.435	7.059	<0.001	Supported
DC $\rightarrow$ OP	0.538	9.711	<0.001	Supported

Note: Compiled by the author based on SmartPLS 4 bootstrapping output (5,000 resamples).

ICT support displays a substantial and positive influence on employee's digital competence ($\beta = 0.369$, $t = 5.713$, $p < 0.001$). This outcome indicates that management behaviors that are conducive to ICT use play a significant role in nurturing employees' digital abilities and confidence in using digital tools in healthcare organizations.

Quality of Service also shows a significant positive influence on employee's digital competence ($\beta = 0.435$, $t = 7.059$, $p < 0.001$). This finding highlights that enhanced perception of service quality correlates with greater digital competence, indicating the intertwined nature of service offerings and the need for optimized employ of digital technologies in healthcare.

Additionally, employees' digital competence positively contributes to organizational performance ($\beta = 0.538$, $t = 9.711$, $p < 0.001$). This result identifies digital competency of employees as a central determinant in the translation of digitalization efforts into quantifiable improvements in organizational performance and management efficacy.

R^2 values further demonstrate the explanatory power of the model. ICT support and quality of Service combine to account for 50.7% of the variance in digital competence ($R^2 = 0.507$), demonstrating significant explanatory capacity. Digital Competence (29.0%) explains a significant percentage of variance in organizational performance ($R^2 = 0.290$), suggesting a meaningful role of digital competence in understanding organization performance in healthcare organizations.

Overall, these outcomes offer empirical validation for the proposed model and shed light on the noteworthy role of factors relating to digitalization, especially ICT support and employees' digital competence, in fostering improved management efficacy and organizational performance in healthcare organizations.

Discussion and Conclusion

These findings of this paper affirm the critical role of digitalization in improving organizational management efficiency, mainly in enriching employees' digital competency. Our results indicate that Ics support has a dramatic positive influence on organizational performance through the employees' digital competence. This concurs with existing research emphasizing the significance of management support regarding ICT (Zhang et al., 2025). In accordance with the RBV (Alchian & Demsetz, 1972; Barney, 2001; Jensen & Meckling, 1976), ICT support constitutes an important organizational asset when considering the role of employees' digital competence in strengthening management performance through the conversion of technological expenditure into measurable performance effects.

The mediating function of digital competence also reinforces the premise that ICT does not suffice in boosting organization performance unless employees possess the required knowledge, skills, and attitude for the effective utilization of digital tools. This aligns with Nordvel's (2022) conceptualization of digital competence as a blend of technological, cognitive, and social capacities. In the healthcare sector, which increasingly uses digital tools in managing administrative, coordination, and management tasks, the capability of employees to critically analyze information and collaborate via ICT evolves into a significant contributor to management effectiveness. The empirical evidence of this study thus strengthens the RBV view by revealing that human resources and digital competence serve as fundamental organizational assets that contribute to organizational performance.

Additionally, the research revealed that employees' digital competence mediates service quality on organizational performance. The results are in agreement with service quality theory (Oldham, 2019) that underscores the importance of individual skills, autonomy, task significance, and feedback in generating high-quality service outcomes. And it is in harmony with the synergy perspective (Barrolly, 2018) that explains performance as a result of the interaction between employee competence and service quality. Empirical evidence in related Previous studies (Ibrahim et al., 2023; Zebua et al., 2025; Waqanimaravu & Arasanmi, 2020) also supports that competent employees are more effective in turning service Quality efforts into organizational performance. Also, digital tools increasingly influence service processes in healthcare organizations and provide a significant

opportunity to utilize competent employees to use digital tools for better coordination, information accuracy and responsiveness to the needs of the organization.

Together, the findings confirm tested hypotheses and also prove that employees' digital competence is a vital mechanism for turning ICT support and service quality into improved organizational performance. The findings enrich current literature on this topic by bringing into consideration the Resource-Based View combined with service quality and competence-based approaches. They elucidate that managing efficiency of healthcare organizations in the digital era is not simply reliant on technological infrastructure, but also involves organizational support and development of employee competence.

Practical Implications

The findings from this study have several practical implications for healthcare managers and policy-makers. First, healthcare organizations should view ICT support as a managerial duty instead of a purely technical one. Supervisors and department heads play a pivotal role in facilitating employees' interaction with computational systems by providing orientation, technical support, and ongoing encouragement as Zhang et al. (2025) emphasized. Fortifying ICT support at the managerial level can minimize resistance to digitalization and promote a more positive digital culture in healthcare organizations.

Second, the findings emphasize the significance of systematic investments in employees' digital competence. Since digital competence serves as a mediator between ICT support, service quality, and organizational performance, healthcare organizations can implement continuous training and development programs targeting the enhancement of employees' digital knowledge, practical skills, and confidence in utilizing ICT to improve their performance. This would be especially crucial in large urban healthcare institutions like Almaty where digitized systems are heavily deployed within both private and public clinics.

Lastly, service quality enhancement strategies should be harmonized with employee digital capability. The successful delivery of high-quality care in healthcare heavily relies on effective utilization of digital systems for coordinating, documentation, and management activities. Specific training programs that unify service quality benchmarks with digital learning could increase employees' competencies in providing continuous and efficient services, thereby boosting organizational performance.

In conclusion, policymakers and healthcare administrators can leverage on the findings from this study to develop digital transformation strategies that transcend mere technological investment. Through an integrated approach of ICT infrastructure development, managerial support, and employee competence-building efforts, healthcare institutions can achieve sustainable enhancements in management efficiency and organizational performance.

Limitations and Future Research

This research entails several limitations that must be addressed to be acknowledged when interpreting the findings. According to the following points, it should be realized: The researchers collected their sample in healthcare organizations based in the city of Almaty. Hence, the results may not be generalizable in different areas or healthcare entities known to have a different level of digital maturity. Future research can extend the study to various cities or even different countries before testing whether the described connection between variables remains valid in certain institutions or cultures.

Third, this study concentrated on digital competence as an important mediator of organizational performance, with ICT support and service quality serving as key antecedents. Future research could expand the model by including other variables, including factors such as organizational culture, leadership style, technological readiness, or organizational innovation. Such an extension would offer a more entire portrait of the ways in which digital

transformation progresses within healthcare organizations. It would likewise be beneficial to use qualitative methods, such as interviews or case studies, to delve deeper into the drivers and effectors of digital competence as it pertains to healthcare management practice.

Additionally, future research may embrace longitudinal designs to examine the extent to which ICT support, digital competence, service quality, and organizational performance have changed with time as healthcare organizations move toward increased digitalization. Finally, comparative analyses between public and private healthcare organizations could help illuminate sector-specific factors that may influence the interplay between digitalization and organizational efficiencies.

Acknowledgements and Conflict of Interest

The authors declare that they have no conflicts of interest related to this study. No acknowledgements are applicable.

Author Contributions

Conceptualization, S.A.; Methodology, S.A.; Software, S.A.; Validation, S.A. and A.S.; Formal Analysis, S.A. and A.S.; Investigation, S.A.; Resources, S.A.; Data Curation, S.A.; Writing – Original Draft Preparation, S.A.; Writing – Review & Editing, A.S. and T.B.; Visualization, S.A.; Supervision, A.S.; Project Administration, A.S. and T.B.

References

- Agha, S., Alrubaiee, L., & Jamhour, M. (2012). Effect of core competence on competitive advantage and organizational performance. *International Journal of Business and Management*, 7(1), 192–204. <http://dx.doi.org/10.5539/ijbm.v7n1p192>
- Akter, K. M., Tang, S. M., & Adnan, Z. (2023). Impact of empowerment and ICT on quality of work life: The mediating effect of trust climate. *Cogent Business & Management*, 10(1), 2176412. <https://doi.org/10.1080/23311975.2023.2176412>
- Almatrooshi, B., Singh, S. K., & Farouk, S. (2016). Determinants of organizational performance: A proposed framework. *International Journal of Productivity and Performance Management*, 65(6), 844–859. <https://doi.org/10.1108/IJPPM-02-2016-0038>
- Carton, R. B. (2004). *Measuring organizational performance: An exploratory study*. Athens, GA: University of Georgia.
- Doan, T. T. T. (2021). The effect of service quality on student loyalty and student satisfaction: An empirical study of universities in Vietnam. *The Journal of Asian Finance, Economics and Business*, 8(1), 209–218.
- Ibrahim, I., Syarifuddin, S., Haeruddin, H., & AR, I. (2023). Influence competence and quality service against performance employees at PDAM Makassar City. *Syntax Idea*, 5(2), 174–186.
- Kang'ethe, M. P. K., Bor, G. A., & Tarus, B. (2021). Influence of ICT support practices and logistical management on the performance of oil companies in Kenya. *South Asian Journal of Humanities and Social Sciences*, 9(9), 367–373. <https://doi.org/10.36347/sjahss.2021.v09i09.003>
- Kritikos, K., Pernici, B., Plebani, P., Cappiello, C., Comuzzi, M., Benbernou, S., ... Carro, M. (2013). A survey on service quality description. *ACM Computing Surveys*, 46(1), 1–36. <https://doi.org/10.1145/2522968.2522969>
- Kupczyk, T. (2021). Self-assessment of digital competences among employees and non-working people of Generation Z in the Economy 4.0. *European Research Studies Journal*, 24(S1), 546–561.

- Lee, H., & Choi, B. (2003). Knowledge management enablers, processes, and organizational performance: An integrative view and empirical examination. *Journal of Management Information Systems*, 20(1), 179–228. <https://doi.org/10.1080/07421222.2003.11045756>
- Muikamba, J. C., & Nzuki, D. (2019). Information communication technology considerations and staff performance in the public sector in Nyandarua County, Kenya. *International Academic Journal of Information Systems and Technology*, 2(1), 183–205.
- Norveel, J., Gonzalez, R., & Presthus, W. (2022). Basic digital competence in Norwegian banking. *Procedia Computer Science*, 196, 277–286. <https://doi.org/10.1016/j.procs.2021.12.004>
- Putra, A. P., Nuraisah, F., & Kuswanto, M. W. (2024). The role of digital transformation on the performance of Indonesia's biggest dry bulk port. *Procedia Computer Science*, 231, 101–108. <https://doi.org/10.1016/j.procs.2024.03.078>
- Santos, J. (2003). E-service quality: A model of virtual service quality dimensions. *Managing Service Quality*, 13(3), 233–246. <https://doi.org/10.1108/09604520310476490>
- Triyani, S., Sutirno, E., & Widjayanti, A. (2025). Implementation of flexible working arrangement at the deputy for institutional and community relations of the Ministry of State Secretariat. *Jurnal DIA*, 21(1), 1–15. <https://doi.org/10.30996/dia.v23i02.12125>
- Waqanimaravu, M., & Arasanmi, C. N. (2020). Employee training and service quality in the hospitality industry. *Journal of Food-service Business Research*, 23(4), 367–385. <https://doi.org/10.1080/15378020.2020.1724850>
- Zebua, P., Parinduri, R. Y., & Dalimunte, N. (2025). The effect of service quality and employee competence on policy improvement through customer satisfaction at the Jasa Bintang Karya Sejahtera Cooperative. *Jurnal Dialektika: Jurnal Ilmu Sosial*, 10(1), 45–58. <https://doi.org/10.63309/dialektika.v23i3.742>
- Zervas, I., & Triantari, S. (2025). Digital HRM practices and perceived digital competence: An analysis of organizational culture's role. *Digital*, 5(3), 34. <https://doi.org/10.3390/digital5030034>
- Zhang, J., van Eerde, W., Liu, F., & Chen, W. (2025). Supervisory support for subordinates' use of information and communication technologies: Development and preliminary validation of a scale in a Chinese context. *Humanities and Social Sciences Communications*, 12, 1–12. <https://doi.org/10.1057/s41599-025-05293-x>
- Singh, V., Sharma, M. P., & Jayapriya, K. (2023). Service quality, customer satisfaction and customer loyalty: A comprehensive literature review. *Journal of Survey in Fisheries Sciences*, 10(2), 456–472.

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CENTRAL BANK POLICY, THE MACROECONOMIC TRILEMMA, AND INCLUSIVE GROWTH IN SUB-SAHARAN AFRICA

Purpose. This study examines the impact of central bank policies on inclusive growth through the Mundell-Fleming trilemma framework in selected Sub-Saharan African countries. It aims to assess how monetary independence and capital mobility jointly influence inclusive economic growth in developing economies.

Design/methodology/approach. The study employs the Panel Autoregressive Distributed Lag (PARDL) model to estimate both short-run and long-run relationships using panel data from ten Sub-Saharan African countries over the period 1995–2024. The methodology captures equilibrium adjustments while accounting for country-level heterogeneity.

Findings. The empirical results reveal a statistically significant positive interaction between free capital mobility (FCM) and monetary independence (MI), indicating that these factors jointly promote inclusive growth. The findings provide empirical support for the Mundell-Fleming trilemma, demonstrating that the effectiveness of independent monetary policy depends on the degree of capital mobility in Sub-Saharan African economies. The study suggests that coordinated monetary policy and capital account management can enhance inclusive economic development.

Originality. This study extends the literature on the Mundell-Fleming trilemma by providing recent empirical evidence from Sub-Saharan Africa using a long-term panel dataset and the PARDL approach. It offers new insights into the interaction between monetary policy independence and capital mobility, highlighting their combined role in fostering inclusive growth and providing policy recommendations for central banks in developing economies.

Keywords: macroeconomic, exchange rate, economic growth, monetary policy, capital movement.

Introduction

The global economy is increasingly characterized by a complex mix of opportunities and challenges, particularly for Sub-Saharan African countries striving for sustainable and inclusive prosperity. In this changing environment, central banks are pivotal institutions with the challenging mandate of securing macroeconomic stability, promoting financial system integrity, and more importantly, contributing to broader developmental objectives. Though, attaining these objectives, is to a great extent limited by the ongoing trinity policy in international economics, which emphasise the fundamental trade-offs among independent monetary policy, exchange rate and capital movement. The central banks strategic choice on policy trilemma or trinity policy have crucial consequences towards achieving economic growth, and importantly, its inclusiveness is a dimension that has necessitated significant attention in modern development discussion. Aizenman et.al. (2022)

opined that in the context of crises, it forces developing nations to make difficult policy choices that have far-reaching implications for their economic stability and the distribution of growth benefits.

As pointed out by Berg et al. (2018), SSA monetary institutions have increasingly modernised their operational frameworks through improved forecasting systems, inflation anchoring mechanisms, and enhanced analytical capacity. However, despite this improvement, several nations in this region still encounter problems of inflation uncertainty, unstable exchange rates, high unemployment, weak monetary transmission mechanism, and poor inclusive economic development. The persistence of these macroeconomic challenges has raised concerns on the ability of central bank policies to promote inclusive sustainable economic development in SSA economies.

The concern over the effectiveness of central bank policies becomes more pronounced when

viewed from the theoretical expectation that monetary policy should stabilize prices and stimulate economic activities. However, Oyadeyi (2025) reported that the transmission of policy actions to the real sector remains relatively weak across many African countries due to financial markets and external vulnerabilities. In Nigeria, for instance, as one of the Sub-Saharan African countries, its central bank has introduced numerous intervention programmes aimed at stimulating productive sectors, improving financing inclusion, and promoting inclusive growth. However, empirical evidence regarding the effectiveness of these interventions remains inconclusive (Kwode, 2024). This suggests that monetary policy interventions alone may not be sufficient to generate sustainable developmental outcomes without strong institutional support.

In addition to these domestic monetary policy challenges, SSA economies are increasingly confronted with the macroeconomic trilemma, which refers to the difficulty of simultaneously achieving monetary policy independence, exchange rate stability, and full capital mobility. The increasing integration of SSA economies into global financial markets has intensified exposure to volatile capital flows and external shocks, thereby constraining the effectiveness of domestic monetary authorities. This implies that central banks within SSA frequently operate under constrained policy environments where achieving price stability and economic growth simultaneously becomes increasingly difficult.

These constraints have important implications for inclusive development outcomes. The extant literature has demonstrated the disconnection between macroeconomic stability pursued by central banks and the microeconomic realities of continuous poverty and widening inequality. For instance, Adeleye et al. (2020) hypothesize a growth-poverty-inequality trilemma, whereby economic growth does not automatically lead to decreases in poverty or inequality. This prompts an unanswered question: in making their strategic choices in the policy trilemma (i.e., exchange rate stability versus monetary policy autonomy, among others), how do central banks in developing countries explicitly include and prioritize the implications for poverty reduction, income distribution, and access to financial services for marginalized segments of their populations?

The practical relevance of this question is reflected in country-specific experiences. The case

study work of Kamamkhudza (2016) on Malawi's trilemma amply illustrates the practical difficulties that central banks encounter in attempting to balance these often competing objectives. In addition, while the scholarly debate, as exemplified by Cheng and Rajan (2020), considers whether the classical trilemma has evolved into a more nuanced "dilemma," for most developing countries, the underlying policy constraints continue to be acutely felt.

Consequently, there is a pressing need for more robust empirical research that systematically explores how specific central bank policy choices made under the trilemma interact with unique domestic structural conditions, such as weak institutions, less advanced financial markets, or large informal sectoral presence, to enhance or impede inclusive growth outcomes. In response to these developmental challenges, some African countries (e.g., Nigeria, Ghana, Cameroon, Ethiopia, etc.) have put into effect a number of policy initiatives aimed at promoting equitable growth. Financial inclusion and interventions in important industries like power, agriculture, MSMEs, oil and gas, and health are a few of these. For example, financial inclusion guarantees the impoverished have access to capital, a crucial instrument for reducing poverty and inequality and a prerequisite for inclusive growth.

Nevertheless, despite the extensive research on inclusive growth in Africa (e.g., Adeleye et al., 2020; Kamamkhudza, 2016; Alley, 2017; Reinders, Dekker, van Kesteren, and Oudenhuijsen, 2019), a consensus remains elusive, and research on central banks and policy trilemma trade-offs in Sub-Saharan African countries remains scanty. Central banks and other policymakers in these countries are consistently concerned about which of the mutually consistent policies is most suitable for achieving effective and inclusive growth in their economies. Equally important is the question of how policymakers have utilized the available policy choices within the Mundell-Fleming framework to guide economic prosperity.

These questions, together with the scholars argument surrounding the Mundell-Fleming impossible trinity in the context of Africa's structural development paths, provide the motivation for further inquiry. Therefore, this study investigates central bank policy, policy trilemma, and their implications for inclusive economic growth in Sub-Saharan Africa.

Literature Review

The relationship among the central banks policies, the macroeconomic policy trilemma and inclusive economic growth has increasingly become a subject of academic studies, especially in Sub-Saharan Africa (SSA), where policy-makers have to deal with a combination of macroeconomic stability and economic growth issues. It can be noted that the existing literature demonstrates how monetary policy and actions of central banks are determined by the macroeconomic policy trilemma and capital flows dynamics.

In examining the relationship between growth, poverty, and inequality, Adeleye et al. (2020) analyses the "growth-poverty-inequality trilemma" with a view to determining whether or not economic growth reduces poverty and how income inequality influences such an impact, particularly in Sub-Saharan Africa and Latin America/Caribbean. It employs panel data for 58 countries spanned from 2000 to 2015 based on per capita consumption expenditure, GDP growth rate, and the Gini coefficient (for inequality), together with control variables including enrollment in secondary school and unemployment. The method involves descriptive and econometric approaches using static and dynamic models, e.g., a reduced poverty model with a combination of inequality and growth. Findings indicate that growth has the tendency to reduce poverty but with the positive effect being heavily dampened by high income inequality. The implication is that economic growth and income distribution should be tackled to guarantee effective poverty reduction.

Supporting this argument, Garcia-Verdu et al. (2011) attempts to diagnose how much the recent growth in Sub-Saharan Africa economies has been inclusive to the majority population. It utilizes household survey data from Uganda, Zambia, Ghana, Cameroon, Mozambique and Tanzania watching over indicators of asset ownership, access to service, and consumption. The approach consists of growth incidence curve (GIC) estimation for tracking real per capita consumption via income quartiles, complemented by Mincer-type regressions for consumption determinants and performance indicators in the labor market. Findings suggest that higher per capita GDP growth is likely to be linked with sound consumption growth in the poorest quartile, with rural farm labor being a key poverty reducer. The authors recommend assigning top

priority to growth-led job creation, especially in rural areas.

Similarly, Reinders and Dekker (2019) synthesized evidence on Africa's development with a focus on reduction of inequality and poverty in the income and non-income dimensions respectively. The focus population is African countries, with particular focus on vulnerable and marginal groups. Key findings indicate that although economic growth has been taking place, most Africans have been left behind and inequality rises with detrimental effects on economic growth and social cohesion. The report advocates applying an "inclusive development goals" by placing equality, diversity, and context-oriented policies which consider distributional implications and empower strategic actors at the forefront, acknowledging that redistributive policies can help to expand economies.

Beyond growth and inequality, the literature identifies financial development and inclusion as important drivers of inclusive growth. A research paper by Mlachila et al. (2016) assesses broadly financial development in Sub-Saharan Africa, its direction, growth and volatility impact, and policy implications. The analysis used data on financial depth measures, a general financial development index, and financial inclusion and stability indicators. Regression analysis was employed to determine its causes and constraints, and the GMM approach was employed. The study found that mobile banking is flourishing, but financial inclusion is entrenched, and there has been enrichment of the financial markets while the markets themselves are shallow relative to other emerging markets. The study concluded that there should be improvement in institutional and legislative frameworks, enhanced cross-border regulation of Pan-African banks, and support for regulatory environments.

Consistent with this finding, Osei and Alagidede (2022) consider the influence of ICT diffusion and how it interacts with financial development on inclusive growth in Sub-Saharan Africa (SSA) both directly and indirectly. Panel data of 42 sub-Saharan nations was used to estimate inclusive growth. Evidence indicates that access to and proficiency in ICT directly brings about inclusive growth in SSA, and the effects are significantly greater when there is access to institutions of finance and financial development. The policy recommendation is to invest first in ICT spread and financial deepening for shared prosperity in the region, in line with green growth and socioeconomic development agendas.

Likewise, Jombo (2021) looks into the impact of financial depth and inclusion on inclusive growth in 26 Sub-Saharan African countries. Using panel data and a random effects panel regressions method, the study concludes that inclusive growth is influenced positively by effective financial inclusion, but at very high levels its marginal impacts fall. Financial depth is not found to have a robust connection with inclusive growth. The recommendation targets promoting more financial inclusion efforts in the region, whose rate is currently low, by lowering transaction tariffs and enhancing the financial literacy of the population.

The role of external capital flows has also received significant attention in the literature. Alley (2017) examined capital flow surges and economic growth in Sub-Saharan Africa. It focuses on private capital flows (FDI, stock, and bonds) and capital control indicators using panel data for 25 Sub-Saharan African nations from 2003 to 2013. The results from the analysis using System Generalized Methods of Moments (Sys.GMM) indicate risk-sharing capital (FDI and equity) to be growth-promoting and credit-supply promoting, whereas risk-averse capital (bonds) is growth-retarding. Such inflows have negative effects on growth and credit. The study suggests that governments should focus on capital controls on the right targets and financial institutions mobilize additional risk-sharing capital in order to maximize benefits from such flows.

The importance of capital flow management is closely linked to the macroeconomic trilemma framework. Klein and Shambaugh (2015) investigate rounding the corners of the policy trilemma as sources of monetary policy autonomy. The author investigated whether and under what circumstances limited capital controls and modest exchange rate flexibility can bring more monetary policy autonomy than has been traditionally assumed by the strict trilemma. The character of data contained country-level nominal interest rates, base country interest rates, and exchange regime and capital account openness classifications. The regression method was used on pooled data over different policy regimes. The result indicates that only comprehensive capital controls allow significant monetary independence, while some exchange rate flexibility does allow some independence, particularly among emerging and developing economies. The study concluded that offering more exchange rate flexibility is the easiest way whereby nations can gain monetary

independence without completely closing their capital accounts.

Similarly, Cheng and Rajan (2020) investigates monetary trilemma, dilemma, or something in between. The data used are short-run Treasury-bill yields and exchange-rate regime classifications of Shambaugh's data, and Chinn-Ito index (KAOPEN) for capital controls, and comprises 88 advanced and emerging economies from 1973 to 2014. The method employs pooled ordinary least squares with cluster-robust standard errors and time-fixed effects. Findings help to validate the "monetary trilemma," with exchange-rate flexibility. The study suggests that holding greater foreign reserve positions can attain some level of monetary policy autonomy, particularly in regards to the management of capital outflows.

Extending the trilemma literature, Aizenman et al. (2022) study how financial crises influence countries' monetary trilemma settings—financial openness, monetary independence, and exchange rate stability—and the role of international reserves. Utilizing panel data for over 180 economies from 1970 to 2020, the methodology involves the comparison of pre- and post-crisis averages for these policy variables, as well as a Seemingly Unrelated Regressions (SURE) approach to identify the determinants of policy alterations. The evidence is such that although the Global Financial Crisis primarily resulted in higher international reserve holdings, the Asian Financial Crisis resulted in significant rises in financial openness and international reserve ownership for emerging economies. In an attempt to prevent global financial instability, the paper suggests policymakers should take into account the simultaneous determination of trilemma policies and international reserve holdings.

In offering a broad perspective of monetary policy in Sub-Saharan Africa, Berg and Portillo (2018) analyzed Monetary Policy in Sub-Saharan Africa between 2000 and 2011. According to their analysis based on impulse response analysis, even though the SSA countries have distinct economic features, the problems in monetary policy that they confront are basically the same as in other advanced and developing countries. They stress that there is an evident process of modernizing monetary policy making in Sub-Saharan Africa, which involves improving inflation targeting and forecasting systems, as well as using forward-looking approaches.

Within this context, the macroeconomic trilemma and the central bank's policy were studied in the

context of Nigeria by Ayinde (2022). The author used quarterly data ranging from 1981 to 2017 and applied the Markov-switching dynamic regression model. The result of the study confirmed the validity of trilemma hypothesis, and it was found that Nigeria's goal of achieving exchange rate stability and capital mobility limited the country's freedom of conducting its monetary policy. It should be stressed that exchange rate targeting was characterized by switches between fixed and managed float regimes, where different regime-specific factors affected the exchange rate dynamics differently.

The consequences of capital mobility for economic performance have been further examined by Nyang'oro (2017). Using the system Generalized Method of Moments approach, the author analyzed the impact of capital flows on economic growth in SSA. It has been established that various types of capital inflows produce different impacts on growth. Whereas portfolio equity inflows supported economic growth, the increase in private debt and equity inflows had a negative effect on growth outcomes. Most notably, the overall level of capital inflows turned out to have a negative influence on economic growth. Hence, the positive effects of financial globalization do not come automatically and might be contingent upon the nature and management of capital flows. Such a finding is consistent with the results of macroeconomic trilemma studies that emphasize the adverse effects of rising capital mobility.

Apart from macroeconomic stability, recent studies have examined developmental roles of central banks through direct intervention programme. One of such studies carried out in Nigeria by Kwode (2024), evaluated the effect of intervention measures applied by the Central Bank of Nigeria to foster inclusive growth through secondary and primary data as well as chi-square and rank correlation approaches. Results revealed a positive correlation between intervention programs of the central bank and inclusive growth; however, the effect on the general economy is not statistically significant.

Likewise, Bello et al. (2024) examined the impact of monetary policy on the economy's growth in selected African countries including Nigeria, Egypt, South Africa, and Kenya based on annual data between 2000 and 2022. According to their findings, monetary policy rate has a statistically insignificant but positive impact on economic growth, while broad money supply plays a significant role in stimulating economic growth. Therefore, it can be said that

traditional tools of monetary policy do not play an effective role in promoting economic growth in African economies owing to poor transmission channels, while expanding money supply does.

Recent evidence has also linked the macroeconomic trilemma to monetary policy credibility, an important prerequisite for sustainable growth and macroeconomic stability. Using data from 94 developed and developing countries, Montes and Dantas (2025) examined how trilemma policy convergence patterns influence monetary policy credibility through Tobit estimation techniques. Their findings indicate that countries whose policy combinations converge toward internationally accepted trilemma configurations enjoy higher monetary policy credibility and stronger inflation expectation anchoring. Conversely, countries pursuing divergent policy mixes tend to experience greater economic instability and weaker policy credibility. These results suggest that the manner in which countries manage the trade-offs among monetary independence, exchange rate stability, and capital account openness has significant implications for macroeconomic outcomes.

From a combined analysis of the literature discussed above, it is evident that Central bank policies, capital flows, and macroeconomic trilemma issues are intimately interrelated in influencing economic performance and inclusive growth. Although monetary policy reform and CBP interventions have the potential to support development objectives, their effectiveness can be hindered by the lack of policy independence, unstable capital flows, poor monetary transmission processes, among other problems. Moreover, existing studies have addressed inclusive growth, effectiveness of monetary policy reforms, or trilemma issue separately. Hence, there exists a dearth in literature about the interrelationship between central bank policies and macroeconomic trilemma concerning inclusive growth in SSA against the backdrop of financial globalization.

Methodology

The model specification is grounded in the theoretical framework of the policy trilemma, which posits that it may not be possible to achieve three key objectives in an economy. The theory and the arguments from other relevant studies in the literature lead to the model specification of this study. In order to examine the impact of central bank's policy and

trilemma trade-offs on inclusive growth in sub-Saharan Africa, this study improves on earlier studies (Hsing, 2012, Kamamkhudza (2016); Adeleye, et al. (2020); Jombo (2021)). The model set up which is anchored on the Mundel-Fleming hypothesis is compactly expressed as:

$$GDP_{pc} = f(EXR, MI, FCM) \quad (1)$$

The model is augmented with the introduction of money supply (MS) as part of the explanatory variables due to inclusion of monetary policy in the trilemma as pointed out in the literature which is expressed as:

$$GDP_{pc} = f(EXR, MI, FCM, MS, EXR * MI, EXR * FCM, CM * MI) \quad (2)$$

Where: GDPpc = gross domestic product per-capita, EXR = exchange rate stability, FMI = monetary autonomy, FCM= free capital mobility and MS = money supply, EXR*MI = interaction of exchange rate and monetary independence, EXR*FCM = interaction of exchange rate and free capital mobility and FCM*MI = interaction of free capital mobility and monetary independence, Equation (2) can be specified econometrically as:

$$GDP_{pc} = \alpha_0 + EXR + \alpha_2 MI + \alpha_3 FCM + \alpha_4 MS + \alpha_5 EXR * MI + \alpha_6 EXR * FCM + \alpha_7 CM * MI + \varepsilon_i \quad (3)$$

to capture the focus of this study, the inclusive growth, Equation (4) expresses economic growth per

capital, poverty rate (POV) and inequality (INEQ) as a function of the surrogates of central banks and policy trilemma which is specified econometrically as:

Equation 3 thus decomposed into the following equations:

$$GDP_{pc} = \alpha_0 + \alpha_1 EXR + \alpha_2 MI + \alpha_3 FCM + \alpha_4 MS + \alpha_5 EXR * MI + \varepsilon_i \quad (4)$$

$$POVT = \alpha_0 + \alpha_1 EXR + \alpha_2 MI + \alpha_3 FCM + \alpha_4 MS + \alpha_5 EXR * FCM + \varepsilon_i \quad (5)$$

$$INEQ = \alpha_0 + \alpha_1 EXR + \alpha_2 MI + \alpha_3 FCM + \alpha_4 MS + \alpha_5 EXR * FCM + \varepsilon_i \quad (6)$$

α_0 to α_6 are coefficients estimated to show the impact of central banks of subsaharan countries policy trilemma on inclusive growth ε_i means stochastic element that is randomly and normally distributed which other variables that are not specified in the model are embedded in it. Pesaran and Shin (1998) and Pesaran *et al* (2001) (as cited in Ajogbeje, Adeniyi & Egwaikhide, (2019), to deal with peculiar outcome a mixture of both $I(0)$ and $I(1)$ variables in a model, autoregressive distributed lag (ARDL) model is appropriate. The PARDL is appropriate in situations where data availability is a problem, especially in developing nations where short time spans for variables are common and frequently insufficient for time series regression fitting.

Model 1

$$GDP_{pct} = \delta_0 + \sum_{j=i}^k \phi_j gdp_{pct} \binom{n}{k} x^k a^{n-k} \quad (7)$$

$$GDP_{pct} = \delta_0 + \sum_{j=0}^k \phi_j GDP_{pct-j} + \sum_{j=0}^{p1} \psi_{1j} EXR_{t-j} + \sum_{j=0}^{p2} \psi_{2j} MI_{t-j} + \sum_{j=0}^{p3} \psi_{3j} FCM_{t-j} + \sum_{j=0}^{p4} \psi_{4j} MS_{t-j} + \sum_{j=0}^5 \psi_{5j} (EXR - MI)_{t-j} + \mu_t \quad (8)$$

Where:

k, p^1 to p^5 are the optimal lag orders for GDPpc_t, EXR_t, MI_t, FCM_t, MS_t, and EXR_MI_t respectively, determined through model selection procedures.

The reparameterized ARDL model, or ECM form, is derived by taking first differences of the variables and incorporating the error correction term. This form highlights the speed of adjustment to long-run equilibrium.

$$\begin{aligned}\Delta GDP_{pct} = & \delta_0 + \sum_{j=0}^k \phi_j \Delta GDP_{pct-j} + \sum_{j=0}^{p1} \psi_{1j} \Delta EXR_{t-j} + \sum_{j=0}^{p2} \psi_{2j} \Delta MI_{i-j} + \sum_{j=0}^{p3} \psi_{3j} \Delta FCM_{i-j} + \sum_{j=0}^{p4} \psi_{4j} \Delta MS_{i-j} \\ & + \sum_{j=0}^5 \psi_{5j} \Delta (EXR - MI)_{i-j} + ECT_{t-1} + v_t.\end{aligned}\quad (9)$$

Model 11

$$\begin{aligned}POV_{pct} = & \delta_0 + \sum_{j=0}^k \phi_j POV_{pct-j} + \sum_{j=0}^{p1} \psi_{1j} EXR_{t-j} + \sum_{j=0}^{p2} \psi_{2j} MI_{i-j} + \sum_{j=0}^{p3} \psi_{3j} FCM_{i-j} + \sum_{j=0}^{p4} \psi_{4j} MS_{i-j} \\ & + \sum_{j=0}^5 \psi_{5j} (EXR - MI)_{i-j} + \mu_1.\end{aligned}\quad (10)$$

The reparameterized ARDL model, or ECM form;

$$\begin{aligned}\Delta POV_{pct} = & \lambda_0 + \sum_{j=0}^k \phi_j \Delta POV_{pct-j} + \sum_{j=0}^{p1} \psi_{1j} \Delta EXR_{t-j} + \sum_{j=0}^{p2} \psi_{2j} \Delta MI_{i-j} + \sum_{j=0}^{p3} \psi_{3j} \Delta FCM_{i-j} + \sum_{j=0}^{p4} \psi_{4j} \Delta MS_{i-j} \\ & + \sum_{j=0}^5 \psi_{5j} \Delta (EXR - MI)_{i-j} + v_t\end{aligned}\quad (11)$$

$$\begin{aligned}INEQ_{pct} = & \delta_0 + \sum_{j=0}^k \phi_j INEQ_{pct-j} + \sum_{j=0}^{p1} \psi_{1j} EXR_{t-j} + \sum_{j=0}^{p2} \psi_{2j} MI_{i-j} + \sum_{j=0}^{p3} \psi_{3j} FCM_{i-j} + \sum_{j=0}^{p4} \psi_{4j} MS_{i-j} \\ & + \sum_{j=0}^5 \psi_{5j} (EXR - MI)_{i-j} + \mu_t.\end{aligned}\quad (12)$$

The reparameterized ARDL model, or ECM form;

$$\begin{aligned}\Delta INEQ_{pct} = & \lambda_0 + \sum_{j=0}^{k-1} \phi_j \Delta POV_{pct-j} + \sum_{j=0}^{p1-1} \psi_{1j} \Delta EXR_{t-j} + \sum_{j=0}^{p2-1} \psi_{2j} \Delta MI_{i-j} + \sum_{j=0}^{p3-1} \psi_{3j} \Delta FCM_{i-j} + \sum_{j=0}^{p4-1} \psi_{4j} \Delta MS_{i-j} \\ & + \sum_{j=0}^{p5-1} \psi_{5j} \Delta (EXR - MI)_{i-j} + v_t.\end{aligned}\quad (13)$$

Where:

Δ the first difference operator (e.g., $\Delta POV_t = POV_t - POV_{t-1}$).

$\gamma_{j,i}$ = the short-run coefficients for the differenced variables.

ECT_{t-1} this refers to Error Correction Term (ECT) with one lagged period, which captures the long-run equilibrium relationship.

κ is the coefficient of the ECT, representing the Speed of Adjustment (SOA).

v_t = white-noise error term.

Results and Discussion

Descriptive Statistics Analysis

As depicted in table 1: GDPpc Mean is around 6.34, median 3.34, which suggests central tendency. It is slightly right-skewed. Meaning there are some higher GDP per capita values that pull the average up with a moderate dispersion (std. dev. 0.42) and is normally distributed. The minimum and maximum (Max and Min) values range between 2.33 to 11.66. EXR Mean is 1.92 but median slightly higher at 1.98,

which suggests strong left skewness. std. dev. (0.99) indicates moderate variability in the exchange rate. MI mean of 1.77 and median of 1.80 are close, suggesting a reasonably symmetric distribution. It has a wide spread (std. dev. 0.94) and is likely to be normally distributed. Values stretch from -0.08 to 4.19. FCM mean of (8.55) and median of 8.65 are very close, suggesting a symmetric distribution. It has a smaller spread (std. dev. 0.87) than the others and is normally distributed. Max and Min values

ranges between 8.55 and 8.65. Mean of Money Supply (1.77) is higher than the Median (1.50), indicating a right-skewed distribution. Range & Dispersion: Ranges from 0.72 to 7.90. The standard deviation (1.23) Skewness & Kurtosis: Displays very high positive skewness (3.80) and is extremely leptokurtic (Kurtosis 17.46). **Normality:** The Jarque-Bera Probability (0.000000) is highly significant, rejecting the null hypothesis of normality. MS is extremely far from normally distributed.

Table 1
Descriptive Statistics of the Variable

	GDPPC	FCM	MI	EXR	MS
Mean	6.335482	8.550656	9.388829	1.922585	1.773700
Median	3.343331	8.654525	10.11813	1.975097	1.503431
Maximum	11.66105	10.60915	35.76000	3.064868	7.896698
Minimum	2.334642	6.176091	-31.45257	-2.560631	0.716843
Std. Dev.	3.652185	0.866016	10.48491	0.772800	1.225176
Skewness	0.265973	-0.493800	-0.588574	-1.237747	3.798263
Kurtosis	1.161372	2.865816	4.346725	6.978820	17.46348
Jarque-Bera	39.53550	10.72000	34.52628	236.9751	2880.291
Probability	0.200000	0.004701	0.140000	0.000000	0.020010
Sum	1640.890	2214.620	2431.707	497.9495	459.3884
Sum Sq. Dev.	3441.322	193.4958	28362.82	154.0827	387.2726
Observations	259	259	259	259	259

The Unit Root (Stationarity) Results

The need to determine whether each variable exhibits mean reversion using Levin, Lin & Chu t statistic Unit tests became paramount. This was conducted using drift only and drifts with trend specifications of unit roots at levels and first differences of the series. It was found that most of

the variables were non-stationary at levels but became stationary at first differencing I(1) except for MI that was stationary at level I(0). Having established that all variables were integrated at an order one and zero, we applied PARDL the bounds test for cointegration analysis in the model.

Table 2
Levin, Lin & Chu t statistic Unit Root Test Result

	Levin, Lin & Chu t statistic critical value	Prob.	Level of integration
RGDPpc	3.6614	0.0001	I(1)
POVrate	2.5231	0.0058	I(1)
INEQ	6.8627	0.0000	I(1)
EXR	6.2160	0.0000	I(1)
MI	4.5955	0.0000	I(0)
FCM	4.7862	0.0000	I(1)
MS	2.0335	0.0210	I(1)

Source: Author's Computation

Long-run Dynamic Analysis**MODEL I:**

The Exchange Rate Coeff (0.0003) with Prob: 0.5387 is statistically not significant. The positive coefficient (0.0003) suggest that a one-unit rise in the exchange rate causes a 0.0003 increase in GDP per capita. By implication, this result suggests that, within the context of this model, changes in the exchange rate do not have a longrun statistically reliable or measurable impact on GDP per capita in the selected sub-saharan countries

Monetary Independence coeff (-0.0877) with prob (0.001) has a longrun statistically significant. A one-unit rise in monetary independence is associated with a statistically significant (-0.0877 decrease in GDP per capita. This suggests that greater monetary independence will lead to lower longrun effect on economic output per person in sub-saharan countries This result suggests that the benefits of policy coordination or credible commitment mechanisms may outweigh the costs of reduced policy autonomy in the selected sub-saharan countries

The FCM coeff (0.3120) with prob (0.001) shows that there is longrun linear relationship between free capital mobility and GDP per capita, and it statistically significant. This suggests that economies benefit significantly from international capital flows, likely through improved resource allocation, technology transfer, and access to foreign investment in sub-saharan countries under consideration

Money Supply (MS) has a substantial positive long-run effect, with a 1% increase associated with about 0.51% higher GDP per-capita in sub-Saharan countries under consideration. This indicates that expansionary monetary policy can stimulate economic growth, consistent with Keynesian theory about money's role in economic activity

The $exr*mi$ Coeff (-5.74E-06) is insignificant (0.8600). This implies that the effect of exchange rate on GDP per-capita does not significantly depend on the level of monetary independence, and vice versa. In other words, there is no long-run statistically significant effect on "joint effect" or moderation between exchange rate and monetary independence on GDP per capita in the selected sub-Saharan countries. This could indicate that these countries have found ways to manage this trade-off without major growth penalties

MODEL II:

A rise in the exchange rate causes -0.0317 unit decrease in poverty in the long run ($p < 0.001$),

implying increase in the value of the domestic currency (if the exchange rate is defined as local per foreign currency) tends to reduce in sub-Saharan countries under consideration. The Coefficient of FCM (-2.6568) and the p-value (0.0000) less than 0.05 means that a 1% decrease in capital mobility leads to a -2.6568% long-run decrease in poverty. Foreign investment creates employment opportunities Technology transfer and it also bring productivity-enhancing technologies in the long-run in the selected sub-Saharan countries

Monetary Independence (MI) and Money Supply (MS) are not statistically significant, suggesting these variables do not have robust long-run effects on poverty in this specification. The insignificant MI coefficient suggests that the degree of monetary independence does not significantly affect long-run poverty outcomes. This could indicate that global monetary conditions are sufficiently synchronized

With coefficient of -0.001094 a p-value of 0.022, this interaction term ($exr*fc$) is statistically significant. The finding of the interaction is statistically significant, implies that the trade-offs highlighted by the trilemma regarding exchange rate policy and capital mobility have long-run direct impact on poverty reduction in the selected sub-Saharan countries

Model III

EXR Coefficient of -0.0345, the probability (0.0018) is lesser than 0.05. The statistically significant negative coefficient suggests that a reduction in the value of the domestic currency associated with a reduction in income inequality in the longrun. Therefore, from a policy perspective, this result suggests that exchange rate depreciation could be a tool to address income inequality in the long-run among the selected sub-Saharan countries

Monetary Independent coefficient of -0.3790 and P-value (0.0065) means the negative coefficient suggests that, in the long run, a unit rise Monetary Independent variable is causes a decrease of 0.3790 units in inequality. This implies that, in the long run, a more restrictive or tighter monetary policy (if your independent variable represents such a stance, e.g., money supply growth is retarded by higher interest rates) causes a reduction in income inequality

MS Coefficient (-35.05) with the p-value (0.0001) is lesser than 0.05. Money Supply (MS) has a negative coefficient, indicating that monetary expansion reduces inequality. This suggests that negative coefficient indicates the long run, for every

a unit rise in the money supply; inequality is expected to decrease by -35.05434 units.

The FCM coefficient (3.975478) and Prob (0.2262) shows that financial capital mobility (fcm) alone is not significant, but this changes when we consider the interaction effect.

The highly significant positive interaction term $mi*fcm$ (-0.1759, $p = 0.0004$) is crucial for under-

standing trilemma dynamics. This indicates that the combination of monetary independence and capital mobility creates particularly strong long-run inequality effects. This suggests a **compounding effect** where countries trying to maintain both monetary independence and capital mobility face the classic trilemma tension, leading to policy volatility that benefits those who can adjust quickly (the wealthy)

Table 3

Long-run Dynamic Results for model I, II and III

	Model I			Model II			Model III		
Variab	Coef	t-stat	Prob	Coef	t-stat	Prob	Coeff	t-stat	Prob
EXR	0.0003	0.6158	0.5387	-0.0317	3.3342	-0.0010	-0.0345	3.16372	-0.0018
MI	-0.0877	-4.1890	0.0000	0.0171	0.4814	0.6307	-0.3790	-2.75064	0.0065
LFCM	0.3120	4.1961	0.000	-2.6568	5.4667	0.0000	3.9754	1.21436	0.2262
MS	0.5059	2.8175	0.0053	0.2324	1.2183	0.2247	-35.054	-4.15178	0.0001
EXR*MI	-5.74E-06	-0.1766	0.8600						
EXR*FCM				-0.00109	-1.2247	0.2222			
MI*IFCM							0.1759	3.5899	0.0004

Source: Author's Computation: Notes: denotes statistical significance at 1% level.

Short-Run Dynamic Analysis

Model I:

A negative coefficient -0.020549 ($p=0.05$) suggests that about 2.05% of the disequilibrium from the past period long-run equilibrium is corrected in the current period. The result support the presence of a long-run association between the variables. The change in the exchange rate has a negative coefficient, but it is **insignificant** ($p\text{-value} > 0.05$). It means that, in the short run, fluctuation in exchange rate which is statistically significant does not affect GDP per-capita. The change in monetary independence also have a negative coefficient but is **insignificant** ($p\text{-value} > 0.05$). This suggests that short-run changes in the degree of monetary independence do not significantly influence GDP per-capita. The change in free capital movement has a negative significant coefficient (p is less than 0.05). This indicates that a 1% increase in free capital movement (in log terms) causes a 0.011302 unit reduction in GDP per-capita in the short-run, holding other factors constant. The change in money supply has a negative coefficient and is statistically significant ($p\text{-value}$ is less than 0.05, often considered significant at a 10% level). This suggests that a 1% increase in money supply causes

approximately a 0.22 unit decrease in GDP per-capita in the short run, though this effect is less robust than that of free capital movement. The combination of exchange rate and monetary independence has a very small positive coefficient but is not statistically significant. This implies that, in the short run, the combined effect of changes in exchange rate and monetary independence does not significantly impact GDP per-capita..

Model II:

The COINTEQ01 term is negative and significant ($p\text{-value} < 0.01$). The 23.46% shows that disequilibrium in the previous period's poverty level from its long-run path is corrected in the current period, suggesting a relatively fast adjustment process towards the long-run equilibrium level of poverty. The change in the exchange rate has a positive coefficient but is statistically insignificant (p is greater than 0.05). This implies that, in the short run, immediate changes in the exchange rate do not have a statistically significant impact on poverty levels. The change in monetary independence has a negative and statistically significant coefficient (p is lesser than 0.05). This indicates that a one-unit increase in monetary independence causes a 0.050584 unit

decrease in poverty in the short run, holding other factors constant. The change in free capital movement has a positive coefficient but is statistically insignificant ($p\text{-value} > 0.05$). This suggests that, in the short run, changes in the degree of free capital movement do not have a statistically significant immediate impact on poverty levels. The result of coefficient of money supply is statistically significant ($p\text{-value} < 0.05$). This is a very large coefficient. It indicates that a 1% increase in money supply (in log terms) causes 11.10 unit *increase* in poverty in the short run. The interaction term between exchange rate and free capital movement has a very small positive coefficient but is statistically insignificant. This implies that the combined effect of changes in exchange rate and free capital movement does not significantly impact poverty in the short run.

Model III:

D(EXR) 0.280805 with the $p\text{-value}$ (0.2641) indicates that this variable is not statistically

significant. Short-run changes in the exchange rate do not have a discernible immediate impact on inequality. D(MI) Coefficient: 0.014850. $p\text{-value}$ (0.7538) shows this variable is not statistically significant. Short-run changes in monetary independence do not have a statistically significant effect on inequality. D(LFCM) Coefficient: -0.188987 with $P\text{-value}$: 0.7431 confirms this variable is not statistically significant. Short-run changes in free capital movement do not have a statistically significant impact on inequality. D(LMS) (-1.897346) with the $P\text{-value}$: 0.7083 means this variable is not statistically significant. Short-run changes in the money supply do not have a statistically significant impact on inequality. D(MI IFCM) Coefficient: -0.001137 with $p\text{-value}$ (0.8765) confirms this interaction term is not statistically significant. The combined effect of changes in monetary independence and free capital movement does not significantly impact inequality in the short run.

Table 4
Short-run Dynamic Results for model I, II and III

Variab	Model I			Model II			Model III		
	Coeff	t-stat	Prob	Coeff	t-stat	Prob	Coeff	t-stat	Prob
COINTEQ01	-0.0205	-2.4703	0.0143	-0.23458	0.0838	-2.7973	-0.0558	-1.1635	0.2461
D(EXR(-1))	-0.00282	-0.5551	0.5794	0.36584	-2.7973	0.0057	-0.2808	-1.1201	0.2641
D(MI(-1))	-0.00150	-1.1990	0.2319	-0.05058	0.9505	0.3431	0.0148	0.3140	0.7538
D(IFCM(-1))	-0.0113	-2.1787	0.0305	0.56492	-2.2128	0.0281	-0.1889	-0.3282	0.7431
D(MS(-1))	-0.21999	-1.8032	0.0728	11.0995	1.1758	0.2412	-1.8973	-0.3747	0.7083
D(EXR*MI)	6.33E-05	0.3001	0.7644						
D(EXR*IFCM)				0.00060	2.5287	0.0123			
D(MI*IFCM)							-0.0011	-0.1555	0.8765

Post Estimation Tests and Results

Table 5 showed the diagnostic and stability post estimation test of the results and findings of this study. Its essence and need is the confirmation of the robustness and reliability of the results, observations and findings derived in the estimation technique and test conducted earlier on in the study. Thus, based on the probability values of the F-statistic and its values which are greater than 5% (0.05) threshold as seen in

all the post estimation tests results in Table 5, we can conclude emphatically that the model specified for this study and its entire results, observations and findings are reliable and do not suffer auto-correlation, mis-specification and heteroskedasticity problems that are usually associated with time series data, implying that the model was correctly specified and stabled as confirmed by the Ramsey Reset and other stability/diagnostic tests adopted in this study

Table 5
SUMMARY OF POST-DIAGNOSTIC TEST

	Model I		Model II		Model III	
	f-stat	Prob	f-stat	prob	f-stat	prob
Breush-Godfrey LM Test For Serial Correlation	0.322304	0.2267	1.46822	0.5126	1.3041	0.7612
Heteroskedasticity Test: Breush-Godfrey	1.6818	0.1648	1.9411	0.1486	1.218	0.1126
Jarque-Bera Normality Test	0.6066	0.064	0.4016	0.0722	0.1411	0.7432

Conclusion

The long-run results offer very significant evidence regarding the interconnectedness of the key macroeconomic variables. One such important result is the statistically significant positive interaction effect of free capital movement (FCM) and monetary independence (MI) in Model III (Coef=0.1759, $p=0.0004$), confirming the empirical support to the Mundell-Fleming trilemma in some selected sub-saharan countries which identifies how effective monetary policy by a central bank is highly dependent on the capital mobility level. Besides, the significant and strong impact of Money Supply (MS) across a variety of different models (e.g., Coef=-35.054, $p=0.0001$ in Model III) is reflective of the central bank's leading role in bringing about long-run macroeconomic stability through money supply control. These findings overall emphasize the significance for central banks, in formulating and implementing monetary policy, to adopt an integrated approach which has as an explicit consideration and unifies the dynamics of international capital flows and their integration with domestic monetary instruments. Such an integrated framework is required for achieving desired long-run economic outcomes and navigating the complexities of a more globalized financial system. Therefore, achieving sustainable inclusive growth and considerable poverty and inequality reduction in Sub-Saharan Africa needs an integrated, coherent policy agenda that judiciously balances macroeconomic stability with structural changes, human development, and social protection.

Policy Implications

Strategic Coordination of Monetary Policy with Capital Account Management: The high degree of

interaction of monetary instruments and free capital movement (MI*IFCM) implies that SSA central banks cannot pursue independent monetary policy independent of its interaction with capital flows.

Prioritizing Exchange Rate Stability for Trade and Investment: The pivotal role of the exchange rate (EXR) indicates its importance to SSA economies, which are extremely trade-dependent and foreign-investment-dependent. Policy should aim at reducing excessive exchange rate volatility through proper macroeconomic management

Leveraging Money Supply for Stability and Financial Inclusion: The significant impact of Money Supply (MS) in the long run suggests its strong influence on the macroeconomic environment. Central banks can leverage money supply management to maintain price stability, which is vital for the poor as inflation erodes real incomes and savings.

Author Contributions

Conceptualization, B.S.O. and B.E.A.; Methodology, B.S.O. and B.E.A.; Software, R.O. and B.S.O.; Validation, B.E.A. and B.S.O.; Formal Analysis, R.O. and B.S.O.; Investigation, R.O. and B.E.A.; Resources, R.O. and B.E.A.; Data Curation, B.S.O. and R.O.; Writing – Original Draft Preparation, B.S.O.; Writing – Review & Editing, B.E.A. and R.O.; Visualization, B.E.A. and R.O.; Supervision, B.E.A. and R.O.; Project Administration, B.S.O.

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The authors declare that there are no acknowledgements and no conflicts of interest related to this study.

References

- Adeleye, B. N., Gershon, O., Ogundipe, A., Owolabi, O., Ogunrinola, I., & Adediran, O. (2020). Comparative investigation of the growth–poverty–inequality trilemma in Sub-Saharan Africa and Latin American and Caribbean countries. *Heliyon*, 6(12), e05631. <https://doi.org/10.1016/j.heliyon.2020.e05631>
- Aizenman, J., & Ito, H. (2012). Trilemma policy convergence patterns and output volatility (NBER Working Paper No. 17806). National Bureau of Economic Research. https://web.pdx.edu/~ito/NBER_WP_w17806.pdf
- Aizenman, J., Chinn, M. D., & Ito, H. (2022). The impacts of crises on the trilemma configurations (NBER Working Paper No. 30406). National Bureau of Economic Research. <https://www.nber.org/papers/w30406>
- Alley, I. (2017). Capital flow surges and economic growth in Sub-Saharan Africa: Any role for capital controls? (Working Paper Series No. 252). African Development Bank. <https://www.afdb.org/en/documents/capital-flow-surges-and-economic-growth-sub-saharan-africa-any-role-capital-controls>
- Ayinde, T. O. (2022). Modelling macroeconomic trilemma and central bank behaviour in Nigeria: A Markov-switching approach. *Economic Change and Restructuring*, 55(3), 1303–1325. <https://doi.org/10.1007/s10644-021-09346-4>
- Berg, A., & Portillo, R. A. (2018). *Monetary policy in Sub-Saharan Africa*. Oxford University Press. <https://doi.org/10.5089/9780198785811.071>
- Bello, A. I., Okaro, C. S., & Okonkwo, V. I. (2024). Monetary policy and economic growth of selected emerging African economies: 2000–2022. *African Banking and Finance Review Journal*, 9(9). <https://www.abfrjournal.com/index.php/abfr/article/view/154>
- Cheng, R., & Rajan, R. S. (2020). Monetary trilemma, dilemma, or something in between? *International Finance*, 23(2), 257–276. <https://doi.org/10.1111/inf.12363>
- Garcia-Verdu, R., Selassie, A. A., & Thomas, A. (2011). Inclusive growth in Sub-Saharan Africa: Evidence from six countries during the recent high-growth period. In *Regional economic outlook: Sub-Saharan Africa* (pp. 245–257). International Monetary Fund.
- Jombo, W. (2021). Inclusive growth in Sub-Saharan Africa: Do financial depth and inclusion matter? (Policy Brief No. 768). African Economic Research Consortium. <https://aercafrica.org/old-website/wp-content/uploads/2021/08/Research-paper-455.pdf>
- Kamamkhudza, C. (2017). *Malawi's trilemma: Monetary policy independence, exchange rate stability and financial integration* (Master's thesis, Rhodes University). <http://hdl.handle.net/10962/41634>
- Klein, M. W., & Shambaugh, J. C. (2015). Rounding the corners of the policy trilemma: Sources of monetary policy autonomy. *American Economic Journal: Macroeconomics*, 7(4), 33–66. <https://doi.org/10.1257/mac.20130237>
- Kwode, I. E. (2024). Central bank intervention schemes and inclusive growth in Sub-Saharan Africa: Empirical evidence from Nigeria. *Journal of Academic Research in Economics*, 16(3). https://www.jare-sh.com/downloads/nov_2024/kwode.pdf
- Mlachila, M., Cui, L., Jidoud, A., Newiak, M., Radzewicz-Bak, B., Takebe, M., Ye, Y., & Zhang, J. (2016). Financial development in Sub-Saharan Africa: Promoting inclusive and sustainable growth. International Monetary Fund. <https://www.imf.org/external/pubs/ft/dp/2016/afr1605.pdf>
- Montes, G. C., & Dantas, J. (2025). Effects of trilemma policies patterns on monetary policy credibility. *Economic Systems*, 49(2), Article 101271. <https://doi.org/10.1016/j.ecosys.2024.101271>
- Nyang'oro, O. (2017). Capital inflows and economic growth in Sub-Saharan African countries (Working Paper Series No. 285). African Development Bank. <https://www.afdb.org/en/documents/publications/working-paper-series/>
- Obstfeld, M., Ostry, J. D., & Qureshi, M. S. (2017). A tie that binds: Revisiting the trilemma in emerging market economies (IMF Working Paper No. 17/130). International Monetary Fund. <https://doi.org/10.5089/9781484302620.001>
- Ofori, I. K., Osei, D. B., & Alagidede, I. P. (2022). Inclusive growth in Sub-Saharan Africa: Exploring the interaction between ICT diffusion and financial development. *Telecommunications Policy*, 46(7), Article 102315. <https://doi.org/10.1016/j.telpol.2022.102315>
- Oyadeyi, O. O. (2025). Financial development, financial inclusion and the effectiveness of monetary policy transmission mechanism in Africa. *Borsa Istanbul Review*, Advance online publication. <https://doi.org/10.1016/j.bir.2025.10.016>
- Reinders, S., Dekker, M., Van Kesteren, F., & Oudenhuijsen, L. (2019). Inclusive development in Africa: Synthesis report series. INCLUDE. <https://includeplatform.net/wp-content/uploads/2019/07/ID-synthesis-INCLUDE-Final.pdf>
- Zhang, J. (2016). Research on marketing management of small and medium-sized enterprises in my country: Based on the perspective of e-commerce development. *Modern Marketing (Late Journal)*, 8, 24.

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SOCIOLOGY

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THE IMPACT OF DIGITALIZATION AND ARTIFICIAL INTELLIGENCE ON FIRMS' EFFICIENCY: THE MEDIATING ROLE OF DIGITAL INNOVATION

Purpose. This study investigates the impact of digitalization and artificial intelligence (AI) adoption on firms' economic efficiency. In particular, the research examines the role of digital capabilities and attitudes toward AI in stimulating digital innovation and improving organizational economic outcomes.

Design/methodology/approach. Data were collected through a structured questionnaire administered to employees working in organizations undergoing digital transformation, yielding 258 valid responses.

Findings. The empirical analysis was conducted using SmartPLS 4.0 and the partial least squares structural equation modeling (PLS-SEM) technique. The results demonstrate that digital capabilities and favorable attitudes toward AI significantly contribute to the development of digital innovation, which in turn has a positive effect on economic efficiency. The findings confirm the proposed research model and underline the importance of effectively leveraging digital technologies and AI-based solutions to enhance organizational performance.

Originality. This study contributes to the literature review on digital transformation by providing empirical evidence from an emerging economy context. From a practical perspective, the results offer valuable insights for managers and decision-makers seeking to improve economic efficiency through the strategic implementation of digital and AI-driven innovations.

Keywords: Economic Efficiency, Digital Capabilities, Digital Innovation, AI Attitudes.

Introduction

The rapid advancement of digital technologies has fundamentally transformed the way organizations operate and compete in modern markets. In recent years, businesses have increasingly integrated digital tools into their core activities, leading to significant changes in organizational structures, processes, and strategic priorities. Among these technologies, artificial intelligence (AI) has emerged as a particularly important driver of transformation, offering new opportunities to enhance operational efficiency, automate routine tasks, and support more accurate and data-driven decision-making. As companies continue to invest in digital transformation initiatives, the focus is gradually shifting from mere adoption of technologies to understanding their tangible impact on organizational outcomes. In this context, examining how digitalization contributes to economic efficiency has become a critical area of

research. Economic efficiency is not only associated with cost reduction but also with the ability of firms to utilize their resources more effectively, improve productivity, and achieve better financial performance in a competitive environment. Economic efficiency (EE) reflects an organization's ability to achieve optimal economic outcomes while minimizing costs and resource inputs. It is commonly interpreted as the extent to which firms approach their optimal production and financial performance levels (Aparicio et al., 2023). Importantly, economic efficiency is not solely dependent on expanding resources but also on improving the quality of their utilization (Geamanu, 2011). In this regard, digital technologies and AI-based solutions may serve as mechanisms that enhance the productive use of organizational assets and capabilities. A central mechanism linking digital transformation to performance outcomes is digital innovation (DI). Digital innovation refers to the creation and implementation of new products,

services, and business models enabled by digital technologies (Nambisan, 2017). It encompasses not only technological upgrades but also the redesign of processes and value-creation logic within firms (Elia et al., 2020). Organizations that successfully leverage digital innovation are often better positioned to improve adaptability, responsiveness, and long-term competitiveness. The development of digital innovation largely depends on digital capabilities (DC). Digital capabilities describe an organization's ability to integrate, deploy, and reconfigure digital resources effectively (Tams et al., 2014). They enable firms to combine diverse knowledge sources and maintain organizational resilience in rapidly changing environments (Chen et al., 2023). Without sufficient digital capabilities, investments in advanced technologies may fail to generate meaningful economic returns. In addition to structural capabilities, individual perceptions toward AI also play a crucial role in digital transformation processes. Attitudes toward artificial intelligence (AIT) represent employees' cognitive and emotional evaluations of AI technologies and their willingness to adopt them (Satici et al., 2025; Abuadas et al., 2025). Positive attitudes toward AI can facilitate smoother implementation and integration into business operations, whereas skepticism or resistance may hinder digital initiatives. Although previous studies have explored digital transformation, digital innovation, and AI adoption separately, limited empirical attention has been given to their combined effect on firms' economic efficiency, particularly in emerging economy contexts. Therefore, this study aims to examine how digital capabilities and attitudes toward AI influence digital innovation and, subsequently, organizational economic efficiency. By empirically testing this framework, the research seeks to provide a clearer understanding of how digitalization and AI implementation translate into measurable economic outcomes for enterprises.

Literature Review

Artificial Intelligence Attitudes and Economic Efficiency

Artificial intelligence (AI) has increasingly been recognized as a transformative digital technology capable of enhancing economic efficiency and accelerating innovation across various sectors. Recent studies emphasize that AI-driven solutions contribute to sustainable efficiency by improving

information processing quality, optimizing resource allocation, and supporting managerial decision-making (Dejanovic, 2025; Hussain et al., 2023).

Empirical evidence from the European Union indicates that the widespread adoption of AI technologies in priority sectors has led to noticeable improvements in both innovation intensity and economic efficiency. These outcomes are largely attributed to AI's ability to automate routine processes, reduce operational costs, and enhance productivity through data-driven insights (Dejanovic, 2025). Similarly, Hussain et al. (2023) argue that AI serves as a key driver of green economic efficiency by enabling firms to utilize resources more effectively while minimizing waste and inefficiencies.

Beyond technological implementation, organizational attitudes toward AI play a critical role in determining its economic outcomes. Positive perceptions and acceptance of AI facilitate smoother integration into organizational processes, thereby strengthening efficiency gains. Ananyi and Nwosu (2023) demonstrate that in Nigerian public universities, favorable attitudes toward AI adoption significantly improved resource utilization and reduced operational inefficiencies. Organizations that actively support AI implementation tend to achieve higher levels of automation, faster decision-making, and improved financial performance.

Furthermore, Wang, Sun, and Li (2025) highlight that the economic efficiency effects of AI are primarily realized through optimized resource distribution and improved technological processes. Organizations with proactive attitudes toward AI adoption exhibit higher levels of process automation and managerial efficiency, resulting in reduced time costs and enhanced economic outcomes. In addition, Dejanovic (2025) identifies AI as a transformational technology that not only improves economic efficiency but also stimulates digital innovation by increasing organizational readiness for technological change.

Based on these arguments, the following hypothesis is proposed:

H1: AI attitudes positively affects to organizational economic efficiency.

Digital Capabilities and Digital Innovation

Digital capabilities refer to an organization's ability to integrate, reconfigure, and utilize digital technologies and resources to support innovation

and operational transformation. Grounded in dynamic capability theory, digital capability is considered a strategic organizational asset that enables firms to respond effectively to rapidly changing technological environments (Lyytinen, Yoo, & Boland, 2016).

Prior research consistently indicates that organizations with strong digital capabilities are more likely to develop and implement digital innovations. Khin and Ho (2018) argue that enhanced digital capabilities significantly increase a firm's potential to generate digital innovations that improve overall performance. Similarly, Del Giudice et al. (2017) find that firms with advanced digital infrastructure and digitally skilled human capital demonstrate greater readiness to adopt and adapt new digital solutions.

Digital capabilities also foster a culture of experimentation and risk-taking, which further strengthens innovation activities. Organizations with well-developed digital competencies are more inclined to explore new business processes, experiment with emerging technologies, and accelerate innovation cycles. Levallet and Chan (2018) emphasize that digital capabilities function as strategic resources that enable firms to respond rapidly to market changes, thereby transforming digital innovation into a source of competitive advantage.

Accordingly, digital capabilities play a decisive role in shaping the scope and effectiveness of digital innovation within organizations. Firms that successfully mobilize digital technologies and human resources are better positioned to translate technological potential into tangible innovative outcomes.

Based on the above discussion, the following hypothesis is formulated:

H2: Digital capabilities positively affects to digital innovation.

Digital Innovation and Economic Efficiency

Digital innovation is widely acknowledged as a key driver of economic efficiency, particularly in environments characterized by rapid technological change. Innovations based on digital technologies enable organizations to enhance decision-making quality, accelerate data processing, and reduce operational costs, thereby improving overall economic efficiency (Hao et al., 2023).

Empirical studies reveal that digital innovation contributes to economic efficiency by optimizing operational processes and increasing innovation speed. Shah et al. (2023) demonstrate that

organizations actively engaging in digital innovation achieve higher levels of automation in administrative and production processes, leading to more efficient resource utilization and improved financial outcomes. Through the integration of advanced digital solutions, firms are able to streamline workflows, minimize redundancies, and enhance productivity.

Moreover, digital innovation supports structural transformation by reshaping business models and industrial processes. As digital technologies become more accessible, organizations can leverage innovative applications to improve operational efficiency and strengthen long-term competitiveness. Consequently, digital innovation serves not only as a technological outcome but also as a strategic mechanism for achieving sustainable economic efficiency.+

Based on these findings, the following hypothesis is proposed:

H3: Digital innovation positively affects to organizational economic efficiency.

Mediating Role of Digital Innovation between Digital Capabilities and Economic Efficiency

Digital innovation serves as a crucial mediating mechanism that explains how an organization's digital capabilities (DC) translate into economic efficiency (EE). By developing digital capabilities, organizations are better equipped to adopt digital technologies, implement innovative solutions, and enhance business processes. However, the impact of these capabilities on economic efficiency is often realized through the practical application of digital innovation.

Empirical studies support the mediating function of digital innovation. For instance, Khin and Ho (2018) found that digital innovation significantly mediates the relationship between digital capabilities and organizational performance. Their findings suggest that digital capabilities alone do not automatically yield measurable economic benefits; rather, they create the potential that is activated and materialized through digital innovation.

Further evidence indicates that digital capabilities directly foster the development of digital innovation (Liu et al., 2017), while digital innovation itself enhances operational processes and promotes the efficient use of resources, thereby improving economic efficiency (Jahanmir & Cavadas, 2018). Moreover, effective collaboration with external partners combined with strong digital

innovation practices can optimize workflows and resource utilization, further contributing to improved economic outcomes (Pal et al., 2022).

According to affordance theory, the accessibility and usability of digital technologies create new opportunities for organizations. In practice, the availability of digital technologies accelerates digital innovation, increases the speed of implementation, and enhances operational efficiency, ultimately improving the organization's overall economic performance.

Consequently, when digital capabilities are established within an organization, the resulting skills and resources can be applied effectively to real-world business processes through digital innovation. This application enhances operational efficiency and supports overall economic performance. Digital innovation thereby functions as a bridge, linking digital capabilities to economic efficiency. Based on this rationale, considering digital innovation as a mediating variable is both logical and appropriate.

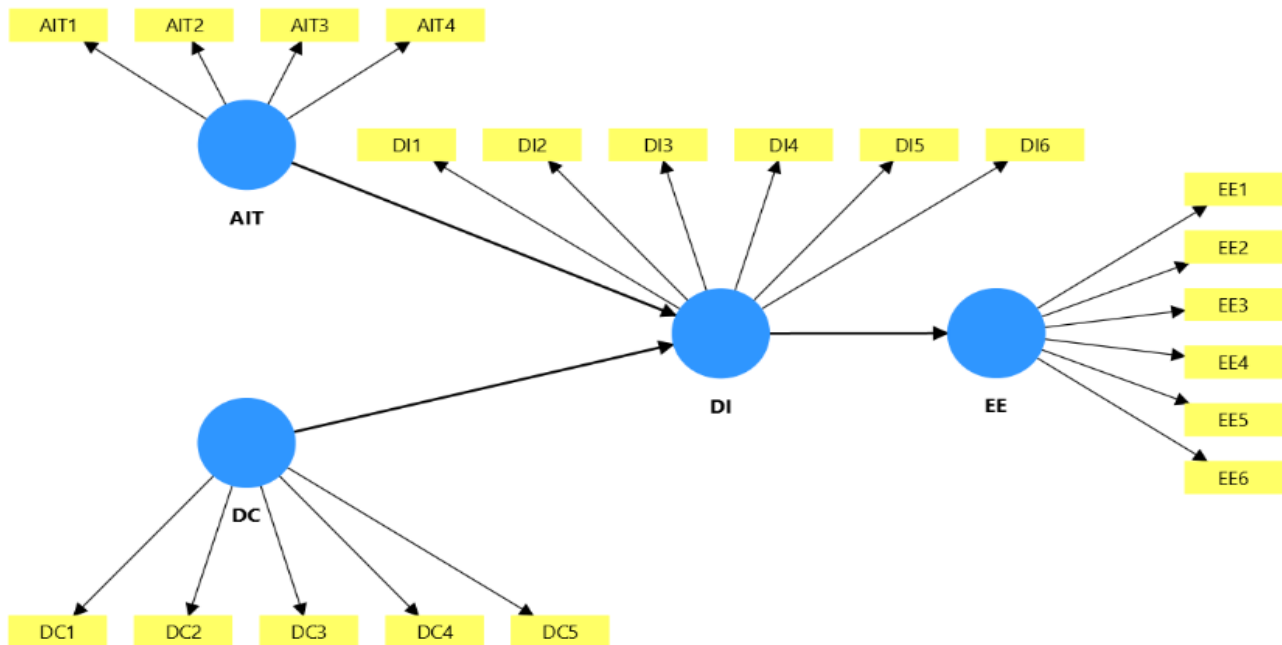
H4: Digital Innovation mediates the relationship between Digital Capabilities and Economic Efficiency.

Methodology

The empirical data for this study were collected using a structured questionnaire survey. A total of 350 questionnaires were distributed among employees of a large industrial enterprise operating in Kazakhstan. In total, 258 completed questionnaires were returned and deemed suitable for further analysis, yielding an adequate response rate.

With respect to the demographic characteristics of the respondents, 48.1% were female and 51.9% were male. The age distribution showed that 46.5% of participants were between 18 and 25 years old, 20.9% were aged 26–35, 15.9% fell within the 36–45 age group, and 16.7% were aged 46 and above. The respondents' work experience ranged from one to twenty-five years, reflecting a heterogeneous sample in terms of professional tenure.

Figure 1
Conceptual Research Model



Measures

The measurement items for all constructs were adapted from previously validated scales in the existing literature. To ensure clarity and consistency, different response formats were applied depending on the nature of each construct.

Economic efficiency was measured using a perceptual scale ranging from “very poor” to “very good”, capturing respondents’ overall assessment of the economic outcomes and performance of their organizations. Digital capabilities were measured on a scale from “very low” to “very high”, reflecting the organization’s ability to develop, integrate, and effectively utilize digital technologies.

AI attitudes and digital innovation were treated as two distinct constructs and measured independently using Likert-type scales ranging from “strongly disagree” to “strongly agree.” The AI attitudes construct captures respondents’ perceptions, acceptance, and overall stance toward the adoption and use of artificial intelligence within the organization, while digital innovation reflects the extent to which organizations implement and develop new digital solutions, processes, and practices.

Economic Efficiency. Following Aparicio, Zofio, and Pastor (2023), economic efficiency refers to the extent to which an organization approaches its optimal economic performance by effectively minimizing costs and maximizing outputs or profits given available resources. The measurement items for economic efficiency (EE) were adapted from Yang, Dong, and Chen (2021) and consisted of six items. All items were measured using a five-point Likert scale. An example item is: *“How would you evaluate the overall economic condition of your company at present?”* The reliability analysis showed that the scale had good internal consistency, with a Cronbach’s alpha coefficient of 0,870.

AI Attitudes. Following Satıcı, Okur, Yilmaz, and Grassini (2025), AI attitudes refer to individuals’ perceptions, acceptance, and emotional responses toward artificial intelligence technologies, reflecting how people evaluate and engage with AI in everyday contexts. The measurement items for AI attitudes (AIT) were adapted from Kukanja (2024) and consisted of four items. All items were measured using a five-point Likert scale. An example item is: *“I am interested in using artificial intelligence in my daily life.”* The reliability analysis showed that the scale had good internal consistency, with a Cronbach’s alpha coefficient of 0,870.

Digital Capabilities. Following Chen, Pan, Liu, and Feng (2023), digital capabilities (DC) are defined as an organization’s ability to integrate diverse knowledge and serve as a key source of knowledge resources necessary for sustaining organizational stability. The measurement items for digital capabilities (DC) were adapted from Khin and Ho (2019) and consisted of five items. All items were measured using a five-point Likert scale. An example item is: *“How would you evaluate your company’s level of adoption of critical digital technologies?”* The reliability analysis showed that the scale had good internal consistency, with a Cronbach’s alpha coefficient of 0,899.

Digital Innovation. Following Nowicka (2019), digital innovation (DI) is defined as the process of developing and implementing new market offerings and business models that emerge through the use of digital technologies. The measurement items for digital innovation (DI) were adapted from Khin and Ho (2019) and consisted of six items. All items were measured using a five-point Likert scale. An example item is: *“To what extent do you consider the quality of your company’s digital solutions to be superior to that of competitors?”* The reliability analysis showed that the scale had good internal consistency, with a Cronbach’s alpha coefficient of 0,925.

For the purpose of data analysis, SmartPLS 4.0 was employed along with the PLS-SEM approach. This software was selected due to its popularity and proven effectiveness for conducting structural equation modeling. Consequently, the analysis produced the following research model.

The mean scores, Cronbach’s alpha, and standard deviation were computed for each measurement item. The Cronbach’s alpha coefficients, used to assess the reliability of the scales, all exceeded the recommended threshold of 0.7. Moreover, the mean values for the items were above 0.6, indicating satisfactory central tendencies.

To further examine our research model, the bootstrapping technique was applied to test the hypotheses related to mediated moderation, utilizing 5,000 bootstrap resamples.

Results

Reliability and Validity Assessment

The measurement model was evaluated using SmartPLS 4 by examining internal consistency

reliability, convergent validity, and discriminant validity.

Internal consistency was assessed through Cronbach's alpha and composite reliability (ρ_a). The Cronbach's alpha coefficients ranged from 0.87 to 0.93, indicating strong internal consistency across all constructs. Similarly, composite reliability values varied between 0.88 and 0.93, exceeding the recommended threshold of 0.70 and confirming the stability of the measurement scales. (See table 1).

Table 1
Reliability and convergent validity of the constructs

Construct	Cronbach's alpha	Composite reliability (ρ_C)	AVE
AIT	0.870	0.881	0.615
DC	0.899	0.896	0.653
DI	0.925	0.911	0.730
EE	0.870	0.931	0.694

Note: Compiled by the author based on SmartPLS 4 output.

Convergent validity was examined using the average variance extracted (AVE). The AVE values ranged from 0.60 to 0.73, which are above the minimum acceptable level of 0.50. These results suggest that the constructs explain a substantial proportion of the variance in their respective indicators. Furthermore, all outer loadings were above 0.70, providing additional support for convergent validity.

Discriminant validity was assessed using both the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT). The square root of AVE for each construct exceeded the inter-construct correlations, satisfying the Fornell–Larcker requirement. In addition, HTMT values ranged from 0.52 to 0.80, remaining below the conservative threshold of 0.85. These findings confirm that the constructs are empirically distinct from one another.

Overall, the measurement model demonstrates satisfactory reliability and validity, supporting the adequacy of the data for subsequent structural model analysis.

The structural model was evaluated using SmartPLS 4.0 along with a bootstrapping procedure of 5,000 resamples. The analysis revealed that all hypothesized relationships were statistically significant. In particular, the effect of AI attitudes (AIT) on digital innovation (DI) was positive and

significant ($\beta = 0.218$, $t = 2.298$, $p = 0.022$), providing support for H1. Similarly, digital capabilities (DC) exerted a strong and significant influence on digital innovation ($\beta = 0.598$, $t = 6.541$, $p < 0.001$), confirming H2. Furthermore, digital innovation positively impacted economic efficiency (EE) ($\beta = 0.522$, $t = 9.049$, $p < 0.001$), supporting H3. (See table 2).

Table 2
Structural paths and hypothesis testing

Path	β	t	p	Decision
AIT $\rightarrow$ DI	0.218	2.298	0.022	Supported
DC $\rightarrow$ DI	0.598	6.541	<0.001	Supported
DI $\rightarrow$ EE	0.522	9.049	<0.001	Supported

Note: Compiled by the author based on SmartPLS 4 bootstrapping output (5,000 resamples).

The mediating role of digital innovation was also examined, and the results confirmed that DI significantly mediates the relationship between digital capabilities and economic efficiency, validating H4. This indicates that the positive effect of digital capabilities on economic efficiency primarily occurs through the development and implementation of digital innovation within the organization.

Regarding the explanatory power of the model, R^2 values indicated satisfactory fit. Digital innovation displayed an R^2 of 0.563, suggesting that approximately 56.3% of its variance is explained by AI attitudes and digital capabilities. Economic efficiency exhibited an R^2 of 0.272, meaning that 27.2% of its variance is accounted for by the model via digital innovation.

Overall, these findings support the theoretical framework and underscore the critical role of both digital capabilities and AI attitudes in fostering digital innovation, which in turn enhances organizational economic efficiency. The results align with previous studies emphasizing that digital resources and innovation serve as key drivers of improved organizational performance.

Discussion and Conclusion

This study provides a comprehensive understanding of how AI attitudes, digital capabilities, and digital innovation interact to influence economic efficiency in organizational

settings. The results highlight the critical role of technological readiness, employee perceptions, and innovative practices in driving organizational performance.

First, our findings indicate that positive attitudes toward AI significantly enhance economic efficiency. Employees' acceptance and favorable perception of AI technologies facilitate smoother integration, better decision-making, and more efficient resource utilization. These outcomes align with previous research demonstrating that AI adoption supports operational optimization and sustainable economic performance (Ananyi & Nwosu, 2023; Dejanovic, 2025).

Second, digital capabilities were confirmed as a key antecedent of digital innovation. Organizations with well-developed digital skills and infrastructure are better able to adopt innovative solutions, experiment with new processes, and adapt to dynamic market conditions. This is consistent with prior studies emphasizing that investment in digital competencies strengthens an organization's capacity to transform technological potential into practical innovations (Pan, Liu & Feng, 2023; Khin & Ho, 2019).

Third, digital innovation mediates the relationship between digital capabilities and economic efficiency. The results show that the benefits of digital capabilities are realized when organizations translate these capabilities into innovative solutions that improve operational processes, resource utilization, and overall economic outcomes. Digital innovation, therefore, acts as a bridge, converting technological potential into measurable efficiency gains and sustainable advantages (Nowicka, 2019; Pal et al., 2022).

Importantly, our findings are supported by affordance theory, which posits that the availability and accessibility of digital technologies create actionable opportunities for organizations. Organizations with strong digital capabilities are able to leverage these affordances to develop new solutions, enhance operational efficiency, and increase economic performance. Similarly, employees' positive attitudes toward AI enable organizations to capitalize on the potential of AI technologies, turning theoretical affordances into tangible organizational and economic benefits.

Overall, the study underscores the interconnected nature of AI attitudes, digital

capabilities, and digital innovation in driving organizational efficiency. Organizations that actively cultivate positive AI perceptions, strengthen digital skills, and foster innovative practices are better positioned to achieve operational improvements, enhance economic outcomes, and sustain competitive advantages.

In conclusion, this research makes both theoretical and practical contributions. Theoretically, it extends the literature review on digital transformation by demonstrating how digital capabilities and AI attitudes translate into economic efficiency through digital innovation. Practically, the results suggest that organizations should focus on fostering favorable AI attitudes, developing robust digital capabilities, and encouraging the implementation of innovative digital solutions. By doing so, firms can effectively convert technological opportunities into sustained economic performance and long-term competitive benefits.

Practical Implications

This study highlights the practical significance of fostering digital capabilities, promoting positive AI attitudes, and implementing digital innovation to enhance economic efficiency within organizations. By developing employees' skills and building strong digital capabilities, organizations can leverage digital technologies more effectively, enabling the creation and implementation of innovative solutions that improve operational processes and resource utilization.

Digital innovation, as a mediating factor, facilitates the translation of digital capabilities into tangible economic outcomes, allowing firms to optimize workflows, automate routine tasks, and focus on higher-value activities. Moreover, positive attitudes toward AI accelerate the adoption and integration of AI-driven solutions, ensuring that organizations can fully capitalize on technological affordances.

In practice, organizations aiming for sustainable economic performance should invest in digital skill development programs, encourage experimentation and innovation, and foster a culture of openness toward AI technologies. These strategies can improve decision-making, enhance productivity, and strengthen long-term competitive advantages, while simultaneously preparing employees to adapt to evolving digital environments.

Limitations and Future Research

This research has several limitations that should be addressed in future studies. First, the study relied on data collected from a single context, which may limit the generalizability of the findings. Future research could expand the sample to include multiple organizations across different sectors and regions to strengthen external validity.

Second, all measurements were based on self-reported survey items, which may introduce subjective or methodological biases. Future studies could complement survey data with objective performance metrics or longitudinal observations to obtain a more robust understanding of the relationships between digital capabilities, digital innovation, AI attitudes, and economic efficiency.

Third, while this study focused on AI attitudes, digital capabilities, digital innovation, and economic efficiency, other variables such as organizational culture, leadership style, and employee engagement may also influence these relationships. Future

research could explore additional mediators or moderators to provide a more comprehensive model of digital transformation in organizations.

Acknowledgements and Conflict of Interest

The author declares no conflicts of interest related to this study. No acknowledgements are applicable.

Author Contributions

Conceptualization, B.R.; Methodology, B.R.; Software, B.R.; Validation, B.R. and Y.S.; Formal Analysis, B.R. and Y.S.; Investigation, B.R.; Resources, B.R.; Data Curation, B.R.; Writing – Original Draft Preparation, B.R., Y.S. and D.Y.; Writing – Review & Editing, B.R., Y.S. and D.Y.; Visualization, B.R.; Supervision, Y.S.; Project Administration, B.R. and Y.S.

References

- Abuadas, M., Albikawi, Z., & Rayani, A. (2025). The impact of an AI-focused ethics education program on nursing students' ethical awareness, moral sensitivity, attitudes, and generative AI adoption intention: A quasi-experimental study. *BMC Nursing*, 24, 720. <https://doi.org/10.1186/s12912-025-03458-2>
- Ananyi, S. O., & Nwosu, L. K. (2023). Artificial intelligence and economic aspects of Nigerian public universities.
- Aparicio, J., Zofio, J. L., & Pastor, J. T. (2023). Decomposing economic efficiency into technical and allocative components: An essential property. *Journal of Optimization Theory and Applications*, 197, 98–129. <https://doi.org/10.1007/s10957-023-02188-2>
- Chen, C., Pan, J., Liu, S., & Feng, T. (2023). Impact of digital capability on firm resilience: The moderating role of coopetition behavior. *Business Process Management Journal*, 29(7), 2167–2190. <https://doi.org/10.1108/BPMJ-02-2023-0095>
- Dejanović, M. (2025). The role of artificial intelligence in enhancing economic efficiency and innovation. *Forum for Economic and Financial Studies*, 3(1), 1541. <https://doi.org/10.24294/feFs1541>
- Del Giudice, M., Della Peruta, M. R., & Tarba, S. (2017). The impact of IT-based knowledge management systems on internal venturing and innovation: A structural equation modeling approach to corporate performance. *Journal of Knowledge Management*, 20(3), 484–498.
- Elia, G., Margherita, A., & Passiante, G. (2020). Digital entrepreneurship ecosystem: How digital technologies and collective intelligence are reshaping the entrepreneurial process. *Technological Forecasting and Social Change*, 150, 119791.
- Geamănu, M. (2011). Economic efficiency and profitability.
- Hao, X., Wen, S., Xue, Y., Wu, H., & Hao, Y. (2023). How to improve environment, resources and economic efficiency in the digital era? *Resources Policy*, 80, 103198.
- Jahanmir, S. F., & Cavadas, J. (2018). Factors affecting late adoption of digital innovations. *Journal of Business Research*, 88, 337–343.
- Khin, S., & Ho, T. C. F. (2019). Digital technology, digital capability and organizational performance. *International Journal of Innovation Science*, 11(2), 177–195. <https://doi.org/10.1108/IJIS-08-2018-0083>
- Kukanja, M. (2024). Examining the impact of entrepreneurial orientation, self-efficacy, and perceived business performance on managers' attitudes towards AI and its adoption in hospitality SMEs. *Systems*, 12(12), 526.
- Levallet, N., & Chan, Y. E. (2018). Role of digital capabilities in unleashing the power of managerial improvisation. *MIS Quarterly Executive*, 17(1), 1–17.
- Lyytinen, K., Yoo, Y., & Boland, R. J., Jr. (2016). Digital product innovation within four classes of innovation networks. *Information Systems Journal*, 26(1), 47–75.
- Nambisan, S., Lyytinen, K., Majchrzak, A., & Song, M. (2017). Digital innovation management: Reinventing innovation management research in a digital world. *MIS Quarterly*, 41(1), 223–238.
- Satici, S. A., Okur, S., Yilmaz, F. B., & Grassini, S. (2025). Psychometric properties and Turkish adaptation of the artificial intelligence attitude scale (AIAS-4): Evidence for construct validity. *BMC Psychology*, 13, 297. <https://doi.org/10.1186/s40359-025-02505-6>

Shah, N., Zehri, A. W., Saraih, U. N., Abdelwahed, N. A. A., & Soomro, B. A. (2024). The role of digital technology and digital innovation towards firm performance in a digital economy. *Kybernetes*, 53(2), 620–644. <https://doi.org/10.1108/K-01-2023-0124>

Zhang, Z., Yousaf, Z., Radulescu, M., & Yasir, M. (2021). Nexus of digital organizational culture, capabilities, organizational readiness, and innovation: Investigation of SMEs operating in the digital economy. *Sustainability*, 13(2), 720. <https://doi.org/10.3390/su13020720>

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