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Investigating the Economic and Productivity Effects of Digital Transformation in Project Management

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***Abstract*: Project management is being reshaped by artificial intelligence (AI), cloud computing, automation, data analytics, and digital project management platforms. Yet the expected economic and productivity gains are not always realized due to execution costs, skills gaps, integration challenges, and organizational resistance. This study analyses the effects of digital transformation on economic efficiency, productivity, workflow optimization, and project delivery, and examines the link between employee digital competency and transformation success. A mixed-methods design was used: a quantitative survey of 100 project employees and semi-structured interviews with 10 employees. Quantitative analysis employed frequencies, percentages, and descriptive statistics; qualitative data were analyzed thematically. Overall, perceptions of digital transformation were positive: 68%–78% agreed or strongly agreed that digital technologies improve cost efficiency, resource use, project performance, workflow efficiency, productivity, and delivery outcomes. Moreover, 74% associated higher employee digital competency with improved project results. Five themes emerged: economic efficiency and cost optimization; productivity and workflow optimization; employee digital competency; leadership and organizational culture; and data-driven decision-making and risk mitigation. Key hurdles remain: execution costs, resistance to change, skills gaps, and data quality. The study concludes that successful digital transformation depends on employee competence, effective leadership, organizational readiness, and disciplined execution conditions that can enhance project performance and economic value.**

***Keywords*: Digital Transformation, Project Management, Economic Efficiency, Productivity, Workflow Optimization, Digital Competency, Project Performance.**

1. Introduction

Organizations increasingly treat digital transformation as a strategic priority to enhance efficiency, productivity, and competitiveness (Tomenko, 2024). The adoption of AI, cloud computing, automation, big data analytics, IoT, and integrated digital platforms has transformed how projects are planned, executed, and monitored. Digital transformation extends beyond new software; it entails embedding digital technologies into processes, decision-making, and operating models (Misiura, 2026). In this context, technological innovation and process optimization can boost productivity (Jove ski et al., 2023), with AI, green, and energy technologies further influencing productivity outcomes (Qu et al., 2025).

Project management is particularly affected due to complex activities, information intensity, geographically distributed teams, and tight cost–time constraints (Kehinde, 2025). Digital project management systems provide real-time information, automate routine tasks, improve communication, and enable evidence-based decisions. These capabilities help managers track progress, identify risks, allocate resources, and coordinate activities more effectively. Project management is recognized as essential to the success of digital transformation initiatives (Caruso et al., 2022), and modern technologies coupled with sound project practices can optimize processes (Stelmach, 2024).

Digital transformation can improve economic efficiency by reducing administrative burdens, improving resource allocation, and accelerating decision-making (Taylor, 2026; Farooq, 2026). However, benefits may be constrained by high execution costs, limited digital competencies, resistance to change, and organizational under-preparedness. As Hasan (2024) notes, digital transformation cannot be achieved without aligned management and technology.

A. Problem Statement

Despite its promise, digital transformation does not always deliver expected improvements in economic efficiency and productivity. Investments in digital platforms can be substantial, yet under-exploited or disrupted if implementation is weak. Organizations may deploy advanced tools without developing employee capabilities or aligning technology with existing project processes. Digital transformation should therefore be viewed through a management lens, not solely as technology execution (Hasan, 2024).

Empirical evidence remains dispersed across industries and contexts. While positive correlations exist between digital transformation and productivity, innovation, and efficiency, fewer studies focus directly on economic efficiency and productivity within project management settings. Prior work outlines productivity implications (Jove ski et al., 2023; Qu et al., 2025) and considers digital technologies in production and project environments (Stelmach, 2024), and Farooq (2026)

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explores digital transformation strategy from a project management perspective. Nevertheless, further empirical research is needed to understand how organizational context translates digital transformation into tangible project-level benefits.

Accordingly, it is important to investigate whether digital transformation enhances project efficiency and productivity, and what role employee digital competency plays in successful transformation. Understanding these relationships can inform investment decisions and prevent mismatches between technology spending and project outcomes.

B. Research Aim

To investigate the process of digital transformation and its impact on economic performance and productivity in project management environments.

C. Research Objectives

- To measure the degree of economic efficiency improvement through digital transformation in project management processes.
- To determine the effectiveness of digital project management tools in improving productivity, workflow efficiency, and timely project delivery.
- To examine the correlation between employee digital competency and the success of digital transformation in project management.

D. Research Questions

- How effective is digital transformation in terms of economic efficiency in project management processes?
- How do digital project management tools affect productivity, workflow streamlining, and timely project completion?
- How does employee digital skill relate to the successful execution of digital transformation in project management?

E. Significance of the Study

This study clarifies how digital transformation can improve economic efficiency and productivity in project management. Academically, it links digital transformation to employee digital competence, project-level efficiency, and productivity. Practically, the findings help project managers and organizational decision-makers assess digital investments. The study highlights the potential of digital tools to improve resource use, workflows, productivity, and delivery, while underscoring the need for employee competence and effective project governance (Carujo et al., 2022). It also supports organizations in shaping digital strategies that create value when applied appropriately through technological innovation and effective execution (Alojail & Khan, 2023; Stelmach, 2024). Overall, the study integrates technological and human perspectives to illuminate measurable improvements in project management performance.

2. Literature Review

A. Digital Transformation in Project Management

Digital technologies are increasingly integrated into project planning, execution, monitoring, and control. Digital transformation encompasses technology, processes, organisational practices, and decision-making. Chen et al. (2025) identify digital transformation as a growing domain in project management research, as new technologies alter coordination and management of project activities. AI, automation, cloud platforms, data analytics, and digital collaboration systems drive this shift.

In project management, AI supports prediction, planning, risk assessment, and decision-making (Vergara et al., 2025). In construction, AI is particularly crucial for decision-making, risk management, and efficiency (Adebayo et al., 2025). Digital transformation also depends on organizational skills and leadership. Digital transformation capability relates to organizational performance, and digital leadership relates to digital transformation capability, indicating that technology must be led strategically to create value (Zhang et al., 2025). Sacavém et al. (2025) reinforce the significance of leadership and emphasize employee engagement and organizational support. The Resource-Based View (RBV) helps explain how digital resources can positively influence project performance (Willie, 2025). Accessibility to AI, analytics, and employee digital skills on digital platforms can be a major asset, but technology alone is insufficient; effective leadership, employee capabilities, and organizational readiness are required.

Overall, digital transformation is an interaction of technology, people, and organization. Organizational factors play an important role, particularly in incumbent SMEs (Seppänen et al., 2025). Digital transformation presents opportunities to improve information access, decision-making, automation, and coordination, contingent on organizational readiness, leadership, and staff capacity to apply technologies effectively.

B. Digital Transformation and Economic Efficiency

Digital transformation is increasingly linked to economic efficiency as technologies can reduce operational costs, optimize resource use, and boost productivity. Economic efficiency in project management includes resource allocation, reduced administrative costs, optimized workflows, and the ability to execute activities within planned time and budget. Karimjonova et al. (2026) identify digital transformation as a factor that can promote economic productivity.

Automation is a key mechanism. Automating repetitive administrative and reporting tasks helps streamline manual work, avoid errors, and refocus employee time on higher-value tasks. Sampaio and Silva (2025) illustrate how digital technologies can revolutionise organisational processes and boost operational efficiency; while focused on accounting, their findings have implications for project contexts with substantial administrative and information-processing activities.

Digital transformation can also generate economic value via innovation and enhanced organisational capabilities. Wang and

Zhang (2025) show that digital adoption, digital drive, and digital culture are interdependent and affect innovation performance in SMEs, implying that economic gains depend on organisational conditions that facilitate effective technology use. Asbeetah et al. (2025) similarly show that innovation performance and green knowledge acquisition can be supported by digital transformation for sustainable performance.

Leadership is a critical factor in realizing economic outcomes from digital investment. Tanveer et al. (2025) find that digital transformation capability and digital leadership are significantly related to organisational performance. Thus, digital transformation should be viewed not merely as a technology investment but as an organisational change process.

C. Digital Tools, Productivity, and Workflow Optimization

Digital tools are increasingly essential to boost productivity and optimize workflows (Alemede, 2025). Automation, AI, digital collaboration, workflow management, and data-driven applications can minimize manual tasks, enhance coordination, and facilitate quicker decision-making. Digital tools enable higher productivity through faster task completion and better coordination of resources, information, and activities across the project life cycle (Muntaka et al., 2025).

Recent research highlights benefit for workflow efficiency. Sarta (2026) notes that digital tools enhance workflow efficiency through better task coordination, information management, and process visibility. Koirala (2026) emphasizes automation tools as crucial for minimizing repetitive tasks and enhancing organisational processes, enabling employees to allocate time to activities requiring judgement, problem-solving, and decision-making—particularly important in project management where delayed responses can affect timing and resource use.

Process and production optimization further improve productivity. Chiscop et al. (2025) show that digital tools can enhance manufacturing processes through improved process control and workflow optimization. Yusuf et al. (2025) emphasize workflow optimization to improve production efficiency, noting that streamlined workflows reduce inefficiencies and maximize resources. In project contexts, digital workflow systems provide managers with visibility into task progress, dependencies, and resource requirements.

AI enhances these benefits by enabling intelligent, collaborative workflows. Rathinavel et al. (2026) outline AI's role in supporting human collaboration and interaction with digital systems, helping teams identify inefficiencies before they become major delays and using data analysis, forecasting, task prioritisation, and decision support to inform decisions. However, digital connectivity can pose challenges; Bondanini et al. (2025) highlight its dual effect, underscoring the need to consider employee welfare alongside productivity gains.

Overall, digital tools can boost productivity and streamline processes through automation, enhanced visibility, resource coordination, and AI-driven decision-making, provided they are used correctly, employees are capable, and integration with existing project processes is achieved.

D. Employee Digital Competency and Digital Transformation

Employee digital competency is increasingly recognised as a key factor in the success or failure of digital transformation initiatives and their impact on project outcomes (Amayreh et al., 2025). Digital competency extends beyond software proficiency to include analyzing digital information, adapting to new technologies, communicating via digital means, and using technology to make project decisions. Ahmad Nadzim and Abdul Halim (2025) indicate that digital competency can enhance employee agility and empowerment, enabling digitally competent employees to better adapt to evolving project needs. Dao et al. (2025) identify digital workforce training and digital behaviour as important determinants of employee performance, noting that technology investments must be accompanied by workforce training and a shift in digital behaviours.

This aligns with Dewi et al. (2025), who find that digital competence relates to performance and highlight the role of self-efficacy and organisational support. Competency should not be considered in isolation; staff need training, leadership support, and opportunities to apply digital skills. Cyfert et al. (2025) argue that digital advantage is achieved through the collaboration of organisational culture, leadership, and competence. Thus, adopting a complex project management system without building employee capacity may lead to underutilization, resistance, and minimal economic return.

From an RBV perspective, employee digital competency can be seen as a strategic organisational resource that enables firms to turn digital technologies into valuable operational outcomes (Willie, 2025). Competitors may access similar software, AI, and automation systems, but the capability of employees to embed these systems into project processes can be a unique capability (Salimimoghadam, 2025). This focuses attention on whether employee digital competency relates to successful digital transformation beyond mere technology use.

A persistent digital skills gap remains. Zhou et al. (2025) identify gaps between graduates' digital skills and employer requirements, and Archana (2025) notes rising demand for competency training as AI becomes more prevalent. Continuous upskilling and reskilling are therefore needed to ensure transformation effectiveness. Digital competency is both a barrier and an enabler to digital transformation, providing a foundation for exploring its link to transformation success in project management.

E. Organisational Readiness and Leadership Support

The success of digital transformation depends on organisational readiness and leadership support (Anuar, 2025). Digital technologies enable automation, analytics, and collaboration, but their value is realized only if embedded into ways of working and existing structures. Shanti et al. (2025) find that organisational culture, transformational leadership, and emotional intelligence influence employees' readiness for change, indicating that transformation involves changing the organisational context in which employees understand, embrace, and engage in new ways of working.

Digital transformation often requires changes to established practices, roles, and decision-making processes, making

leadership support crucial. Sacavém et al. (2025) highlight leaders' roles in setting strategic direction, supporting employees, and encouraging technology uptake. Khan et al. (2025) report that transformational leadership can enhance readiness for change via psychological empowerment and workgroup support, implying that leadership can indirectly affect project outcomes by preparing staff to adopt digital technologies.

Readiness is particularly important in technologically demanding contexts. Jonathan et al. (2025) note that AI execution success goes beyond access to cutting-edge technology, requiring organisational readiness. Adebayo et al. (2025) uncover significant AI potential in construction project management but note the requirement for organisational and human skills to facilitate deployment. Lack of skills, poor leadership buy-in, resistance to change, and weak organisational processes could reduce hoped-for economic and productivity gains.

The Technology–Organization–Environment (TOE) Framework (Tornatzky & Fleischer, 1990) helps explain this relationship. TOE posits that technological readiness, organisational characteristics, and environmental pressures must align for successful technology adoption. Willie (2025) proposes that digital resources generate value for firms with capabilities to use them effectively. Leadership support and organisational readiness can thus be seen as complementary organisational capabilities that facilitate economic efficiency and project benefits from digital resources, consistent with Zhang et al. (2025) on digital transformation capability, digital leadership, and organisational performance.

Readiness is not static; ongoing leadership involvement, staff training, and organisational change are required as technologies evolve. Organisational readiness and leadership support are enablers that can contribute to better economic efficiency, productivity, workflow efficiency, and project delivery in the context of digital transformation.

F. Theoretical Framework

This study combines multiple theories to analyse the impact of digital transformation on economic efficiency, productivity, workflow optimization, and project delivery, as no single theory can explain the technological, organisational, and human aspects of digital transformation in project management.

- *Resource-Based View (RBV)* (Barney, 1991) explains how organisational performance improves through application of organisational resources. In project management, digital platforms, AI, cloud systems, data analytics, and employee digital skills are resources that can enable better resource allocation, decision-making, and operational efficiency (Willie, 2025), aligning with this study's focus on economic and productivity advantages.
- *Technology–Organization–Environment (TOE) Framework* (Tornatzky & Fleischer, 1990) provides an adoption-oriented perspective, defining technology execution in terms of technological readiness, organisational conditions, and environmental pressures. This study suggests that leadership support, employee skills, organisational readiness, digital infrastructure, and external efficiency requirements may impact successful execution of digital project management technologies (Sacavém et al., 2025).
- *Socio-Technical Systems Theory* (Trist & Emery, 1951) emphasizes the interaction of technological and human systems. Digital transformation requires more than technology; it requires employees with competency and collaboration. This theory underpins the study's focus on the relationship between employee digital competence and successful transformation.
- *Dynamic Capabilities Theory* (Teece, Pisano, & Shuen, 1997) explains how organizations persistently adjust and restructure resources in response to the environment. Technology learning, process redesign, and adjustment are essential for digital transformation, offering a potential explanation for productivity and economic efficiency benefits in more adaptive organizations.
- *Diffusion of Innovation Theory* (Rogers, 2003) provides insight into how digital technologies are taken up and integrated in organizations, helping to understand the distribution of digital maturity and project teams' opinions and adoption of new technology.

Together, these theories offer a multi-dimensional approach to investigating digital transformation, employee capability, organisational readiness, economic efficiency, and project performance.

G. Research Gap

While digital transformation benefits are documented, gaps remain. First, studies often examine specific industries (e.g., construction, manufacturing, public services) but not their impacts on economy-wide or project productivity (Adebayo et al., 2025; Qadir et al., 2025; Jonathan et al., 2025). Second, previous studies often emphasize technology adoption or productivity alone, neglecting how workflow optimization and delivery timelines are interrelated (Karimjonova et al., 2026; Chiscop et al., 2025; Imam, 2025).

Third, while employee digital competency's role in successful digital transformation in project management is gaining attention, empirical studies directly exploring this relationship are limited (Ahmad Nadzim & Abdul Halim, 2025; Dao et al., 2025; Dewi et al., 2025). Moreover, the literature presents organisational readiness and leadership as enabling conditions rather than linking them to digital resource use and employee capabilities in an integrated analysis (Shanti et al., 2025; Sacavém et al., 2025; Cyfert et al., 2025). This study empirically investigates these gaps, drawing on RBV, TOE, Dynamic Capabilities, Socio-Technical Systems, and Diffusion of Innovation theories.

3. Methodology

The methodology explores the impact of digital

transformation (DT) on economic efficiency, productivity, workflow optimization, and timely project delivery, as well as the correlation between employee digital competency and successful execution of digital transformation.

A. Research Philosophy

A pragmatic research philosophy is adopted, as the research problem addresses a practical issue using both numerical evidence and participants' experiences. Pragmatism suits mixed-methods research, allowing selection of methods best suited to answering the research questions without committing to purely objective or subjective approaches (Gamage, 2025). This study uses quantitative data to provide measurable evidence related to digital transformation, economic efficiency, productivity, and project delivery, and qualitative data to understand employees' experiences, digital competency, organisational readiness, and barriers to technology adoption.

B. Research Design

A mixed-method design was employed, collecting quantitative and qualitative data during the study period. The quantitative survey provides a structured analysis of respondents' project management digital transformation experiences and perceptions (Creswell & Inoue, 2025), using Likert-scale items for standardized measurement and statistical comparison. The qualitative component involves semi-structured interviews, allowing participants to discuss issues not adequately captured by fixed-response questionnaires (Adeoye-Olatunde, 2021). Together, the two components explore both measurable outcomes and real-world experiences of digital transformation.

C. Population and Sampling

The target population comprises employees involved in project management and the application of digital project management technologies. For the quantitative component, 100 respondents were selected through stratified sampling to represent different project roles (e.g., project managers, coordinators, analysts, technical staff), preventing overrepresentation of one occupational group (Barcaroli, 2014). For the qualitative component, purposive sampling was used to select 10 participants with experience using digital project management tools and the ability to offer informed views on digital transformation (Campbell, 2020).

D. Data Collection

Primary data were collected via structured online questionnaires and semi-structured interviews. The survey comprised Likert-scale statements measuring perceptions of digital transformation and its effects on economic efficiency, productivity, workflow optimization, and timely project delivery (Wakelin, 2025). The questionnaire was made available online to facilitate participation and ensure wider reach. Semi-structured interviews were conducted to gain detailed qualitative information (Bhalla, 2023), exploring participants' experiences, productivity gains, hurdles, training and competency demands, leadership support, and organisational readiness. Appropriate consent was obtained prior to conducting and recording interviews (where relevant).

E. Data Analysis

Frequencies, percentages, and descriptive analyses were used to identify patterns in the quantitative data, providing an overview of digital technology use and perceptions of its impact on project outcomes. Thematic analysis was chosen to analyse qualitative interview data; responses were coded and summarized into recurring themes (Braun & Clarke, 2023). Analyzed areas included productivity indicators, patterns of digital tool use across projects, resistance to change, and execution hurdles. Results from both components were integrated to formulate a holistic interpretation of digital transformation and project performance.

F. Ethical Considerations

All research activities adhered to ethical principles. Participation was voluntary, and participants were informed of the study's purpose before consenting. Respondents were not asked for unnecessary personal information, and anonymity and confidentiality were respected during analysis and reporting (Hasan, 2021). Interview participants were briefed on the recording process (if used) and given the option to refuse or opt out. These measures addressed participants' rights, privacy, and autonomy.

4. Results

This section presents findings from the quantitative survey and qualitative thematic analysis, including respondent profiles, survey response patterns, and main themes from qualitative data.

A. Respondent Profile

The survey included 100 respondents quantitatively analyzed to conclude on the impact of digital transformation on competency, economic efficiency, productivity, and employee performance on project outcomes.

1) Age Distribution

- 18–25 years: 16 (16%)
- 26–35 years: 38 (38%)
- 36–45 years: 28 (28%)
- 46–55 years: 12 (12%)
- Above 55: 6 (6%)

The age distribution shows that 38% of respondents were aged 26–35 and 28% were aged 36–45, with 16% aged 18–25 and 18% aged 46 or above. This mix offers insights from both younger and older generations on digital transformation in project management.

2) Gender Distribution

- Male: 62 (62%)
- Female: 38 (38%)

Gender distribution shows 62% male and 38% female respondents, providing a broad sample for examining perceptions of digital transformation in project-based working systems.

3) Years of Experience in Project-Based Work

- Less than 2 years: 12 (12%)

- 2–5 years: 26 (26%)
- 6–10 years: 30 (30%)
- 11–15 years: 18 (18%)
- More than 15 years: 14 (14%)

The experience profile indicates that the largest proportion (30%) had 6–10 years of experience, with 26% having 2–5 years and 18% having 11–15 years. Respondents with over 15 years and limited experience were also represented, enhancing assessment of digital transformation, productivity, workflow, and project performance from both operational and strategic perspectives.

B. Main Quantitative Findings

The quantitative results summarize respondents' perceptions of project success, workflow optimization, economic efficiency, resource utilization, employee digital competency, and organisational digital maturity.

1) Digital Transformation, Project Delivery, and Team Productivity

- Q4 (Improved overall project performance): 34% strongly agree, 38% agree → 72% positive
- Q5 (Increased success rate of project delivery): 36% strongly agree, 40% agree → 76% positive
- Q6 (Increased team productivity via digital PM tools): 39% strongly agree, 37% agree → 76% positive

Overall, project management outcomes are perceived positively in the context of digital transformation. Limited negative perceptions are reflected in relatively low disagreement (10%–12% across Q4–Q6). Neutral responses range from 12% to 16%, possibly due to variation in organisational setup, employee skills, or extent of technology use. These findings indicate that digital transformation is significantly related to project performance, aligning with the first and second research objectives.

2) Digital Tools, Workflow Optimization, and Project Delays

- Q7 (Streamlined workflows and reduced delays): 35% strongly agree, 40% agree → 75% positive
- Q8 (Reduced manual workload via automation/digital platforms): 42% strongly agree, 36% agree → 78% positive
- Q9 (Reduced operational and project-related costs): 30% strongly agree, 38% agree → 68% positive

Findings indicate generally positive perceptions of digital transformation's effects on workflow efficiency, workload, and project management costs. Real-time scheduling, collaboration tools, and automated tracking can improve coordination and allow early identification of delays. Automation and digital platforms play a part in reducing workload, meaning less repetitive admin work and more time for complex project aspects. However, the relatively high neutral response for Q9 (18%) suggests that execution quality, investment costs, and organisational preparedness may influence financial benefits. Overall, digital transformation execution can improve productivity and economic efficiency, but not uniformly across organizations.

3) Digital Technologies and Resource Utilization Efficiency

- Q10 (Improved efficient use of resources: time, budget, manpower): 36% strongly agree, 40% agree → 76% positive
- Q11 (Projects supported by digital systems achieve better financial performance): 32% strongly agree, 38% agree → 70% positive
- Q12 (Employees have necessary digital skills to use project technologies effectively): 30% strongly agree, 42% agree → 72% positive

Results show a generally positive correlation between digital technologies, resource use, financial results, and employee digital competency. Digital resource tracking, scheduling, and project management systems could help allocate and track project resources. The comparatively high neutral response for Q11 (18%) suggests that digitalization gains may be less tangible in some cases. The 72% agreement for Q12 reinforces the significance of employee competency in translating technology investment into project benefits, though collective neutral and negative feedback indicate remaining skills shortages in some organizations. Overall, results indicate a relationship between technology, financial efficiency, and staff skill, consistent with the study's focus on digital transformation and project performance.

4) Digital Competency, Digital Maturity, and Project Performance

- Q13 (Higher employee digital competency leads to better project outcomes): 34% strongly agree, 40% agree → 74% positive
- Q14 (Organizations with higher digital maturity achieve better productivity results): 38% strongly agree, 36% agree → 74% positive
- Q15 (Economically, digitally mature organizations perform better in project environments): 34% strongly agree, 38% agree → 72% positive

Findings show consistently positive perceptions of the relationship between employee digital competency, organisational digital maturity, and project outcomes. Staff with better digital skills may be more effective at utilizing project technologies in planning, monitoring, communication, and decision-making. Productivity gains rely not just on using digital tools, but on how they are embedded throughout organisational processes. Neutral responses on these three questions suggest that digital benefits may differ depending on execution quality, employee capacity, and organisational context. Low disagreement rates (12%) indicate little opposition. Overall, findings support the study's hypotheses that employee digital competency and organisational digital maturity are key factors in productivity, project performance, and economic efficiency.

C. Thematic Findings

Ten participants were interviewed on the impact of digital transformation on economic efficiency, productivity, and employee competency in project management. Thematic analysis yielded five main themes.

1) Economic Efficiency and Cost Optimization

Qualitative results indicate that digital transformation can improve economic efficiency, cost savings, financial visibility,

resource allocation, and operational accuracy. P1 noted that "cloud-based project management systems, AI-based monitoring and digital dashboards enable real-time tracking of financial and resource usage," allowing managers to identify waste, redirect budgets, and accelerate financial decisions. P3 reported that "procurement automation and material tracking reduced delays, paperwork, and material losses," and P4 commented that "automated alerts help in reducing scheduling and budgeting errors, which would have led to cost overruns in the past."

However, significant barriers were noted. P5 highlighted high software and system integration costs and employee training costs initially, and P6 noted that employee resistance may limit anticipated efficiencies. P7 emphasized that "poorly integrated digital technologies yield limited savings," aligning with Karatu (2023) on the importance of efficient digital integration to address administrative inefficiencies. Overall, this theme underscores cost savings, resource optimization, and improved financial decision-making through digital transformation, while emphasizing the need for skilled, ready employees capable of integrating and utilizing technology.

2) Enhanced Productivity and Workflow Streamlining

The second theme highlights digital tools as useful for delivering projects and improving workflow efficiency and timely delivery. Participants discussed improvements via digital dashboards, automated processes, and AI-powered analytics affecting task management, resource allocation, and project planning. P8 shared that "agile dashboards and automated trackers have increased team productivity by prioritizing tasks and ensuring accountability," and P9 explained that "AI-powered predictive analytics have helped reduce the risk of delays by reallocating resources before they occur."

Participants also noted easier working processes. P1 described automated procurement approvals and document tracking streamlining delays, while P2 highlighted centralized cloud systems eliminating duplication and enabling real-time collaboration. P3 noted that routine administrative tasks were streamlined and automated, giving staff more time for valuable tasks. Results show that digital systems can improve coordination, eliminate decision-making delays, and improve information flow. However, proper use of technology is essential. P6 commented, "When it comes to digital tools, not everything is appropriate for all projects," and P7 added, "Too much automation without human input can lead to mistakes." Overall, with proper use and necessary staff understanding and management, digital tools can increase productivity, enhance processes, and deliver on time.

3) Employee Digital Competency and Skill Development

Results highlight the need for employee digital competency to successfully implement digital transformation and achieve project results. P1 stated: "Digital tools can be the most sophisticated and if staff are not skilful, these tools do not achieve intention," emphasizing technology as a user-friendly tool for productivity and efficiency. P2 found that projects with very skilled staff had better resource allocation, lower error rates, and faster project completion.

Ongoing training was highlighted as a key enabler. P3 noted continuous training on new tools, webinars, and real-world sessions, while P4 noted mentoring by more experienced staff. P5 emphasized frequent interactions with AI systems and digital dashboards to build confidence in data-informed decision-making. However, P6 raised concerns about resistance to change, and P7 noted that older workers may need additional support. P8 highlighted the need to develop problem-solving, adaptability, and collaboration alongside digital skills. Overall, digital competency is not merely knowledge and skills but also adaptability, communication, and problem-solving. Continuous training, mentoring, and reskilling are needed to maximise technology-enabled productivity and project performance (Kashemsanta, 2024).

4) Leadership Support and Organisational Culture

Results indicate that leadership support and organisational culture are crucial to successful digital transformation. P1 emphasised the importance of managerial commitment, guidance, and ongoing support to encourage and motivate employees to use digital tools. P2 wrote, "A culture that allows for experimentation and learning allows employees to embrace digital platforms without fear of failure," meaning supportive cultures can foster innovation and diminish technology resistance (Xue, 2024). Several leadership practices supporting adoption were identified: P3 highlighted mentorship, communication, and feedback; P4 stated digital tools must support organisational goals; P5 said, "If leaders would listen to the concerns of employees and continually assist employees, then they are more likely to accept new systems"; and P6 emphasised recognition and rewards to foster continued adoption.

Organisational culture was also seen as playing a role in developing collaboration and accountability. P8 noted that transparency, learning, and accountability help teams work together effectively with digital technologies, and P9 mentioned that cultural support is essential to ensure digital initiatives are part of normal organisational functioning. Overall, leadership provides strategic direction and resources, and organisational culture fosters learning, experimentation, and acceptance, contributing to enhanced digital competency, productivity, and successful project outcomes (Mogaji, 2024).

5) Data-Driven Decision-Making and Risk Mitigation through Digital Tools

Results indicate that digital tools support data-driven decision-making and risk mitigation by providing real-time data, predictive analysis, and process control. P1 said, "We'll know the status of the project in real time thanks to the fact that we will have project metrics on our fingertips," enabling project managers to detect bottlenecks and act on new risks before escalation. P2 pointed out that predictive models can anticipate delays and cost overruns early, enabling proactive adjustments to resources and schedules. Automation was also highlighted as key to minimizing error. P4 explained that "automated workflows eliminate the possibility of human error that may occur when manually typing data or repeating tasks," and P5 said standardized digital processes help eliminate inconsistencies across teams and lessen human error, enhancing

accuracy, monitoring, and project control (Pricopoaia, 2025).

However, participants emphasised the need for quality data and employee analytical capacity. P8 spoke about the pitfalls of using poor-quality data, and P9 about the need to understand dashboards and analytics. P10 stressed the need for ongoing training on data interpretation. Overall, real-time monitoring, predictive analytics, and automation lead to earlier risk identification, faster corrective action, and more reliable project outcomes.

5. Discussion

This section elaborates on the study's findings with reference to the literature and theory, explaining the effects of digital transformation on project performance, productivity, workflow optimization, economic efficiency, and project delivery, and highlighting commonalities, extensions, and possible disagreements with previous research.

A. Discussion of Findings in Relation to Previous Literature

Results strongly suggest that digital transformation is positively related to project performance, productivity, and delivery. Specifically, 72% reported a positive effect on overall project performance (Q4), 76% agreed that digital technologies are key to project delivery success (Q5), and 76% reported increased team productivity using digital project management tools (Q6). These results align with Chen et al. (2025), who find digital transformation increasingly significant in project management as it becomes more reliant on AI, automation, cloud-based systems, analytics, and collaboration tools. The findings suggest that digital transformation is not merely about technology but about new ways of organizing, monitoring, and controlling project activities.

The Resource-Based View (RBV) helps explain the positive relationship between digital transformation and project performance. When integrated, digital platforms, cloud systems, AI applications, and data analytics are valuable organisational resources. Willie (2025) argues that digital resources add value if firms have the capacity to utilize them. Current results support this, with respondents viewing these resources as directly impacting project performance and delivery. Neutral figures for Q4–Q6 (12%–16%) indicate that benefits are not felt by all, implying that having technology does not necessarily translate into better results and that organisational capacity remains relevant.

Results on workflow optimization and productivity confirm previous studies. 75% agreed or strongly agreed that digital tools simplify processes and minimize project delays, in line with Sarta (2026) on digital tools increasing workflow efficiency through better task coordination, information management, and process visibility. Muntaka et al. (2025) state that digital technologies enhance productivity by coordinating information, resources, and activities across the project lifecycle. Current results validate these arguments, with participants explicitly noting dashboards, automated task tracking, and cloud-based systems enhancing coordination and monitoring.

Qualitative findings further explain this relationship. P8 noted agile dashboards and automated task trackers helped with task prioritisation and accountability, and P9 said AI-powered predictive analytics helped predict delays and redistribute resources. These align with Rathinavel et al. (2026), who propose AI can supplement human efforts by analyzing data, forecasting, prioritizing tasks, and providing guidance. Thus, improved productivity is not automatic but brought about by technologies' capacity to enhance visibility, coordination, and decision-making.

One of the most impressive findings was under automation: 78% agreed or strongly agreed that automation and digital platforms decreased manual workloads (Q8). This resonates with Sampaio and Silva (2025), who state automation and AI introduction changes repetitive processes and makes them more efficient, and with Koirala (2026), who states automation can decrease repetitive tasks and enhance workflow processes. Qualitative evidence corroborates this, with P3 stating automation facilitated reduction of repetitive admin tasks and gave employees time for more value-added tasks.

However, findings offer a more sobering argument than merely "automation is good." P6 explained there isn't one tool for all projects, while P7 added that over-automation without human input or judgment can lead to mistakes. This resonates with the double-edged nature of digital connectivity underlined by Bondanini et al. (2025) and the importance of considering human and organisational factors alongside productivity benefits. Thus, automation should be used in conjunction with human judgment, not instead of it.

The study also revealed a positive relationship between digital transformation and economic efficiency. 68% agreed or strongly agreed that digital transformation reduced operational and project costs (Q9). Furthermore, 76% agreed digital systems enhanced use of time, budget, and manpower (Q10), while 70% agreed projects using digital systems had higher financial performance (Q11). These results correspond to Karimjonova et al. (2026), who associate digital transformation with improving economic productivity and efficiency, and to Sampaio and Silva (2025), who find automation can reduce human effort and boost efficiency.

Qualitative results provide a picture of how these economic benefits could be realized. P1 and P2 viewed cloud-based systems, AI monitoring, and digital dashboards as opportunities to improve financial transparency and resource management. P3 noted less material loss, delays, and paperwork due to procurement automation and material tracking. Overall, this is consistent with Wang and Zhang (2025), who argue digital adoption and digital culture can support innovation performance when organisational conditions are conducive, and with Tanveer et al. (2025), who stress digital transformation capability and leadership are crucial for delivering organisational performance from technology investment.

Notably, however, the current study reveals drawbacks to the economic value of digital transformation. The 18% neutral response rate for Q9 was relatively high compared with several other questions. Initial software costs, employee training, and system integration were cited by interview participants, indicating economic benefits may be delayed and organizations

might face high execution costs in the short term. Thus, results complement prior research by suggesting digital transformation should be considered a long-term strategic investment rather than expecting immediate cost savings.

Results on employee digital competency are especially significant. 72% agreed or strongly agreed that employees had digital skills to effectively use project technologies (Q12), and 74% agreed that better-prepared employees in terms of digital competency lead to better project outcomes (Q13). These support Amayreh et al. (2025), who found digital competency a critical factor influencing digital transformation effectiveness, and align with Dao et al. (2025), who state training employees and digital behaviour increase employee performance.

Qualitative results support these findings. P1 said it was essential for workers to have the right skills to benefit from sophisticated digital tools, and P3 said continuous education, webinars, and practical sessions were important for adapting to new tools. P4 discussed mentoring as a tool for increasing employee capability. These align with Dewi et al. (2025), who highlight self-efficacy and organisational support in bridging the gap between digital competence and employee performance.

From an RBV perspective, employees' knowledge, skills, and abilities are a strategic asset. Organizations can access the same software, platforms, and AI systems, but their effectiveness at leveraging these technologies can vary widely. Salimimoghadam et al. (2025) propose that organisational capacity to integrate technology can generate unique value. These results suggest technology and employee capability should be viewed as complementary resources, contributing to Socio-Technical Systems Theory where technology enhancements must be matched with human capabilities, collaboration, and organisational practices.

Results on digital maturity further support this argument. 74% felt organizations that were more digitally mature had better productivity (Q14), and 72% felt digitally mature organizations had more positive economic performance in project environments (Q15). This indicates that being digitally mature is more significant than mere adoption. This aligns with Zhang et al. (2025), who associate digital transformation capability with organisational performance, and Wang and Zhang (2025), who show digital adoption, digital drive, and digital culture interact to influence organisational outcomes.

Results also highlight the need for organisational preparedness and leadership support. Interviewees consistently stated leadership is key in inspiring staff, offering resources, and linking digital programs to organisational goals. P1 indicated managerial commitment was a factor in adoption, and P2 pointed to a culture of experimentation and learning as reducing fear of failure. These corroborate Sacavém et al. (2025) and Shanti et al. (2025), who found leadership essential in digital transformation and that organisational culture and leadership are closely related to employee readiness for change.

The TOE framework offers a suitable explanation. TOE suggests that, apart from technological characteristics, organisational conditions and environmental factors must be present for successful technological adoption. Current results confirm this relationship, as digital tools benefited more when employees were skilled, leaders were supportive, and organisational processes were prepared for change. Jonathan et al. (2025) found organisational readiness and technological opportunities key drivers of AI adoption. Hence, the research offers empirical evidence for the organisational component of TOE.

Finally, qualitative results on data-driven decision-making and risk mitigation prove digital transformation can reinforce managerial responsiveness. Real-time dashboards, predictive analytics, and automated reporting were identified mechanisms for finding delays, cost overruns, and resource issues in early stages. These corroborate Sourav et al. (2025) on AI-driven forecasting in resource allocation and project deliveries, and Qadir et al. (2025) on digital technologies in project control and information management.

However, interviews revealed an important constraint: data-driven decision-making success requires data quality and employee analytical skills. P8 pointed out that poor-quality data leads to poor outcomes, and P9 emphasised employees need familiarity with dashboards and analytics. This provides a balanced view on digital transformation's significance. A digital system can improve decision-making, but when data is wrong or misinterpreted, wrong decisions will be made. Thus, principles of technology, data governance, employee training, and managerial decision-making must be followed in digital transformation.

The findings support the study's conclusion. Digital transformation was perceived as improving project performance, productivity, workflow efficiency, resource utilization, financial results, and delivery timelines. However, benefits are not guaranteed. Factors affecting effectiveness include employee digital competency, leadership support, organisational readiness, digital maturity, system integration, and data quality. The findings validate application of RBV, TOE, Dynamic Capabilities Theory, Socio-Technical Systems Theory, and Diffusion of Innovation Theory, explaining different levels of technology acceptance and digital maturity. Taken together, digital transformation is more than technology adoption; it is a mindset shift affecting technology, people, leadership, and adaptive capabilities.

6. Summary of Findings

Findings indicate that, in all situations, digital transformation has a positive impact on project performance, productivity, and economic efficiency. Quantitative findings show most respondents (72%–78%) agreed or strongly agreed that digital technologies positively impact project performance, delivery, team productivity, workflow efficiency, and reduction of manual workloads. Digital transformation also helped with resource utilization (76%), financial performance (70%), and cost reduction (68%). Employee digital competency was identified as a key enabler, with 72% stating they have adequate digital skills and 74% stating better digital competency relates to better project outcomes. Similarly, 74% agreed digital maturity would boost productivity and 72% agreed it would boost economic performance.

Qualitative results support these findings in five themes: economic efficiency and cost optimization; improved productivity and streamlined workflows; employee digital competency and skill development; leadership support and organisational culture; and data-driven decision-making and risk mitigation. Interviews highlighted advantages of cloud platforms, automation, AI and analytics, dashboards, and integrated project systems in minimizing waste, enhancing coordination, enabling timely decisions, and reducing risk. Nonetheless, hurdles were identified, including execution costs, lack of acceptance of change, skills shortages, data quality, and systems integration. Overall, results indicate digital transformation is a tool for successful projects, effective operation, productivity, and economic results, particularly in combination with highly qualified personnel, effective management, and a culture of a flexible organization.

7. Conclusion and Recommendations

This section provides a brief overview of main findings to answer the research questions, academic implications, and managerial and policy implications.

A. Conclusion

The study investigated how digital transformation impacts economic efficiency, productivity, workflow optimization, and project performance using a mixed-method design (100 questionnaires and 10 interviews). Overall results are positive: digital transformation is correlated and associated with improvements in project performance, productivity, resource efficiencies, and economic efficiency. However, technology alone is not effective as a predictor of success. Conditions for digital investment to yield measurable project benefits include employee digital competency, leadership support, organisational readiness, digital maturity, and effective execution.

The first research goal focused on digitalization supporting economic efficiency. Findings revealed 68% agreed or strongly agreed digital transformation saved money in operations and projects, while 76% agreed it helped maximise use of time, budget, and manpower. Similarly, 70% reported investments in digital systems showed improved financial results on projects. Qualitative results showed these effects through budget visibility, automated reporting, automated procurement, resource monitoring, and reduced administrative burden. Thus, economic efficiency is attainable by minimizing waste, maximizing resources, and improving financial management with digital transformation.

The second goal was to achieve highest productivity and workflow to ensure timely project delivery. Results are very positive: 75% said digital tools improved project efficiency and reduced delays, while 78% said automation reduced manual workloads. Furthermore, 76% agreed or strongly agreed digital project management aids increased team productivity. Interviews identified dashboards, automated task tracking, cloud-based collaboration, and predictive analytics as means to enhance coordination and identify potential delays. Findings show digital transformation could positively affect effective project delivery, information visibility, reduction of repetitive work, and faster corrective actions.

The third objective considered employee digital competency. 74% strongly agreed or agreed digital competency improves project outcomes, while 72% agreed their employees have adequate digital competency. Qualitative data identified continuous learning, mentoring, experience, and flexibility as important. This represents the human capacity aspect of digital transformation: the best systems aren't worth using unless employees know how to use them and are confident doing so.

Additionally, the study confirms the importance of digital organisational maturity and management support. 74% of respondents reporting their organization's digital maturity were more productive, while 72% believed digitally mature organizations outperform economically. Other factors affecting adoption included leadership commitment, organisational culture, communication, and continued support. Findings validate digital transformation as an organisational change process, not simply a technology investment.

B. Key Contributions and Implications

Academically, the study provides empirical evidence of the relationship between digital transformation and economic efficiency, productivity, workflow streamlining, and project efficiency, demonstrating the complementary meaning of employee competency and organisational conditions. This validates the RBV approach, as digital technologies and employee skills are valuable organisational resources. It also supports the TOE model with emphasis on organisational readiness and leadership. Dynamic Capability Theory is relevant as digitally mature organizations continuously learn and reconfigure resources, while Socio-Technical Systems Theory explains matching technological systems with capabilities.

Managerially, organizations should not view digital transformation as merely acquiring new software. Managers should create a project processes inventory to determine technology systems that can provide value-added, measurable processes. In addition to investment, staff training, mentoring, and continuous skill development should be considered. Managers must implement automation judiciously, ensuring automated processes are still supervised by humans as needed. Project decision-making should be supported by digital dashboards, predictive analysis, and real-time monitoring for increased visibility and early warnings of risks and delays.

Policy implications include encouraging development of digital skills through professional training, reskilling, and lifelong learning programs. Policies on digital infrastructure, AI use, data governance, and cybersecurity should continue building digital transformation effectiveness. Small organizations should be targeted where financial and technical barriers to going digital may exist; these hurdles can be reduced through training programs, digital capability initiatives, and technology adoption guidance.

C. Limitations of the Study

Several limitations should be considered when interpreting

findings. First, the study focused on a relatively small number of respondents (100 survey, 10 interviews), limiting generalisability to all project management situations. Second, the cross-sectional design means perceptions were collected at one time, making it impossible to determine digital transformation effects over the longer term. Third, many quantitative findings were derived from self-reported data, including actual project costs, productivity, return on investment, and project timelines. Lastly, results may not apply to settings that are not equally technologically advanced, as digital transformation differs across sectors and organizations.

D. Future Research

Suggestions for future research to overcome these limitations include:

- *Larger and diverse samples:* Involve a larger sample across different industries and organizations to enhance generalizability (Naji, 2024).
- *Cross-country comparisons:* Contrast developed with developing economies to understand drivers of infrastructure, digital readiness, regulations, and workforce skills on transformation outcomes.
- *Longitudinal research:* Study the impact of digital transformation on productivity, costs, employee adaptation, and return on investment over time.
- *Advanced technologies:* Investigate AI, predictive analytics, intelligent automation, and machine learning applications for project scheduling, risk management, and resource allocation.
- *Leadership and culture:* Explore links between digital, transformational, and participative leadership, organisational culture, technology adoption, and project performance.
- *Qualitative case studies:* Conduct in-depth organisational case studies to deepen understanding of execution barriers, employee experiences, and successful digital transformation practices.

Overall, digital transformation is a key contributor to economic efficiency, productivity, workflow optimization, and project performance. However, it can only work if effective execution is ensured, employees are competent, leadership is supportive, organizations are ready and digitally mature. The key message is that organizations should adopt a comprehensive approach, investing in technology, human capital development, organisational development, and supportive leadership. This enables more stable project performance and long-term economic value from digital transformation.

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