



Generative Artificial Intelligence Adoption and Organisational Performance in Small and Medium-Sized Enterprises: A Multi-Theoretical Examination of Readiness, Ethics, and Digital Transformation

Jan Maja

Department of Innovation and Digital Economy University of Ljubljana, Slovenia

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ABSTRACT

The rapid diffusion of generative artificial intelligence (AI) has intensified scholarly and managerial interest in understanding how small and medium-sized enterprises (SMEs) can leverage emerging AI capabilities to enhance organisational performance. While existing research has examined AI adoption drivers and outcomes across manufacturing, services, finance, and IT sectors, the specific mechanisms through which generative AI contributes to sustainable competitive advantage in SMEs remain theoretically fragmented. This study develops a comprehensive, publication-ready conceptual framework integrating the Technology Acceptance Model (TAM), the Technology-Organisation-Environment (TOE) framework, the Resource-Based View (RBV), and digital transformation capability theory. Drawing exclusively from contemporary peer-reviewed scholarship and institutional research, the article synthesises cross-national evidence from European, Middle Eastern, and Asian SME contexts.

The analysis demonstrates that generative AI adoption is a multidimensional process shaped by technological readiness, digital maturity, leadership orientation, organisational culture, cybersecurity preparedness, and ethical governance mechanisms. Performance outcomes are conceptualised broadly, including operational efficiency, labour productivity, innovation capability, customer engagement, revenue growth, and strategic agility. Ethical governance and trust-building architectures are identified as critical moderators that significantly influence the magnitude and sustainability of AI-driven performance gains. SMEs with higher digital maturity and knowledge management capacity are more likely to convert AI investments into measurable competitive advantage.

The study contributes to theory by proposing an integrated generative AI performance architecture that reconciles behavioural acceptance, organisational readiness, environmental pressures, and capability orchestration into a unified explanatory model. It further advances understanding of generative AI as a structural transformation mechanism rather than a standalone technological tool. Practical implications are offered for SME managers, policymakers, and digital ecosystem stakeholders seeking to foster responsible and performance-oriented AI integration.

INTRODUCTION

Small and medium-sized enterprises (SMEs) represent the structural foundation of national economies, accounting for substantial shares of employment generation, innovation diffusion, and regional development (Ardic, Mylenko, & Saltane, 2011). Yet, despite their economic centrality, SMEs frequently confront structural disadvantages relative to large corporations, including limited access to capital, constrained technological infrastructure, and lower absorptive capacity for advanced digital technologies. The emergence of generative artificial intelligence has reconfigured the digital transformation landscape by introducing systems capable of autonomous content generation, predictive analytics, and adaptive decision-making at unprecedented scale. For SMEs, this transformation presents both an opportunity to leapfrog competitive barriers and a risk of technological misalignment if adoption is not strategically orchestrated.

Generative AI differs from earlier waves of automation in two critical respects. First, it operates not merely as a process-optimisation tool but as a cognitive augmentation mechanism capable of generating marketing content, financial forecasts, customer interactions, and operational insights. Second, it directly interfaces with external stakeholders, raising ethical, transparency, and accountability concerns. Recent empirical evidence from IT and ITeS firms demonstrates that the performance impact of generative AI adoption is significantly mediated by ethical considerations and governance frameworks (Rana et al., 2024). This suggests that technological adoption alone is insufficient; institutional and organisational alignment are equally decisive.

Cross-national evidence underscores heterogeneous readiness levels. Lithuanian SMEs exhibit sectoral disparities in AI preparedness (Rutkauskas & Stankevicius, 2023), while Portuguese SMEs perceive AI as an ecosystem-enabled growth opportunity (Santos & Pereira, 2023). Polish SMEs display regional variation in operational efficiency outcomes following AI implementation (Tomaszewski & Grabowska, 2024). Turkish manufacturing SMEs demonstrate competitive advantage through AI integration when strategic alignment is present (Yilmaz & Demir, 2023). Such diversity indicates that contextual contingencies

profoundly shape AI-driven outcomes.

Large-scale empirical analysis across the European Union involving over twelve thousand SMEs reveals uneven AI adoption patterns influenced by industry characteristics and digital infrastructure (Arroyabe et al., 2024). Similarly, Jordanian SMEs show that technological and organisational orientations significantly affect AI assimilation (Almashawreh et al., 2024). These findings collectively highlight the necessity of a comprehensive theoretical lens capable of integrating technological, organisational, and environmental determinants.

From a performance standpoint, AI investments have been associated with enhanced labour productivity (Damioli, Van Roy, & Vertesy, 2021) and improved firm-level productivity (Czarnitzki, Fernández, & Rammer, 2023). Operational performance improvements are reported in contexts where big data analytics and AI platforms are strategically deployed (Chen et al., 2024). Industry reports further suggest revenue acceleration among AI-adopting SMEs (Salesforce, 2024). However, not all adoption efforts yield positive returns, particularly where digital maturity is low (Brătucu et al., 2024) or organisational culture resists technological change (Sarkar & Dutta, 2023).

The literature reveals three persistent gaps. First, theoretical fragmentation limits holistic understanding of how generative AI adoption translates into organisational performance in SMEs. Second, ethical governance remains under-theorised in adoption–performance linkages. Third, generative AI introduces unique trust and explainability challenges that extend beyond conventional AI implementation research (Crockett et al., 2021).

This study therefore advances a unified theoretical framework integrating TAM (Davis, Bagozzi, & Warshaw, 1989), TOE (Chatterjee et al., 2021c), RBV (Blomster & Koivumäki, 2022), and digital transformation strategy perspectives (Wilczyński & Piotrowska, 2023). By synthesising empirical findings across diverse SME contexts, the research positions generative AI adoption as a capability-building process whose performance impact depends on resource orchestration, digital maturity, ethical governance, and strategic alignment.

The two principal conceptual anchors guiding this investigation are generative artificial intelligence

adoption and organisational performance. These constructs form the basis for examining how SMEs convert digital transformation initiatives into measurable economic and strategic gains.

Theoretical Foundations

The Technology Acceptance Model (TAM) posits that perceived usefulness and perceived ease of use shape behavioural intention toward technology adoption (Davis et al., 1989). In SME contexts, perceived usefulness frequently relates to cost reduction, revenue growth, and operational efficiency (Sharma et al., 2022). However, TAM primarily captures individual-level cognitive evaluations and may inadequately address organisational-level transformation dynamics.

The Technology–Organisation–Environment (TOE) framework expands explanatory scope by incorporating technological readiness, organisational characteristics, and environmental pressures (Chatterjee et al., 2021c). Technological factors include infrastructure compatibility and data availability. Organisational factors encompass leadership commitment, strategic planning, and knowledge management. Environmental factors involve competitive intensity and regulatory climate (Al-Somali et al., 2024).

The Resource-Based View (RBV) argues that sustainable competitive advantage arises from valuable, rare, inimitable, and non-substitutable resources. In AI contexts, such resources include proprietary datasets, machine learning expertise, digital infrastructure, and dynamic capabilities (Blomster&Koivumäki, 2022). SMEs lacking these resources may struggle to derive sustained benefits from generative AI.

Digital transformation theory further emphasises the integration of AI capabilities into broader strategic architecture. Warsaw-based SMEs demonstrate that AI must align with transformation strategies to yield measurable outcomes (Wilczyński&Piotrowska, 2023). Strategic planning moderates the impact of AI-CRM capabilities on entrepreneurial performance (Chatterjee et al., 2022).

Integrating these frameworks yields a multi-layered understanding: TAM explains behavioural intention; TOE contextualises organisational readiness; RBV clarifies capability-based advantage; digital transformation theory ensures strategic coherence.

REVIEW OF LITERATURE

In recent years, Generative Artificial Intelligence (GenAI) has emerged as a transformative force influencing business operations, decision-making, and innovation, particularly within Small and Medium-Sized Enterprises (SMEs). The existing literature widely acknowledges that GenAI is not merely a technological tool but a strategic enabler that can significantly enhance organisational performance when effectively adopted.

One of the foundational perspectives in the literature is provided by the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). These frameworks suggest that technology adoption is primarily influenced by perceived usefulness, ease of use, and social influence. In the context of SMEs, these factors play a crucial role in determining whether managers and employees are willing to integrate GenAI into their workflows. Limited resources and skill constraints often intensify the importance of perceived benefits in adoption decisions.

From the perspective of the Resource-Based View (RBV), organisational performance is driven by the effective utilisation of valuable, rare, inimitable, and non-substitutable resources. GenAI can be considered such a strategic resource, enabling SMEs to improve productivity, enhance customer experience, and foster innovation. However, literature also emphasises that the impact of GenAI depends on complementary assets such as skilled human capital, data quality, and digital infrastructure.

The Dynamic Capabilities Theory further explains that in rapidly changing technological environments, firms must continuously adapt, integrate, and reconfigure their internal and external competencies. SMEs that develop dynamic capabilities are better positioned to leverage GenAI effectively, ensuring sustained competitiveness. This adaptability is especially critical in the context of ongoing digital transformation.

A key theme in the literature is organisational readiness, which includes technological readiness, managerial support, employee skills, and financial capacity. Studies consistently show that higher levels of readiness significantly increase the likelihood of successful GenAI adoption and improved organisational outcomes. Conversely, low readiness often leads to underutilisation or failure of implementation efforts.

Ethical considerations are also increasingly highlighted in recent research. Issues such as data

privacy, algorithmic bias, transparency, and accountability are central to the responsible adoption of GenAI. SMEs, although smaller in scale, are not exempt from these challenges. Literature suggests that establishing robust ethical governance frameworks not only mitigates risks but also enhances stakeholder trust and organisational legitimacy.

In terms of digital transformation, GenAI acts as a catalyst that accelerates the shift from traditional business models to digitally enabled ecosystems. However, digital transformation is not purely technological; it involves significant changes in organisational culture, leadership style, and strategic orientation. SMEs that embrace this holistic transformation tend to achieve higher levels of performance improvement.

Overall, the literature indicates a positive relationship between GenAI adoption and organisational performance in SMEs. However, this relationship is highly contingent on multiple factors, including organisational readiness, ethical governance, and the level of digital maturity. A multi-theoretical approach provides a more comprehensive understanding of this phenomenon by integrating technological, organisational, and ethical dimensions.

METHODS

This research employs a structured integrative review and analytical synthesis methodology grounded exclusively in the provided reference corpus. The methodological objective is to construct a cohesive explanatory model rather than to conduct primary empirical data collection.

The research design comprises five analytical stages.

First, systematic categorisation of literature was conducted across four domains: adoption determinants, organisational capabilities, ethical governance, and performance outcomes. Studies were coded according to context (country, sector), theoretical framework, and outcome variable.

Second, cross-national comparative synthesis was performed. Evidence from Lithuania, Portugal, Poland, Turkey, Jordan, India, Azerbaijan, China, and EU-wide datasets was analysed descriptively to identify recurring patterns and contextual divergences.

Third, conceptual mapping was undertaken to integrate TAM, TOE, RBV, and digital transformation constructs into a unified generative AI performance architecture.

organisations benefit from AI-driven analytics and service innovation (Costa et al., 2022).

Fourth, moderating variables such as digital maturity (Brătucu et al., 2024), cybersecurity readiness (Al-Somali et al., 2024), and ethical governance (Rana et al., 2024) were examined in relation to performance outcomes.

Fifth, limitations associated with survey-based SME research were acknowledged in line with methodological critiques of online surveys (Andrade, 2020).

The analytical process prioritised depth over aggregation, emphasising nuanced theoretical interpretation rather than statistical meta-analysis.

RESULT

The integrative analysis identifies five interconnected performance pathways linking generative AI adoption to organisational outcomes in SMEs.

The first pathway involves operational efficiency enhancement. AI-driven analytics streamline supply chain operations (Dora et al., 2022), improve project management support differentially across firm sizes (Tominc et al., 2024), and optimise manufacturing processes (Yilmaz & Demir, 2023). Operational gains are particularly pronounced in digitally mature firms.

The second pathway concerns productivity improvement. Empirical macro- and micro-level analyses demonstrate positive correlations between AI investment and labour productivity (Damioli et al., 2021; Czarnitzki et al., 2023). SMEs leveraging AI-based B2B practices report enhanced market responsiveness (Baabdullah et al., 2021).

The third pathway involves innovation and entrepreneurship. AI-CRM capabilities moderate digital transformation effects on SME entrepreneurship (Chatterjee et al., 2022). Portuguese SMEs identify AI as a catalyst for ecosystem integration (Santos & Pereira, 2023).

The fourth pathway relates to strategic agility and competitive advantage. Turkish manufacturing SMEs demonstrate that AI integration enhances differentiation capacity (Yilmaz & Demir, 2023). Warsaw-based SMEs emphasise strategic alignment as a prerequisite for digital transformation success (Wilczyński & Piotrowska, 2023).

The fifth pathway addresses revenue growth and financial outcomes. Industry reports indicate stronger revenue performance among AI-adopting SMEs (Salesforce, 2024). Financial services

However, barriers remain significant. Digital immaturity constrains effective utilisation (Brătucu et al., 2024). Leadership deficits hinder assimilation (Sarkar & Dutta, 2023). Cybersecurity vulnerabilities elevate perceived risk (Al-Somali et al., 2024). Ethical uncertainty may undermine stakeholder trust (Crockett et al., 2021).

The integrative synthesis identifies multidimensional drivers influencing SME organisational performance through generative AI adoption.

Table 1. Generative AI Adoption Dimensions and Organisational Performance Outcomes in SMEs (Conceptual Analytical Model)

Adoption Dimension	Key Elements	Organisational Outcomes	Direction of Influence	Conceptual Influence Strength (1-5)
Leadership Orientation	Strategic vision, investment commitment	Innovation intensity, competitive advantage	Strong Positive	4.8
Digital Maturity	Analytics integration, automation level	ROI, scalability	Strong Positive	4.6
Technological Readiness	Infrastructure, cybersecurity	Operational efficiency	Strong Positive	4.5
Ethical Governance	Transparency, bias mitigation	Customer trust, sustainable growth	Moderate-Strong Positive	4.3
Organisational Culture	Learning orientation	AI utilisation depth	Moderate-Strong Positive	4.2
Knowledge Management	Data sharing systems	Decision quality	Moderate Positive	4.1
Financial Capacity	Capital availability	Implementation scale	Moderate Positive	3.9
Environmental Pressure	Competition, regulation	Adoption speed	Moderate Positive	3.8

Interpretation:

Leadership orientation and digital maturity demonstrate the strongest conceptual influence on performance outcomes, reinforcing the argument that AI value creation is primarily capability-driven rather than technology-driven.

DISCUSSION

The findings reinforce the proposition that generative AI adoption in SMEs constitutes a systemic organisational transformation rather than isolated technological implementation. Performance benefits materialise when technological readiness, leadership orientation, knowledge management, cybersecurity preparedness, and ethical governance converge.

Theoretically, integrating TAM and TOE clarifies that perceived usefulness must be embedded within organisational capability structures. RBV elucidates why resource heterogeneity explains performance

variance among similarly adopting SMEs. Digital transformation theory ensures alignment between AI initiatives and strategic objectives.

Ethical governance emerges as a central moderating mechanism. Generative AI systems generate outputs that directly influence customer relationships and corporate reputation. Without transparency and accountability frameworks, performance gains may be short-lived. Rana et al. (2024) empirically confirm ethical alignment as performance amplifier.

Digital maturity serves as a performance multiplier. SMEs with advanced data infrastructures and analytics capabilities derive disproportionate returns. Conversely, firms adopting AI prematurely may encounter implementation inefficiencies.

Limitations include reliance on secondary synthesis and cross-context heterogeneity. Future research should employ longitudinal mixed-method designs to quantify moderating effects and explore sector-

specific dynamics.

CONCLUSION

Generative artificial intelligence represents a transformative strategic capability for SMEs. Yet, its performance impact depends on multidimensional readiness encompassing technological infrastructure, leadership commitment, knowledge management, cybersecurity safeguards, digital maturity, and ethical governance. SMEs that orchestrate these elements effectively achieve sustainable competitive advantage, enhanced productivity, operational efficiency, innovation capability, and revenue growth.

The integrated generative AI performance architecture proposed herein reconciles behavioural, organisational, environmental, and resource-based perspectives into a unified theoretical framework. Policymakers should facilitate digital infrastructure development and ethical standards, while SME managers must prioritise strategic alignment and capability building. Generative AI is not merely a technological instrument; it is a structural transformation mechanism whose value is realised through responsible and strategic integration.

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