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The Impact of Artificial Intelligence on Technology Management and Organizational Performance

[1] **Hamza Farooq**
[2] **Sara Mahmood**

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Abstract

Artificial intelligence (AI) is now a key technology management issue as it alters the way organisations are able to acquire, deploy, govern and derive value from their digital resources. This paper reviews literature from the last five years to assess how AI is affecting technology management practices and organizational performance, conducting an integrative review of relevant peer-reviewed literature and policy evidence. The paper builds on the resource-based view, the dynamic capabilities and the technology–organization–environment view, conceptualizing AI as a capability and not just a tool. The synthesis suggests a correlation between AI adoption and better operational efficiency, data-centric decision making, innovation, adapting to market needs, and, in an enabling environment, financial and non-financial performance. But these advantages hinge upon complementary assets like digital infrastructure, managerial and technical abilities, data quality, governance and employee preparedness. The review also pinpoints obstacles including resource limitations, technological intricacy, moral doubt, and organizational change reluctance. It claims that the technology management is an intervening variable between investing in AI and achieving greater results, with organizations achieving better results when AI is linked to strategy, integrated into routine and innovative processes, and complemented by learning mechanisms. The study makes a significant contribution to the field of AI-enabled technology management by providing a capability-based framework and practical implications for managers looking to transform the adoption of AI into long-term organizational success. Further studies are warranted with longitudinal and multi-level designs for exploring causality, governance, workforce results, and cross-sectoral and firm size performance differences.

Keywords: *AI, technology management, organizational performance, dynamic capabilities, AI adoption, digital transformation, innovation*

[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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1. Introduction

AI has transitioned from being a specialized computational discipline to a broad technology that influences all aspects of contemporary businesses. The potential of AI systems lies in repetitive tasks, analyzing large and complex datasets, making predictions, aiding managerial decisions, personalizing customer interactions, and creating new products and services. Consequently, AI is not a matter that impacts only on information technology departments, but that of technology management, operations, marketing, human resources, finances, and corporate governance. Indeed, the use of AI in companies has grown rapidly in recent years – in the OECD member countries, AI use in firms with ten or more employees rose from 5.6% in 2020 to 14% in 2024, with further increase to 20.2% projected by 2025 (OECD, 2025a, 2026).

With the spread of AI, a key management issue is: When is AI a performance asset for organizations? Early enthusiasm can cause AI to be seen as a direct source of productivity and competitive advantage. However empirical studies indicate that it is not the same. While AI can have a positive impact on the productivity of tasks, it can only support organization-level performance if firms can combine AI with existing processes, data assets, human capabilities, and strategies. The OECD conclude that companies that adopt AI tend to perform better than other companies that do not adopt AI, but that the productivity gains that can be achieved through AI are associated with other assets, such as information and communication technology, management skills, and digital capability and digital infrastructure (OECD, 2024a).

Such a lens can be provided by technology management. Technology management is the process of planning, developing, implementing and managing technologies for an organization's goals. It involves choosing the right applications, creating data and model foundations, conducting implementation initiatives, enhancing employee skills, complying with ethical and legal standards, and integrating AI strategies into business plans. So, AI is not a performance that

[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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can be created out of the blue; it's something that must be nurtured as an organizational capability.

In this paper, the author discusses the connection between AI, tech management and organizational performance. It has three purposes. It begins by summarizing the latest academic research on the relationship between AI adoption and AI capabilities to organizational outcomes. Secondly, it builds a model of how AI impacts performance. Thirdly, it pinpoints gaps in research and for managers and policy makers. The paper is divided into five sections: Section 2 presents a review of the literature, Section 3 outlines the research gap, Section 4 outlines research objectives and questions, Section 5 outlines methodology and Section 6 presents the synthesized findings, followed by Section 7, which discusses the implications of the findings, and Section 8, which concludes.

2. Literature Review

AI as a Strategic Technology is described in this section.In this section, AI as a Strategic Technology is described.

AI describes are systems that are designed and built to carry out tasks that are normally done by people in a way that requires human intelligence to learn from data, recognize patterns, reason, predict and produce content. Some of the most popular ones are machine learning, natural language processing, computer vision, robotic process automation, and generative AI. AI is defined as a potential general-purpose technology, as it can spread across industries and sectors to support innovation and productivity in a broad range of applications (OECD, 2024b).

The strategic value of AI lies in its ability to revolutionize how organizations create value. AI can lower the cost of information processing, boost forecasting accuracy, help with mass customization and continuous operation optimization. But these options don't necessarily mean they'll be an advantage since other competitors can use the same AI tools. Sustainable advantage is more likely if AI is leveraged alongside organizational routines, complementary skills and capabilities that are

[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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hard-to-imitate, and firm-specific data and tacit knowledge (Enholm et al., 2022; Mikalef et al., 2023).

AI has also taken the pulse of organizations in new directions with generative AI. Traditional analytical systems are mostly used to classify and predict, whereas generative AI can generate design alternatives, code, images, and text. Evidence indicates that generative AI can be used for both exploratory innovation (new products and processes) and exploitative innovation (improving current processes). Results from the study by Bag et al. (2024) showed the positive relationship between generative AI applications and organizational performance via explorative innovation and exploitative innovation, while ethical issues and environmental dynamism affected the relationships.

2.2 Technology Management and AI Adoption (Draft)

In the past, technology management concentrated on the technology strategy, research and development, innovation management, technology transfer and linkage between technological investments and business objectives. AI amplifies these duties, as it relies on data, has a probabilistic nature, and is constantly evolving. Managers also have to think about data governance, model validation, cybersecurity, human-AI collaboration and talent development when making hardware and software acquisition decisions.

The technology–organization–environment (TOE) framework is a popular explanation for the adoption of technology. It suggests that there are three factors that impact the decision to adopt: technological, organizational, and environmental. Tornatzky and Fleischer (1990) and Enholm et al. (2022) identify technological, organizational, and environmental aspects as factors in the adoption of AI.Technological, organizational, and environmental factors are identified by Tornatzky and Fleischer, 1990, and Enholm et al. 2022 as factors in the adoption of AI.

The latest reviews show that there is uneven adoption of AI across organizations. AI is frequently used sooner in larger companies due to the scale, data sources and intangible complementary assets that they have. There may be greater barriers to finance, technical knowledge, and organizational preparedness for

[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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SMEs. However, when properly implemented in line with strategic goals and with a level of trust and readiness, AI can contribute to enhance efficiency, decision-making, and competitiveness (OECD, 2025b; Springer Nature, 2026).

The second topic is on AI capabilities and organizational performance.The second topic is about AI capabilities and organizational performance.

Organizational performance is a multifaceted concept. It involves financial results (profitability, revenue growth, and cost savings); operational results (productivity, quality, speed, and efficiency); and strategic results (innovation, customer satisfaction, market responsiveness, competitive position). The adoption of AI, that is, the extent to which an organisation uses AI, is increasingly different from the capability of the organisation to mobilise the data, technology, skills and governance to generate value.

Mikalef et al. (2023) investigated the competencies of AI from a business-capabilities point of view, and concluded that AI-related competencies can support the performance of the organization when they are transformed into marketing and business competencies. Likewise, Wamba-Taguimdje et al. (2020) revealed that AI capabilities in public organizations resulted in an increase in process automation and cognitive insights generated, thus enhancing organizational performance. These findings indicate that creating value in the AI revolution relies on the transformation of technology assets to higher-order organizational capabilities.

AI adoption also looks like a positive correlation with performance, based on survey data. Wamba and Queiroz (2024) revealed that the AI adoption intensity positively correlates with firm performance, highlighting that factors such as organization and context play a role in this relationship. Similarly, Sullivan and Fossa Wamba (2024) found that adaptive response to market changes via AI can increase the firm's performance, process innovation, and product innovation, which in turn boosts the firm's performance. This evidence suggests that there is potential for AI to have an indirect impact on performance through its ability to support organizational agility and innovation.

2.4-mechanisms linking AI to performance.

[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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There are several mechanisms by which AI impacts organizational effectiveness that have been discussed in the literature. The first one is process automation. AI can complete repetitive tasks, tasks based on rules, or pattern recognition tasks faster and more accurately than humans, freeing up time for employees to focus on more value-added tasks. The second is cognitive insight. AI-driven analytics can analyze vast amounts of data, help predict outcomes, flag outliers and enhance evidence-based decision-making. The third one is cognitive engagement, meaning AI systems communicate with customers or employees via chatbots, recommendation systems, and personalized services.

A fourth one is innovation. AI can aid in product design, service development, process optimization, and new models. For instance, AI tools can provide insights into customer needs, and generative AI can facilitate prototyping and content generation. The fifth mechanism is one of organizational adaptability. By offering instant access to information and decision support, AI can enhance the velocity and quality of responding to market updates. AI-powered features can boost adaptability to market shifts and performance-in-innovation has been linked to adaptability (Sullivan and Fosso Wamba, 2024).

All of these mechanisms are not mutually exclusive. Organizations can leverage AI across multiple dimensions, such as streamlining operations, deriving insights, enhancing customer interaction, and fostering innovation in practice. The impact of the performance, therefore, will be incremental, albeit dependent on integration across systems, processes and people.

2.5 Enablers, Barriers, and Risks

Investments are required for AI-enabled performance. Complementary assets, such as ICT infrastructure, digital skills, management capacity and data resources, are characteristics of firms that benefit from AI to improve productivity, according to OECD (2024a). The result is in line with the resource-based view that states that valuable resources create advantage if they are rare, difficult to imitate and well organized (Barney, 1991).

[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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Human and human aspects are especially significant. Staff must be technically literate, know how to interpret data, and have the ability to interact with AI systems. Managers must have the ability to find the right scenarios, re-engineer processes, drive change and measure return-on-effort. Bankins et al (2024) identify a multi-level impact of AI on individuals, teams, and organizations, indicating the importance of taking into account employee attitude, job design, trust, and well-being, as well as technical aspects, when implementing AI.

AI may fail to generate anticipated returns due to barriers. The challenges that are common are lack of finances, lack of skilled people, faulty data quality, legacy systems, cyber concerns, regulatory uncertainty, and cultural resistance. Additionally, ethical concerns such as algorithmic bias, privacy issues, transparency limitations, and accountability challenges can also hinder adoption and erode trust. Such risks are critical in high-stake sectors like healthcare, finance, human resources, and public services (Bankins et al., 2024; OECD, 2024b).

3. Research Gap

Despite the growing momentum in the study of AI in organizational performance, there are still some gaps. First, there is a lack of distinction between AI and machine learning, which impacts the recognition of the differences in technical requirements, implementation challenges, and impacts of these various technologies.First, many studies assume that AI is one uniform technology, when in fact there are three different technologies: machine learning, predictive analytics, and robotic process automation, and each impacts the world, technical requirements, implementation challenges, and performance effects differently. Further studies are required to differentiate the impacts of various AI applications. Secondly, most of the current evidence is limited to direct links between AI use and performance. There are fewer studies that explicitly model technology management practices, such as AI governance, data management, talent development, and workflow redesign, as technologies that transform AI investments in to performance. This lack of information restricts the

[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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comprehension of the organization's management for achieving outcomes with AI.

Third, mixed results exist in the literature on boundary conditions. Some studies indicate positive performance effects, and others highlight implementation problems, stress among employees, ethical issues, and negative effects of some types of cognitive involvement. For instance, Wamba-Taguimdje et al. (2020) discovered that cognitive involvement was detrimental to organizational performance in their public sector sample; sometimes, AI can be customer- or employee-facing or even have a negative impact. There is a need to continue research at the intersection of when AI is helpful vs. harmful.

Fourth, demands exist for more longitudinal, multi-level and context-sensitive research. It is hard to determine causality and to separate short-term efficiency gains from long-term competitive advantage from much of the evidence, which is largely cross-sectional and perceptual. Moreover, large technology intensive companies outnumber SMEs, public bodies and companies in developing economies.

Research Objectives and Questions:

The primary aim of this paper is to explore the impact of AI on technology management and organizational outcomes. Specific objectives are:

Review recent evidence of the link between AI adoption, AI capabilities and organizational performance.

2. Mapping out technology-management practices that help organizations drive performance through their investments in AI.

3. To explore the enablers, obstacles and threats that shape the relationship between AI and performance.

4. To suggest a conceptual framework and future directions of research.

The study thus focuses on the following research questions:

RQ1: What are the results of the adoption of AI on organizational performance?

RQ2: How does AI impact performance via technology-management mechanisms?

RQ3: What are the organizational and environmental factors that moderate the relationship between AI and performance?

[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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5. Methodology

This paper uses an integrative literature-review methodology. Integrative reviews are suitable for the topics that require multiple disciplines and research designs, as it enables the integration of empirical, conceptual and review evidences. The review has been conducted on the literature, which has been published mainly in the period 2020 to 2026, and for which foundational theoretical works were included if necessary.

The sources were retrieved by searching scholarly databases and policy repositories with different combinations of search terms including "artificial intelligence," "AI adoption," "AI capabilities," "technology management," "digital transformation," "organizational performance," "firm performance," "innovation," and "productivity." Peer-reviewed journal articles, systematic reviews and reports from well-known institutions like the OECD were given higher priority. Only studies that covered both organizational level and explored the use of AI, its capabilities, implementation, practices, innovation, productivity or performance were included.

The following analysis used a thematic-synthesis method. To begin with, studies were classified in terms of focus: AI adoption, AI capabilities, technology management, innovation, and the outcomes of using AI. Second, recurring mechanisms, moderators, enablers and barriers were identified. Third, the findings were analyzed using the resource-based view, the dynamic capabilities perspective and the TOE framework. No new primary data were gathered; hence, the paper does not contain fabricated primary data results. Rather, it makes verifiable discoveries from previous studies.

6. Results

6.1 AI Adoption and Performance Outcomes

The evidence reviewed reflects a mostly positive relationship between AI adoption and organisational performance, albeit the strength and nature of this relationship is variable. Wamba and Queiroz (2024) reported a positive relationship between the adoption level of AI and the performance of the

[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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companies. OECD evidence also shows that AI adopters are more productive than similar non-adopters, even when adjusting for firm size, age and sector (OECD, 2025a). The results indicate the possibility of AI's contribution toward productivity, efficiency and competitiveness.

The relationship is not necessarily causative, however. The impact of AI on labour productivity is estimated to vary from zero to 11% at the firm level, depending on the type of applications used, the quality of their implementation and complementary investments (OECD, 2024b). This heterogeneity shows that the use of AI can't explain performance entirely. Organizations need to reflect on the nature, users and processes of AI.

Differences are also observed across sectors and firm sizes. Adoption of AI is predominantly in ICT-intensive industries, where businesses are likely to have more robust digital resources and analytical capabilities. Larger companies are more likely to be using AI, as they could benefit from scale benefits and have more complementary assets. While AI applications could present more challenges to SMEs, they also offer opportunities if they are cost-effective, scalable, and tailored to specific business contexts (OECD, 2024a, 2025b).

6.2 AI Capabilities as a Source of Value

This synthesis suggests that the use of AI is more strongly associated with performance than just being a part of the solution. AI capability encompasses technological tools, data resources, knowledge, and managerial practices that enable an organization to recognize opportunities, implement AI responsibly, and continuously evolve their systems. In their study, Mikalef et al. (2023) proved that AI skills can translate and boost organizational performance when transferred to business skills. The discovery reinforces the notion that AI is a meta-competency, designed to help the organization feel a sense of opportunity, grab it, and re-configure resources.

There are multiple ways in which the use of AI affects performance. Automation in the process stream enhances operational efficiency and minimizes errors. Cognitive insight enhances decision quality by making it possible for managers to

[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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use vast amounts of data for forecasting, risk identification and resource allocation. Innovation support helps companies create new products and services and enhance the existing ones. Adaptive response is a resilience tool that enables companies to identify and react to market changes faster (Sullivan & Fosso Wamba, 2024; Wamba-Taguimdje et al., 2020).

Additionally, the findings indicate that AI applications do not always yield positive results. In Wamba-Taguimdje et al. (2020) context, the result indicated that this cognitive engagement negatively affected the organizational performance. It indicates that if the interaction with AI is poorly designed, there is insufficient trust in AI, or it fails to align with the needs of those who use it, then the value can be diminished. When considering AI initiatives, organizations should take into account both the technical correctness and user experience, fairness, transparency, and strategic compatibility.

This section examines the technology management as a mediating mechanism.This section discusses technology management as a mediating mechanism.

One of the key findings of this review is that technology management acts as an intermediary between AI investments and organizational performance. If AI systems aren't used effectively in the organization, they don't generate value. AI strategy formulation, use-case prioritization, data governance, model development and monitoring, cybersecurity, workforce training, change management and performance measurement are key techno-management practices.

AI strategy formulation ensures that AI efforts align with organisational goals, and are not merely projects. Managers can use use case prioritization to allocate limited resources to applications that have specific value potential. Data governance provides for data to be accurate, secure, accessible, and ethically used. Over time, model monitoring identifies performance decay, bias, and security issues. Workforce training and change management drive the human capacities needed for effective use of AI.

[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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These practices are examples of dynamic capabilities. Sensing is the ability to identify technological opportunities and threats, Seizing is the ability to muster the resources to bring AI solutions to market and Transforming is the ability to redesign routines, structures and skills to ensure advantage is maintained. AI has the potential to transform into an organizational driver of renewal and performance for organizations with strong dynamic capabilities.

6.4 Enablers and Barriers

The review highlights a number of enablers of AI-enabled performance. Strategic direction and resources are provided by top-management. Data collection, storage, processing, and integration is enabled by digital infrastructure. Well informed human resources is responsible for the development, interpretation and responsible use of the model. Organizational learning helps organizations improve AI systems by testing and modifying them based on the results of their use. Trust and collaboration foster a more welcoming workplace and enhance human-AI collaboration.

Challenges range from limited budgets and technical capabilities, to poor data quality, disconnected legacy systems and the challenge of integrating artificial intelligence into workflows. Cultural resistance can occur when employees are concerned about losing their jobs, loss of autonomy, or greater monitoring. The ethical and regulatory issues such as privacy, bias, transparency, and accountability can also slow down the implementation process. Bankins et al. (2024) highlight that introducing AI goes beyond a simple technical solution; it also impacts people, teams, and organisations, and managers need to attend to the concerns of their employees as well as the technical deployment.

All of these obstacles help to understand why this doesn't automatically result in better performance when adopting AI. The dot-com companies with limited complementary assets can invest in AI, but still not see a return. On the other hand, public institutions that integrate AI with robust management, skills, and data systems have better chances of achieving performance improvements (OECD, 2024a).

[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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7. Discussion

7.1 Theoretical Implications

The findings compliment the capability-based perspective on AI. The use of AI is not about a single technology but rather about a package of resources and routines that needs to be adapted to generate value. The resource based view suggests that the advantage of generic AI tools is not necessarily sustainable, as competitors can also acquire the resources, knowledge, relationships, and processes necessary to gain a similar advantage. The Dynamic-Capabilities approach provides insights into how firms transform AI into performance by detecting opportunities, investing and implementing AI, and restructuring routines to maintain the advantages.

The TOE framework also provides insight into the variability in AI results. Technological readiness impacts on feasibility; organizational readiness impacts on implementation capacity; and environmental conditions impact on strategic urgency and constraints. This holistic view indicates that AI's effectiveness is not a given but is instead dependent on specific conditions. The same AI system can have a significant impact on efficiency in one company and in another have little to no value if there are missing data, skills, leadership or integration into the process.

The review also emphasises the importance of complementarities. AI's true strength lies in its synergy with digital infrastructure, data assets, human skills, and optimized workflows. This aligns with OECD data that complementary assets are needed for AI's productivity benefits (OECD 2024a). This would mean that, in theory, AI should be considered as a component of a larger digital-orientation construct, not a performance predictor alone.

7.2 Managerial Implications

Managers should start with strategic questions and not technology experimentation. AI projects should be connected to quantifiable goals, whether they be minimizing production faults, better forecasting ability, quicker customer-response times, fraud identification, or quicker product development. The right

[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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use cases are selected to avoid wasted investments and to help demonstrate value early.

Secondly, Prioritize data and infrastructure investment before scaling AI. High-quality, accessible, and well-governed data are prerequisites for reliable AI systems. Data standards, security procedures, privacy protections and model-monitoring processes should be developed by organizations. These practices mitigate technical and ethical risks, and enhance the reliability of AI-driven decisions.

Third, organizations should develop human–AI collaboration. AI should complement, rather than supplant, the human element in decision-making. Data literacy, critical evaluation of AI outputs, and redesigning work processes should be developed through training programs. Involving employees in implementation can help to make it accepted, bring up practical problems, and minimize resistance.

Fourth, managers need to set up AI governance. Governance should establish accountability for decisions made with the use of AI, standards for fairness and transparency, processes that provide human oversight, and processes that assess unintended consequences. This is especially true for generative AI systems, where results might seem credible but are incorrect. Ethical governance is not just a compliance issue, but can enhance trust, mitigate operational risk, and prevent damage to the organization's brand.

7.3 Policy Implications

Policymakers can facilitate AI performance by eliminating obstacles to its use, especially for SMEs. Digital-infrastructure investments, workforce reskilling programs, shared computing resources, advisory services, and regulatory guidance. Policies should not presume all companies have the same capacity to benefit from AI implementation as AI is not fully adopted.

AI's distributional implications should also be a policy concern. AI can enhance productivity, but it could be seen as benefitting the larger, more digitized companies and the more highly qualified workforce. The OECD recognizes that

[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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inequalities in access to complementary assets, and unequal uptake of complementary assets, can add to inequality and other social issues (OECD, 2024b). So policies need to have both productivity targets and inclusion, skills development and responsible-innovation targets.

7.4 Limitations

This paper is subject to limitations. It is a narrative and integrative review and not a meta-analysis, and therefore does not quantitatively calculate the average effect of AI on performance. The reviewed studies have varying definitions of AI, measures of performance, sectors and research design, making direct comparisons difficult. Much of the research uses cross sectional survey data, which restricts causal inferences. Lastly, as AI evolves, particularly generative AI, results could vary as technologies, regulations, and management methodologies develop.

This work concludes with a discussion on future research and implications for practice.

The influence of AI on technology management and organizational performance is significant but contingent. The data suggests that AI has the potential to enhance efficiency, decision making, innovation, adaptation, and competitiveness. AI doesn't make value, though. Performance improvements will rely on technology-management practices that align data and technology with strategy, develop data and digital infrastructure, grow human skills, redesign workflows, and manage ethical and operational risks.

The paper presents a capability-based framework that elucidates how AI adoption impacts performance via technology management, AI capabilities and complementary organizational assets. This framework provides the perspective on why some organisations achieve strong returns on AI and others achieve less or fail to implement. It also sets the tone that AI is a strategic, socio-technical capability, not a project involving information technology.

Future research should focus on causal and longitudinal impacts of AI on performance with panel data, quasi-experimental studies, and objective measures

[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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of performance. AI researchers need to differentiate between the various kinds of AI (such as predictive analytics, automation, or generative AI) and explore how they operate. Future studies could examine the mediators or moderators between these and performance, such as AI governance, employee well-being, workforce transformation, data quality, and ethical risk. Finally, cross-SME and cross-economy public/private comparative research would help advance insights into the role of context in value creation with AI in SMEs.

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[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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[1] Department of Management Sciences, National University of Sciences and Technology, Islamabad, Pakistan.
Email : hamzafarooq@gmail.com
[2] Department of Computer Science, COMSATS University Islamabad, Pakistan
Corresponding Email : saramahmood!@gmail.com

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