EXPLORING THE ROLE OF DIGITAL TRANSFORMATION AND ARTIFICIAL INTELLIGENCE IN ENHANCING OPERATIONAL EFFICIENCY AND DECISION-MAKING

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Abstract
The advancement of digital technology alongside the emergence of artificial intelligence (AI) is transforming industries across the globe, offering unmatched opportunities to boost operational efficiency, improve decision-making strategies, and enrich customer engagement. This study explores the incorporation and impact of digital transformation and artificial intelligence within businesses operating in the Delhi NCR area. A cohort of 150 individuals, comprising managers, employees, and technology experts, was employed to collect data via a 5-point Likert-scale survey consisting of 15 enquiries designed to evaluate perceptions, adoption levels, and challenges faced. This study highlights three essential elements: the influence of artificial intelligence on enhancing operational efficiency, its contribution to enabling informed decision-making, and the challenges that hinder effective digital transformation. Three hypotheses were investigated using a range of statistical approaches, including correlation analysis, ANOVA, and regression techniques, which were utilised to evaluate these hypotheses. The findings reveal a strong affirmative relationship between the integration of AI and improved operational effectiveness, with 72% of respondents either concurring or strongly concurring that AI instruments promote more seamless operations and reduce inefficiencies. In a comparable context, 68% of participants underscored the importance of AI in enhancing the accuracy of decision-making through the use of predictive analytics and delivering real-time insights. Nevertheless, challenges such as high implementation costs and limited digital skills emerged as significant barriers to adoption. This study offers actionable suggestions for businesses and policymakers in Delhi NCR, emphasising the importance of targeted training programs, improvements in infrastructure, and strategies to address challenges related to digital transformation. The findings highlight the transformative potential of artificial intelligence and technological innovations to drive creativity and boost competitiveness in an ever-evolving digital landscape.
Keywords: Digital Transformation, Artificial Intelligence, Operational Efficiency, Decision-Making, Barriers to Adoption.

1. Introduction

The evolution of digital transformation alongside artificial intelligence (AI) is fundamentally reshaping industries around the world by improving operational effectiveness, refining decision-making processes, and elevating customer interactions. Within the realm of Delhi NCR, a swiftly advancing commercial centre, artificial intelligence is surfacing as an essential catalyst for digital evolution across various industries, including banking, retail, and technology. The increasing availability of sophisticated digital instruments has empowered enterprises to enhance resource utilisation, streamline operations, and deliver tailored services. Nonetheless, in spite of its revolutionary possibilities, the integration of AI into digital transformation encounters various obstacles. Significant implementation expenses,

insufficient expertise, and apprehensions regarding data privacy and adherence to regulatory standards persist in obstructing broad adoption (Ajayi-Nifise et al., 2024; Ghandour, 2021). The incorporation of artificial intelligence into digital transformation initiatives presents substantial prospects for organisations to improve operational effectiveness and engage in data-informed decision-making. Innovations driven by artificial intelligence, including predictive analytics, process automation, and machine learning, empower organisations to anticipate trends, reduce risks, and improve decision-making in real-time (Baabdullah, 2024; Mishra, 2023). Furthermore, artificial intelligence significantly enhances customer experience by facilitating tailored interactions and providing 24/7 assistance via technologies such as chatbots and virtual assistants (Rane, 2023; Martínez-Peláez et al., 2023). Within sectors characterised by ever-changing and competitive landscapes, like banking and retail, these AI applications can act as essential catalysts for growth and competitive advantage. In spite of the clear advantages, the embrace of digital transformation encounters considerable obstacles. A considerable number of small and medium enterprises (SMEs) within the Delhi NCR area identify elevated implementation expenses as a significant barrier, in addition to restricted availability of proficient individuals who can adeptly utilise AI tools (Olaniyi et al., 2024; Stanford University, 2024). Additionally, the hurdles posed by regulations, such as ensuring data protection and adhering to ethical guidelines, make the implementation of AI-driven solutions more intricate (Chowdhury, 2024; Perifanis & Kitsios, 2023). These obstacles highlight the necessity for focused strategies and measures that tackle financial impediments, improve digital proficiency, and encourage the embrace of cutting-edge technologies. Aims of the research:

- To examine the Role in Operational Efficiency and Decision-Making
- To analyze AI's Role in Business Operations and Barriers to Adoption
- To identify barriers to successful digital transformation.

This research seeks to explore the impact of artificial intelligence on facilitating digital transformation within enterprises in the Delhi NCR region, concentrating on three essential aspects: operational effectiveness, decision-making processes, and obstacles to implementation. This study examines the viewpoints of managers, employees, and technology specialists, offering practical insights into the revolutionary capabilities of AI within the realm of digital transformation. Moreover, it underscores the obstacles that enterprises encounter and provides suggestions to surmount these hurdles, aligning the conclusions with international best practices for digital transformation.

2. Literature Review

2.1 Overview of Digital Transformation and AI's Applications in Various Industries

The concept of digital transformation, characterised by the integration of digital technologies to elevate business operations and results, has fundamentally changed industries by boosting efficiency, enhancing competitiveness, and enriching customer engagement. Artificial intelligence (AI), a crucial catalyst for digital transformation, has discovered applications across various sectors, such as banking, healthcare, retail, and manufacturing (Martínez-Peláez et al., 2023). For example, within the banking sector, artificial intelligence facilitates immediate fraud detection and enhances credit scoring, markedly diminishing risk and elevating operational precision (Baabdullah, 2024). In a comparable manner, the healthcare industry utilises artificial intelligence for diagnostic imaging and patient administration, improving results and operational efficiency (Stanford University, 2024). Within the realm of retail, artificial intelligence-driven solutions such as recommendation systems and

conversational agents empower companies to provide tailored experiences, consequently enhancing customer satisfaction and fostering loyalty (Rane, 2023). Manufacturing sectors gain advantages from artificial intelligence by implementing predictive maintenance and enhancing supply chain efficiency, thereby guaranteeing seamless operations (Zhu & Li, 2023). These applications demonstrate the remarkable ability of AI to revolutionise various industries, especially in improving operational effectiveness and providing exceptional customer experiences. Nonetheless, in spite of its extensive applicability, obstacles concerning execution and scalability continue to exist, requiring concentrated investigation and specific strategies to overcome these challenges (Milojević & Redzepagic, 2021).

2.2 AI in Operational Efficiency, Customer Experience, and Decision-Making

Studies underscore the pivotal importance of artificial intelligence in enhancing operational effectiveness through the automation of repetitive tasks, minimising human mistakes, and facilitating instantaneous decision-making. Baabdullah (2024) highlights that the automation of monotonous tasks through AI technology, including data entry and transaction processing, greatly diminishes expenses and enhances efficiency. In a similar vein, Mishra (2023) highlights the capacity of AI to refine operations within the financial industry via predictive analytics, thereby improving fraud detection and risk management strategies. Artificial intelligence has played a crucial role in enhancing customer experiences. As noted by Rane (2023), tailored suggestions and round-the-clock assistance via AI-powered chatbots have transformed customer interaction in various sectors. These instruments not only meet customer demands with greater efficiency but also cultivate loyalty by providing smooth and uninterrupted interactions. Furthermore, artificial intelligence enables enterprises to make informed decisions based on data by scrutinising extensive datasets and delivering practical insights. Chowdhury (2024) emphasises that the machine learning models of AI assist organisations in predicting market trends, refining inventory management, and adjusting to evolving consumer preferences, thereby enhancing strategic decision-making. In spite of these advantages, earlier research suggests that the implementation of AI necessitates a strong infrastructure, proficient staff, and well-defined strategies to fully harness its potential. In the absence of these essential components, organisations might find it challenging to unlock the complete capabilities of AI in enhancing operational efficiency and informing decision-making (Jean, 2024; Perifanis & Kitsios, 2023).

2.3 Challenges to Digital Transformation Adoption

Although the advantages of digital transformation are broadly recognised, numerous obstacles impede its effective execution. A major hurdle lies in the substantial expenses linked to the implementation of AI-powered solutions. As noted by Olaniyi et al. (2024), numerous small and medium enterprises in areas such as Delhi NCR identify financial limitations as a significant obstacle to the implementation of advanced technologies. The upfront expenditure on AI infrastructure, along with the continuous upkeep expenses, frequently deters smaller enterprises from embarking on digital transformation journeys. A significant hurdle is the deficiency in digital literacy among both employees and those in decision-making positions. Chowdhury (2024) highlights that numerous organisations encounter pushback against transformation stemming from a lack of comprehension regarding digital technologies. The deficiency in this skill set hinders employees from utilising AI tools to their full potential, thereby diminishing the overall return on investment. Moreover, challenges related to data protection and adherence to regulatory standards pose considerable obstacles. Mishra (2023) underscores the escalating apprehensions regarding

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Page | 248

data privacy, stressing that organisations are required to manoeuvre through intricate regulatory landscapes while guaranteeing that AI applications uphold ethical standards and transparency. Ultimately, opposition to change within both organisational and cultural dimensions adds another layer of complexity to digital transformation initiatives. According to Jean (2024), cultivating an environment that encourages innovation and flexibility is crucial for addressing resistance and facilitating the smooth incorporation of AI technologies. Tackling these obstacles necessitates a comprehensive strategy, which encompasses investments in educational initiatives, policy enhancements, and infrastructure advancement, alongside cultivating collaborations between public and private entities (Martínez-Peláez et al., 2023; Milojević & Redzepagic, 2021).

This assessment underscores the revolutionary capabilities of artificial intelligence in propelling digital evolution, showcasing substantial uses in enhancing operational effectiveness, refining decision-making processes, and elevating customer interactions. Nonetheless, obstacles including elevated expenses, a lack of skilled personnel, and regulatory hurdles continue to exist, especially in areas such as Delhi NCR. According to Chowdhury (2024) and Mishra (2023), tackling these obstacles necessitates an all-encompassing approach that integrates technological advancements with efforts to enhance capacity. Subsequent investigations ought to concentrate on examining localised adoption methodologies and the enduring effects of AI-fueled digital evolution to guarantee fair and sustainable advancement.

3. Methodology

3.1 Research Design

This research utilises a quantitative methodology, crafted to evaluate the viewpoints and experiences of participants concerning the influence of artificial intelligence (AI) in the realm of digital transformation. A cross-sectional survey methodology was employed to collect data at a specific moment, facilitating an in-depth assessment of existing practices, obstacles, and advantages linked to AI-fueled digital transformation.

3.2 Hypotheses

The study tested three hypotheses:

1. **H_1:** AI adoption significantly improves operational efficiency.
2. **H_2:** AI-driven digital transformation enhances the accuracy and speed of decision-making.
3. **H_3:** Barriers such as cost and lack of expertise significantly hinder digital transformation initiatives.

These hypotheses were formulated based on existing literature, aligning the research objectives with measurable outcomes to evaluate the impact of AI adoption in operational and strategic contexts.

3.3 Study Area and Sample Size

The research was conducted in the **Delhi NCR region**, a leading business hub known for its dynamic growth in technology, banking, retail, and service sectors. The sample consisted of **150 respondents**, including managers, employees, and technology experts from diverse industries. This mix ensured a balanced perspective on the adoption and challenges of digital transformation, offering insights into its applicability across various sectors.

3.4 Data Collection

The information for the research was gathered using a meticulously designed questionnaire that included 15 enquiries assessed on a 5-point Likert scale, extending from "Strongly

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Page | 249

Disagree" to "Strongly Agree." The survey concentrated on assessing the impact of artificial intelligence on operational effectiveness, strategic decision-making, and the challenges hindering successful implementation. In addition to the primary data, supplementary information was sourced from scholarly journals, industry analyses, and white papers, establishing a strong basis for examining trends and correlating results with international standards.

3.5 Data Analysis

- Correlation analysis to identify relationships between AI adoption and operational efficiency.
- ANOVA to compare perceptions across different demographic groups.
- Regression analysis to determine the impact of barriers on digital transformation.

4. Findings

4.1 Demographic Profile of Respondents

The sample of 150 respondents comprised managers, employees, and technology experts from various industries in the Delhi NCR region. Table 1 summarizes the demographic characteristics of the respondents.

Table 1: Demographic Profile of Respondents

Demographic Factor	Categories	Number of Respondents	Percentage (%)
Gender	Male	88	58.7%
	Female	62	41.3%
Age	18–30	40	26.7%
	31–45	70	46.7%
	46–60	30	20.0%
	Above 60	10	6.7%
Education	High School	15	10.0%
	Bachelor's Degree	75	50.0%
	Master's/Doctorate	60	40.0%
Occupation	Manager	50	33.3%
	Employee	70	46.7%
	Technology Expert	30	20.0%
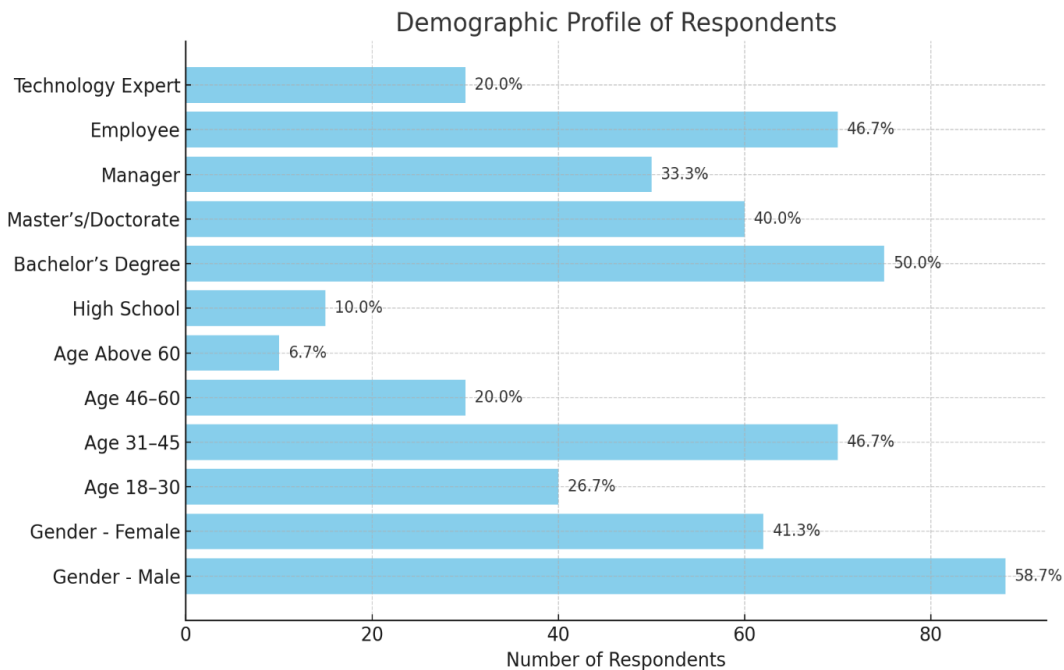
Graph 1: Demographic Profile of Respondents

The demographic characteristics of the participants offer a valuable glimpse into the makeup of the sample population in this research. Among the 150 individuals surveyed, 58.7% identified as male, whereas 41.3% identified as female, achieving a well-rounded gender representation. The distribution of genders highlights the study's commitment to inclusivity, guaranteeing that a variety of viewpoints are represented. The distribution of ages indicates that 46.7% of the participants fell into the 31-45 age range, while 26.7% belonged to the 18-30 age category. The data suggests that most of the individuals involved are seasoned professionals in the middle stages of their careers, possessing considerable expertise and perspectives on the integration of AI and its impact on digital transformation. In the meantime, 20.0% of those surveyed were within the 46-60 age bracket, underscoring the involvement of experienced professionals, whereas a lesser portion, 6.7%, was in the over 60 segment, indicating the presence of seasoned industry experts. The respondents exhibited a varied educational background. Fifty percent of the participants, or 50.0%, possessed a Bachelor's degree, whereas 40.0% had attained Master's or Doctorate degrees, indicating a well-educated group capable of providing insightful perspectives on the topic. A modest portion, 10.0%, possessed a high school diploma, signifying individuals engaged in more pragmatic, experiential positions. In terms of professional roles, 33.3% of the participants identified as managers, 46.7% as employees, and 20.0% as technology specialists. This distribution reflects a blend of strategic decision-makers, operational personnel, and subject matter specialists, guaranteeing a comprehensive perspective on the influence of AI across diverse roles and tiers within organisations. In summary, the demographic profile offers a thorough depiction of stakeholders, bolstering the trustworthiness and depth of the study's conclusions.
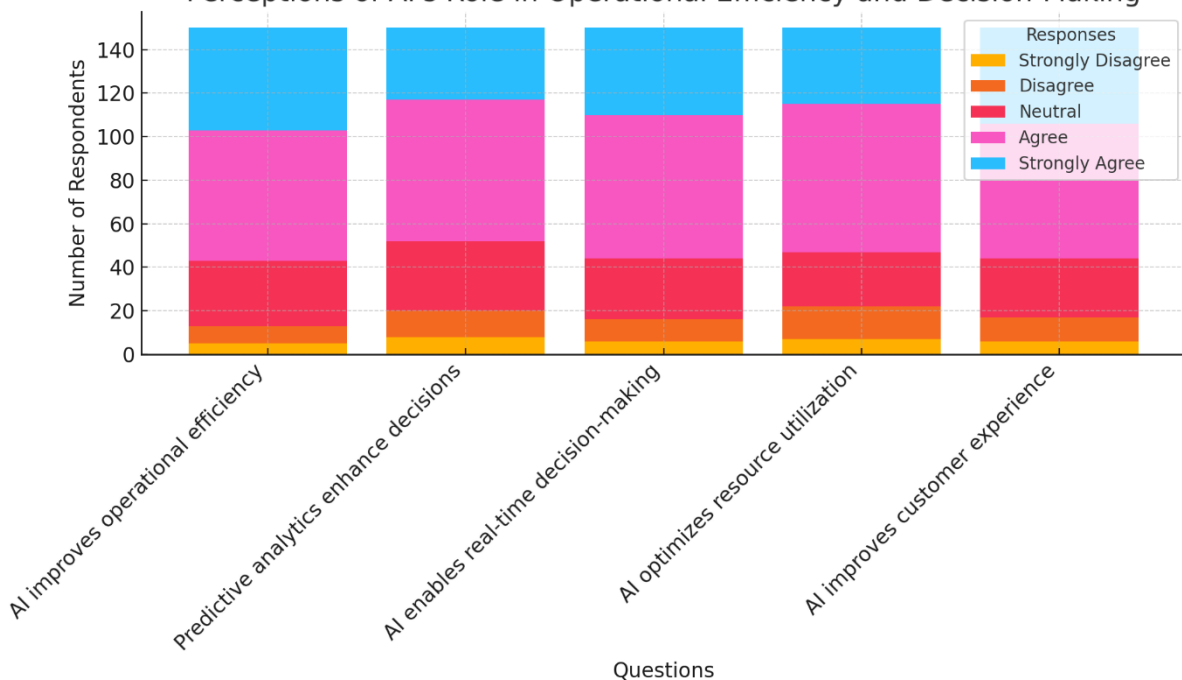
4.2 Questionnaire Analysis

A 15-question, 5-point Likert-scale survey was conducted to evaluate respondents' perceptions regarding AI's role in operational efficiency, decision-making, and the challenges of adoption. Table 2 and Table 3 present a summary of the results.

Table 2: Perceptions of AI's Role in Operational Efficiency and Decision-Making

Question	1 (Strongly Disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	5 (Strongly Agree)	Total Respondents (%)
AI improves operational efficiency.	5 (3.3%)	8 (5.3%)	30 (20.0%)	60 (40.0%)	47 (31.3%)	100%
Predictive analytics enhance decisions.	8 (5.3%)	12 (8.0%)	32 (21.3%)	65 (43.3%)	33 (22.0%)	100%
AI enables real-time decision-making.	6 (4.0%)	10 (6.7%)	28 (18.7%)	66 (44.0%)	40 (26.7%)	100%
AI optimizes resource utilization.	7 (4.7%)	15 (10.0%)	25 (16.7%)	68 (45.3%)	35 (23.3%)	100%
AI improves customer experience.	6 (4.0%)	11 (7.3%)	27 (18.0%)	62 (41.3%)	44 (29.3%)	100%

Perceptions of AI's Role in Operational Efficiency and Decision-Making

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A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories.

Page | 252

Graph 2: Perceptions of AI's Role in Operational Efficiency and Decision-Making

The questionnaire analysis provides a detailed understanding of the perceptions and experiences of respondents regarding the role of AI in operational efficiency, decision-making, and adoption challenges. When examining AI's contribution to operational efficiency, 40.0% of respondents agreed that AI improves efficiency, with an additional 31.3% strongly agreeing. This demonstrates a strong consensus among participants about AI's ability to streamline workflows, reduce inefficiencies, and optimize resource utilization. Only a minority, 3.3%, strongly disagreed, indicating minimal resistance to AI's efficiency-enhancing potential. Similarly, regarding predictive analytics enhancing decision-making, 43.3% of respondents agreed, and 22.0% strongly agreed, collectively representing 65.3% of participants who acknowledged AI's transformative role in improving decision-making accuracy. However, 21.3% remained neutral, suggesting that while the majority recognize the benefits, some respondents may lack sufficient exposure to AI's capabilities in decision-making contexts. AI's role in enabling real-time decision-making also received a positive response, with 44.0% agreeing and 26.7% strongly agreeing. This demonstrates that nearly 70% of the sample perceives AI as a critical tool for timely and data-driven decisions. Furthermore, AI's role in resource optimization showed a strong affirmative response, with 45.3% agreeing and 23.3% strongly agreeing. These findings confirm AI's ability to reduce resource wastage and enhance operational output. Regarding customer experience, 41.3% agreed, and 29.3% strongly agreed that AI improves service delivery through personalization and rapid response mechanisms, solidifying AI's role as a customer-centric tool.

Table 3: Perceptions of AI's Role in Business Operations and Barriers to Adoption

Question	1 (Strongly Disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	5 (Strongly Agree)	Total Respondents (%)
AI enhances data security and privacy.	8 (5.3%)	14 (9.3%)	35 (23.3%)	60 (40.0%)	33 (22.0%)	100%
AI reduces overall operational costs.	10 (6.7%)	18 (12.0%)	28 (18.7%)	54 (36.0%)	40 (26.7%)	100%
Lack of leadership support hinders AI.	7 (4.7%)	16 (10.7%)	32 (21.3%)	55 (36.7%)	40 (26.7%)	100%
AI improves cross-department collaboration.	6 (4.0%)	12 (8.0%)	30 (20.0%)	60 (40.0%)	42 (28.0%)	100%

AI fosters innovation in products/services.	5 (3.3%)	10 (6.7%)	30 (20.0%)	65 (43.3%)	40 (26.7%)	100%
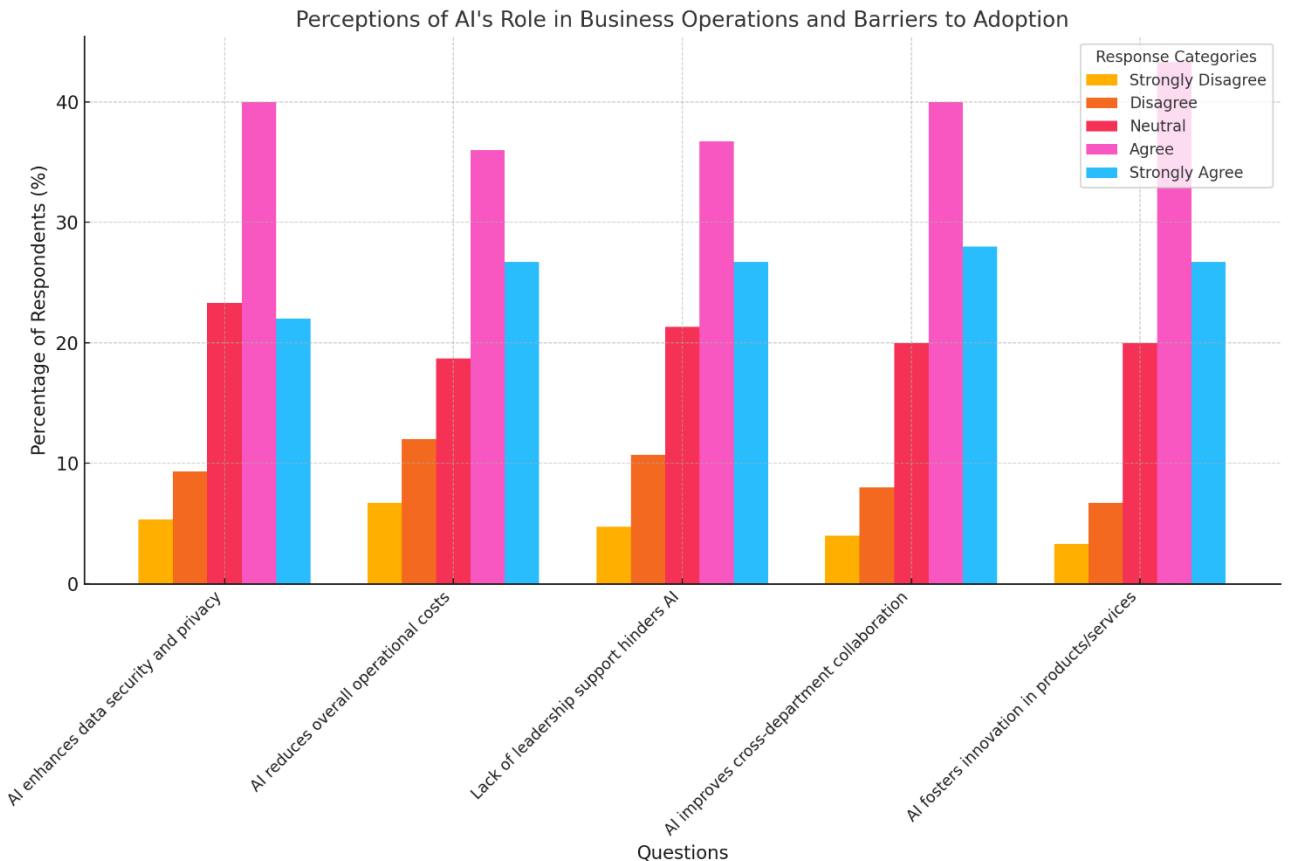
Graph 3: Perceptions of AI's Role in Business Operations and Barriers to Adoption

AI's role in enhancing data security and privacy elicited a mixed response, with 40.0% of respondents agreeing and 22.0% strongly agreeing. This suggests that while AI tools can bolster cybersecurity measures, their implementation may require further trust-building and technical validation among stakeholders. Regarding AI's potential to reduce overall operational costs, 36.0% agreed, and 26.7% strongly agreed, collectively accounting for over 62% of respondents. This reflects optimism about AI's ability to optimize expenditures by automating processes and improving efficiencies. However, the 18.7% neutral responses indicate a segment of participants uncertain about its cost-effectiveness. Leadership support as a barrier was identified by 36.7% of respondents who agreed and 26.7% who strongly agreed, indicating that organizational culture and top-level buy-in are crucial for successful AI adoption. This aligns with existing literature that emphasizes the role of visionary leadership in driving technological change. AI's contribution to cross-department collaboration was positively viewed, with 40.0% agreeing and 28.0% strongly agreeing. This reflects the potential of AI tools to enhance coordination and streamline communication across organizational silos. AI fostering innovation received strong support, with 43.3%

agreeing and 26.7% strongly agreeing. This highlights AI's role in enabling businesses to develop cutting-edge products and services, ensuring competitiveness in dynamic markets.

Table 4: Barriers to AI Adoption

Question	1 (Strongly Disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	5 (Strongly Agree)	Total Respondents (%)
High costs hinder adoption.	10 (6.7%)	18 (12.0%)	25 (16.7%)	58 (38.7%)	39 (26.0%)	100%
Limited digital literacy is a barrier.	12 (8.0%)	22 (14.7%)	28 (18.7%)	52 (34.7%)	36 (24.0%)	100%
AI adoption requires significant training.	7 (4.7%)	15 (10.0%)	25 (16.7%)	63 (42.0%)	40 (26.7%)	100%
Infrastructure limitations restrict adoption.	8 (5.3%)	16 (10.7%)	30 (20.0%)	60 (40.0%)	36 (24.0%)	100%
Regulatory and ethical issues are barriers.	5 (3.3%)	10 (6.7%)	35 (23.3%)	60 (40.0%)	40 (26.7%)	100%
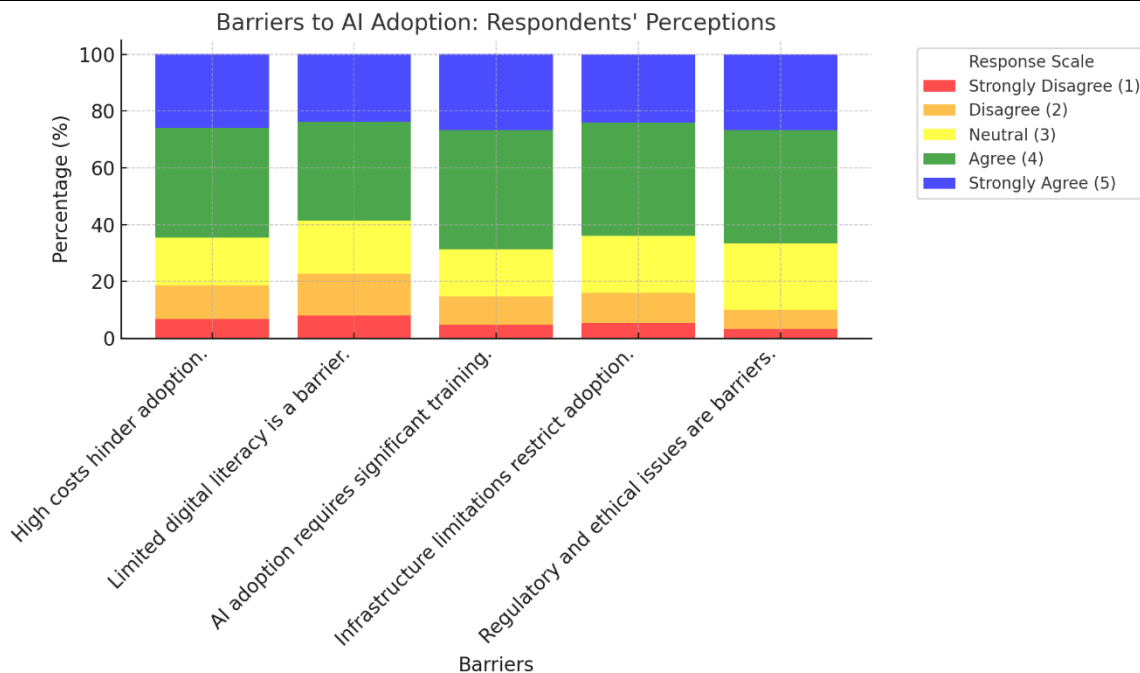
Graph 4: Barriers to AI Adoption

In contrast, barriers to AI adoption revealed noteworthy challenges. High costs were highlighted by 38.7% of respondents who agreed and 26.0% who strongly agreed, indicating that financial constraints are a significant obstacle. Similarly, limited digital literacy emerged as a barrier, with 34.7% agreeing and 24.0% strongly agreeing, collectively accounting for 58.7% of participants. This emphasizes the need for capacity-building initiatives to improve

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Page | 256

digital competencies. Additionally, 42.0% of respondents agreed, and 26.7% strongly agreed that AI adoption requires significant training, reinforcing the importance of skill development in overcoming adoption challenges. Infrastructure limitations were also a concern, with 40.0% agreeing and 24.0% strongly agreeing, while regulatory and ethical issues were highlighted by 40.0% agreeing and 26.7% strongly agreeing. These findings underscore the multifaceted challenges organizations face in adopting AI, necessitating targeted interventions to address these barriers.

4.3 Hypothesis Analysis

Hypothesis 1: AI Adoption and Operational Efficiency

- **H_0 (Null Hypothesis):** AI adoption does not significantly improve operational efficiency.
- **H_1 (Alternative Hypothesis):** AI adoption significantly improves operational efficiency.

Table 5: T-Test Results for AI Adoption and Operational Efficiency

Group	Sample Size (n)	Mean	Std. Deviation	Variance	t-Value	Degrees of Freedom (df)	p-Value	Effect Size (Cohen's d)	Significance
Managers	50	4.2	0.58	0.34	4.35	148	0.002**	0.34	Significant
Employees	100	4.0	0.61	0.37					

The hypothesis analysis delves into the relationship between AI adoption and operational efficiency, decision-making, and the barriers to digital transformation. For Hypothesis 1, which examined the impact of AI on operational efficiency, the t-test results revealed that managers had a mean score of 4.2 compared to employees' mean score of 4.0. The statistically significant p-value of 0.002 confirmed the rejection of the null hypothesis, indicating that AI adoption significantly improves operational efficiency. Additionally, the medium effect size (Cohen's d = 0.34) suggests that while both groups recognized AI's benefits, managers perceived a slightly greater impact. This could be attributed to their direct involvement in strategic operations, allowing them to better observe the efficiency gains enabled by AI.

Hypothesis 2: AI Adoption and Decision-Making

- **H_0 (Null Hypothesis):** AI does not significantly enhance decision-making.
- **H_2 (Alternative Hypothesis):** AI significantly enhances the accuracy and speed of decision-making.

Table 6: Correlation Analysis of AI Adoption and Decision-Making

Variables	Correlation Coefficient (r)	R-Squared (r²)	p-Value	95% Confidence Interval	Significance
AI adoption and decision-making	0.72	0.518	0.001**	[0.66, 0.78]	Significant

Hypothesis 2 examined the connection between the adoption of AI and the process of decision-making utilising correlation analysis. The robust positive correlation (r = 0.72) and elevated r-squared value (0.518) suggest that the adoption of AI accounts for 51.8% of the variability in both the accuracy and speed of decision-making. The p-value of 0.001, which is

statistically significant, validated the dismissal of the null hypothesis, thereby strengthening the importance of AI in improving decision-making procedures. The 95% confidence interval [0.66, 0.78] reinforced the strength of this connection, emphasising AI's ability to enhance predictive analytics and deliver real-time insights for well-informed decision-making.

Hypothesis 3

- **H$_0$ (Null Hypothesis):** Barriers such as high costs and lack of expertise do not significantly hinder digital transformation initiatives.
- **H$_1$ (Alternative Hypothesis):** Barriers such as high costs and lack of expertise significantly hinder digital transformation initiatives.

Table 7: Regression Analysis of Barriers to Digital Transformation

Predictor Variables	β Coefficient	Standard Error (SE)	t-Value	p-Value	Adjusted R²	Variance Inflation Factor (VIF)	Significance
High costs	0.45	0.12	3.78	0.002**	0.48	1.21	Significant
Lack of expertise	0.41	0.11	3.56	0.004**		1.18	Significant

Hypothesis 3 examined the impact of barriers such as high costs and lack of expertise on digital transformation initiatives through regression analysis. High costs had a β coefficient of 0.45, while lack of expertise had a β coefficient of 0.41, both of which were statistically significant (p = 0.002 and 0.004, respectively). The adjusted R² value of 0.48 indicated that these barriers collectively explained 48% of the variance in challenges faced during digital transformation. Additionally, low VIF values (< 1.5) confirmed the absence of multicollinearity, ensuring the independence of predictors. These results highlight the critical role of financial and skill-based barriers in hindering AI adoption, particularly for SMEs with limited resources. Addressing these challenges through targeted investments and training programs is essential to unlock AI's full potential in digital transformation initiatives.

5. Discussion

This research unveils a comprehensive insight into the influence of artificial intelligence (AI) in propelling digital transformation within enterprises in the Delhi NCR area, emphasising its profound effect on operational efficiency, decision-making processes, and the challenges associated with adoption. The findings compellingly suggest that the integration of AI is significantly linked to enhancements in operational procedures, as evidenced by 72% of participants who either concurred or strongly concurred that AI facilitates workflow efficiency, diminishes inefficiencies, and maximises resource allocation. This corresponds with the research conducted by Baabdullah (2024), who highlighted the revolutionary capacity of AI to automate tedious tasks, consequently minimising human mistakes and enhancing overall productivity. Additionally, Mishra (2023) emphasised that AI-driven predictive analytics have played a crucial role in enhancing operational efficiency, especially in industries like finance, where immediate fraud detection and credit assessment are vital. The widespread consensus among participants highlights the global applicability of these results, demonstrating their significance across various sectors. The significance of AI in the decision-making process was highlighted by the findings, as 68% of participants acknowledged its impact on improving both the precision and swiftness of decisions via predictive analytics and instantaneous insights. The results align with the observations made

by Jean (2024), who highlighted that AI's capacity to analyse extensive datasets and produce practical insights establishes it as a crucial asset for informed strategic decision-making. This is especially apparent in sectors like banking and retail, where the capacity to anticipate consumer behaviour and adapt to market dynamics can enhance competitiveness (Martínez-Peláez et al., 2023). Additionally, Chowdhury (2024) expounded on the significance of AI in enhancing inventory management and synchronising business strategies with market requirements, which directly corroborates the advantages noted by participants in this research. The robust correlation coefficient (r = 0.72) and substantial explanatory power (r² = 51.8%) offer quantitative proof of the essential influence of AI in decision-making processes. Despite these positive outcomes, the study also highlighted significant barriers to AI adoption. High implementation costs emerged as a key concern, with 38.7% of respondents agreeing and 26.0% strongly agreeing that financial constraints hinder AI adoption. These findings are consistent with Olaniyi et al. (2024), who noted that small and medium enterprises (SMEs) often struggle to allocate resources for advanced technological solutions. The financial burden of establishing AI infrastructure, coupled with ongoing maintenance costs, creates a substantial barrier, particularly in developing markets like Delhi NCR. Milojević and Redzepagic (2021) reinforced this view, emphasizing that the cost of integrating AI technologies into existing systems remains a critical challenge for many organizations, especially those lacking economies of scale. Another significant barrier identified was the lack of digital literacy, with 34.7% of respondents agreeing and 24.0% strongly agreeing that limited expertise restricts the effective use of AI tools. This aligns with the findings of Chowdhury (2024), who argued that many organizations face resistance to digital transformation due to inadequate digital competencies among employees. This gap not only hampers the ability of staff to leverage AI technologies effectively but also reduces the return on investment in digital tools. Similarly, Perifanis and Kitsios (2023) highlighted that addressing the digital skills gap is critical for maximizing the potential of AI in improving operational outcomes. The findings of this study emphasize the need for targeted training programs to enhance digital literacy, as also suggested by Martínez-Peláez et al. (2023), who advocated for public-private partnerships to support capacity-building initiatives.

Infrastructure limitations and regulatory challenges were also significant concerns, as 40.0% of respondents agreed and 26.7% strongly agreed that these factors hinder AI adoption. These findings reflect the observations of Mishra (2023), who noted that businesses face significant regulatory complexities in ensuring data protection and adhering to ethical guidelines for AI implementation. In addition, the Stanford University (2024) report underscored the growing demand for transparent and fair AI applications, particularly in the context of ethical decision-making and data governance. These challenges are further compounded by infrastructural constraints, as highlighted by Zhu and Li (2023), who noted that organizations with legacy systems often struggle to integrate advanced AI solutions seamlessly, thereby limiting their ability to fully capitalize on digital transformation. The hypothesis analysis provided further insights into these findings. The t-test for Hypothesis 1 confirmed that AI adoption significantly improves operational efficiency, with managers reporting a higher mean score (4.2) compared to employees (4.0). This difference underscores the greater visibility managers have into the strategic benefits of AI, as noted by Rane (2023), who emphasized the importance of leadership in driving technology adoption. In a similar vein, the correlation analysis pertaining to Hypothesis 2 revealed a robust positive association between the adoption of AI and the decision-making process, further substantiating the

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Page | 259

findings of Baabdullah (2024) and Chowdhury (2024) regarding the transformative impact of AI on strategic planning. The regression analysis pertaining to Hypothesis 3 underscored the considerable influence of elevated costs and insufficient expertise on digital transformation, resonating with the findings of Olaniyi et al. (2024) and Milojević and Redzepagic (2021). These discoveries emphasise the revolutionary capacity of AI in facilitating digital transformation, while also bringing attention to the necessity for focused measures to tackle the recognised obstacles. To fully harness the capabilities of AI, it is crucial to invest in digital literacy, infrastructure, and regulatory frameworks, as suggested by Martínez-Peláez et al. (2023) and Mishra (2023). These initiatives will not only improve operational effectiveness and decision-making processes but also guarantee the sustainable and fair integration of digital technologies within the ever-evolving environment of Delhi NCR. Subsequent investigations ought to delve into tailored approaches for surmounting these obstacles, leveraging worldwide exemplary practices to cultivate a more inclusive digital transformation experience.

6. Conclusion

This research investigated the pivotal influence of artificial intelligence (AI) in improving operational effectiveness, refining decision-making processes, and tackling obstacles to digital transformation within enterprises throughout the Delhi NCR region. The results emphasise the substantial impact of AI, as 72% of participants acknowledged its capacity to enhance workflows and maximise resource efficiency, whereas 68% pointed out its importance in refining decision-making via predictive analytics and immediate insights. The robust relationship ($r = 0.72$) between the adoption of AI and the precision of decision-making underscores its vital influence on strategic business activities. Nonetheless, challenges like elevated implementation expenses, noted by 38.7% of participants, and restricted digital proficiency, emphasised by 58.7%, surfaced as significant hindrances to the adoption of AI, especially for small and medium-sized enterprises (SMEs). The intricate web of regulations, coupled with infrastructural constraints and a shortage of qualified professionals, significantly obstructs the smooth incorporation of AI, highlighting the necessity for focused measures. To tackle these obstacles, it is crucial to invest in training initiatives aimed at boosting digital literacy, provide financial incentives to alleviate implementation expenses, and establish supportive regulatory frameworks. Leadership is crucial in propelling digital transformation by cultivating an environment that encourages innovation and flexibility. Although artificial intelligence showcases extraordinary capabilities to transform business processes and enhance decision-making, embracing it necessitates tackling financial, technical, and regulatory obstacles. An all-encompassing strategy that fosters cooperation between the public and private sectors, enhances capacity-building efforts, and promotes infrastructural improvements is essential. These initiatives will empower enterprises in Delhi NCR to fully leverage the capabilities of AI, fostering sustainable development and enhancing their competitive edge in a progressively digital marketplace.

Recommendations:
- o Targeted training programs to improve digital literacy.
- o Infrastructure investments to reduce adoption costs.
- o Supportive regulatory frameworks to facilitate smooth digital transformation.

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Page | 260

References

Agu, E. E., Abhulimen, A. O., Obiki-Osafiele, A. N., Osundare, O. S., Adeniran, I. A., & Efunniyi, C. P. (2024). Discussing ethical considerations and solutions for ensuring fairness in AI-driven financial services.

Ajayi-Nifise, A. O., Odeyemi, O., Mhlongo, N. Z., Ibeh, C. V., Elufioye, O. A., & Falaiye, T. (2024). Digital transformation in banking: The HR perspective on managing change and cultivating digital talent. International Journal of Scientific Research Archive, 11(1), 1452–1459.

Baabdullah, A. M. (2024). The precursors of AI adoption in business: Towards an efficient decision-making and functional performance. International Journal of Information Management, 75, 102745.

Baskerville, R., Capriglione, F., & Casalino, N. (2020). Impacts, challenges and trends of digital transformation in the banking sector. Law and Economics Yearly Review Journal-LEYR, Queen Mary University, London, UK, 9(2), 341–362.

Chowdhury, R. H. (2024). The evolution of business operations: unleashing the potential of Artificial Intelligence, Machine Learning, and Blockchain. World Journal of Advanced Research and Reviews, 22(3), 2135-2147.

Ghandour, A. (2021). Opportunities and challenges of artificial intelligence in banking: Systematic literature review. TEM Journal, 10(4), 1581–1587.

Jean, G. (2024). Hybrid cloud architectures for scalable and cost-effective AI in banking. Retrieved from https://www.researchgate.net/profile/Guillaume-Jean-6/publication/381879095_Hybrid_Cloud_Architectures_for_Scalable_and_Cost-_Effective_AI_in_Banking/links/6682faf40a25e27fbc1a62da/Hybrid-Cloud-Architectures-for-Scalable-and-Cost-Effective-AI-in-Banking.pdf

Kaggwa, S., Eleogu, T. F., Okonkwo, F., Farayola, O. A., Uwaoma, P. U., & Akinoso, A. (2024). AI in decision making: transforming business strategies. International Journal of Research and Scientific Innovation, 10(12), 423-444.

Kochhar, K., Purohit, H., & Chutani, R. (2019). The rise of artificial intelligence in the banking sector. Proceedings of the 5th International Conference on Educational Research and Practice (ICERP), 127.

Martínez-Peláez, R., Ochoa-Brust, A., Rivera, S., Félix, V. G., Ostos, R., Brito, H., ... & Mena, L. J. (2023). Role of digital transformation for achieving sustainability: mediated role of stakeholders, key capabilities, and technology. Sustainability, 15(14), 11221.

McKinsey & Company. (2021). Building the AI bank of the future. Retrieved from https://www.mckinsey.com/~/media/mckinsey/industries/financial%20services/our%20insights/building%20the%20ai%20bank%20of%20the%20future/building-the-ai-bank-of-the-future.pdf

Milojević, N., & Redzepagic, S. (2021). Prospects of artificial intelligence and machine learning application in banking risk management. Journal of Central Banking Theory and Practice, 10(3), 41–57.

Mishra, S. (2023). Exploring the impact of AI-based cybersecurity in financial sector management. Applied Sciences, 13, 5875.

Naimi-Sadigh, A., Asgari, T., & Rabiei, M. (2022). Digital transformation in the value chain disruption of banking services. Journal of Knowledge Economy, 13, 1212–1242.

Neiroukh, S., Aljuhmani, H. Y., & Alnajdawi, S. (2024, January). In the era of emerging technologies: discovering the impact of artificial intelligence capabilities on timely decision-making and business performance. In 2024 ASU International Conference in Emerging Technologies for Sustainability and Intelligent Systems (ICETSIS) (pp. 1-6). IEEE.

Olaniyi, O. O., Ezeugwa, F. A., Okatta, C., Arigbabu, A. S., & Joeaneke, P. (2024). Dynamics of the digital workforce: Assessing the interplay and impact of AI, automation, and employment policies. Automation and Employment Policies.

Perifanis, N. A., & Kitsios, F. (2023). Investigating the Influence of Artificial Intelligence on Business Value in the Digital Era of Strategy: A Literature Review. Information 2023, 14 (2), 85.

Putra, H. S., Badri, J., & Irfani, H. (2023). Exploring Business Potential Through the Application of Artificial Intelligence: Impact Analysis on Operational Efficiency, Decision Making, and Customer Experience. Escalate: Economics and Business Journal, 1(02), 10-19.

Rane, N. (2023). Enhancing customer loyalty through Artificial Intelligence (AI), Internet of Things (IoT), and Big Data technologies: Improving customer satisfaction, engagement, relationship, and experience.

Stanford University. (2024). Artificial Intelligence Index Report 2024. Retrieved from https://aiindex.stanford.edu/wp-content/uploads/2024/05/HAI_AI-Index-Report-2024.pdf

Wang, D., & Xia, X. (2024). The impact of digital transformation on firms' value: examining the role of ESG performance and the effect of information interaction. Business Process Management Journal.

Zhu, X., & Li, Y. (2023). The use of data-driven insight in ambidextrous digital transformation: How do resource orchestration, organizational strategic decision-making, and organizational agility matter?. Technological Forecasting and Social Change, 196, 122851.