Journal of Trends in Financial and Economics
ISSN: 3007-696X
DOI: https://doi.org/10.61784/jtfe3055

AI AND BUSINESS ANALYTICS IN POST-PANDEMIC U.S. DIGITAL TRANSFORMATION: DRIVING IT PROJECT SUCCESS AND ORGANIZATIONAL AGILITY

Kamal Khan, Anjon Rathore, Amit Kumar*
Department of Computer Application, National University, Gazipur, Bangladesh.
Corresponding Author: Amit Kumar, Email: evankd375@gmail.com

Abstract: The COVID-19 pandemic acted as a pivotal driver of digital transformation across U.S. industries, forcing organizations to adopt Artificial Intelligence (AI) and Business Analytics (BA) at unprecedented speed to manage severe disruptions. This study examines how AI and BA work in synergy to boost IT project success and strengthen organizational agility in the post-pandemic era. The rapid transition to remote work, digital operations, and real-time data usage highlighted the need to embed intelligent technologies into core business strategies. AI solutions such as machine learning, natural language processing, and robotic process automation have enabled predictive decision-making, process automation, and adaptive project management. In parallel, BA tools have delivered real-time forecasting, performance monitoring, and actionable insights. Together, these technologies are reshaping traditional IT project frameworks, helping businesses remain competitive, agile, and resilient in volatile markets. Drawing on an extensive review of literature and industry case studies, this paper analyzes the transformative effects of AI and BA on operational efficiency, talent management, and strategic governance. It also addresses ethical concerns, including data privacy and digital equity. The findings offer a strategic roadmap for U.S. organizations to transition from reactive problem-solving to proactive innovation leveraging AI and BA to achieve long-term adaptability, resilience, and digital maturity in a rapidly evolving global environment.
Keywords: AI; Business analytics; COVID-19; Digital transformation

1 INTRODUCTION

The COVID-19 pandemic marked a defining moment in the digital era, fundamentally reshaping operational paradigms across industries. The global crisis accelerated digital transformation initiatives, particularly in the United States, where organizations were compelled to rapidly transition to remote work, digital service delivery, and real-time data analytics to maintain continuity and competitiveness. In this context, Artificial Intelligence (AI) and Business Analytics (BA) emerged as critical enablers of organizational resilience and innovation [1-3]. Digital transformation refers to the strategic adoption of digital technologies to reengineer traditional processes, elevate customer experiences, and enhance operational efficiency. U.S. companies accelerated their digital offerings by three to four years in response to pandemic-related disruptions. While digital transformation was already underway prior to COVID-19, the pandemic underscored its strategic urgency and elevated its role as a business imperative [3-4].

AI has been instrumental in enabling predictive decision-making, task automation, and advanced data interpretation. Subfields such as machine learning (ML), natural language processing (NLP), and robotic process automation (RPA) are increasingly embedded across functions ranging from customer service to supply chain optimization. In parallel, BA empowers organizations with real-time dashboards, predictive forecasting tools, and descriptive analytics, enabling data-driven decision-making at scale. Together, AI and BA not only enhance IT project success but also strengthen organizational agility, equipping businesses to respond swiftly to market volatility and operational disruptions [5-8].

The pandemic's impact was particularly profound on IT project management. Conventional approaches struggled to adapt to rapidly evolving requirements, geographically dispersed teams, and fluctuating resource availability. The need for intelligent, adaptive solutions became evident [9-10]. AI-driven tools are now transforming project execution by detecting risk patterns, forecasting potential delays, and generating automated corrective measures. Similarly, BA platforms provide project managers with real-time insights into key performance indicators (KPIs), resource allocation, and stakeholder engagement metrics [11-13].

Organizational agility the capacity to sense, respond, and adapt to change has emerged as a defining characteristic of post-pandemic success. Businesses with robust digital infrastructures and data-centric cultures have shown greater resilience and faster recovery rates. Another group of researchers reported that organizations making significant investments in AI and BA during the pandemic outperformed competitors in both profitability and market share growth. This underscores the strategic imperative of embedding intelligent technologies into core business planning [14-15].

The digital shift also extends its influence to talent management, cybersecurity, regulatory compliance, and customer engagement. Many organizations are adopting hybrid work models, rolling out digital upskilling initiatives, and deploying AI-driven tools to enhance employee productivity. However, the increasing reliance on intelligent systems raises important ethical considerations, including data privacy, algorithmic bias, and digital inequality necessitating the development of inclusive governance frameworks and responsible technology practices.

© By the Author(s) 2024, under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0).

2 THEORETICAL FRAMEWORK

Artificial Intelligence (AI) and Business Analytics (BA) have become foundational technologies in reshaping the modern digital enterprise. Operating synergistically, these domains deliver deep insights and automation capabilities across diverse business functions. AI has progressed from simple rule-based automation to advanced machine learning (ML) and deep learning (DL) models capable of simulating human cognition, reasoning, and pattern recognition. BA, in contrast, centers on systematic collection, processing, and interpretation of business data to guide strategic and operational decision-making [15-18]. Digital transformation refers to the re-engineering of organizational processes, business models, and cultures through the strategic adoption of digital technologies. When implemented effectively, it enhances efficiency, fosters innovation, and improves customer satisfaction. Achieving these outcomes requires the integration of multiple technologies, including AI and BA—within a coherent, long-term framework [1, 4, 9].

The Technology-Organization-Environment (TOE) framework offers a useful lens for understanding this integration. It identifies three dimensions influencing technology adoption: the technological context (e.g., predictive modeling, natural language processing, cloud-based analytics), the organizational context (e.g., data maturity, leadership vision, digital skills), and the environmental context (e.g., industry-specific challenges, customer expectations, regulatory requirements). Similarly, the Dynamic Capabilities View (DCV) emphasizes that organizations must build, integrate, and reconfigure internal competencies to adapt to rapidly changing environments [19-20]. AI and BA strengthen dynamic capabilities by enabling real-time sensing of opportunities and threats, informed decision-making, and operational transformation.

AI contributes to predictive forecasting, sentiment analysis, process automation, and anomaly detection. For instance, ML algorithms can analyze vast historical sales datasets to accurately forecast demand, while in project management, AI can predict delays, recommend optimal resource allocation, and automate risk mitigation. BA encompasses four key analytical approaches: descriptive (understanding past performance), diagnostic (identifying causes of trends), predictive (forecasting outcomes), and prescriptive (recommending actions). Widely used platforms such as Tableau, Microsoft Power BI, and SAS Analytics support these functions [13, 17, 21].

Integration of AI and BA occurs at both strategic and operational levels. Strategically, AI-generated insights refine digital transformation roadmaps; operationally, AI-augmented dashboards enable real-time tracking of KPIs and departmental performance. The growth of self-service analytics further empowers non-technical stakeholders to engage in data-driven decision-making [21-24]. Despite their potential, digital transformation projects often fail due to unclear vision, resistance to change, or underestimating implementation complexity. AI and BA mitigate these risks by delivering evidence-based insights, optimizing change management strategies, and track transformation success over time. In essence, AI and BA are interdependent pillars of digital transformation. Their integration promotes agility, innovation, and resilience qualities essential for navigating uncertainty in a post-pandemic business environment. The next section explores how the pandemic has shaped digital transformation and IT project management in the United States.

3 PANDEMIC-DRIVEN SHIFTS IN TECHNOLOGY ADOPTION

The COVID-19 pandemic fundamentally altered the landscape of information technology (IT) project management and technology adoption across industries. The U.S., being a global technology hub, experienced accelerated shifts in both strategic priorities and operational execution. As organizations rushed to ensure continuity, minimize disruption, and meet new consumer expectations, digital tools particularly those involving AI and Business Analytics became critical for project success [24-28]. Prior to the pandemic, digital transformation initiatives were often long-term strategic objectives. However, COVID-19 created immediate imperatives that required businesses to deploy digital solutions overnight. According to a report by PwC (2021), over 77% of U.S. businesses adopted at least one new digital tool during the pandemic, with cloud services, collaboration platforms, and analytics tools leading the charge. One of the most profound shifts was the transition to remote work. Traditional project management methodologies, such as Waterfall, were challenged by the new need for flexibility. Agile and hybrid frameworks have gained prominence due to their iterative nature and adaptability. AI-driven project management platforms like Asana, ClickUp, and Monday.com emerged as essential tools for task allocation, deadline tracking, and real-time communication [29-30]. AI played a transformative role in adapting project workflows. Natural language processing (NLP) was integrated into helpdesk operations to automate ticket resolution, while machine learning models optimized scheduling and resource allocation. AI-enabled virtual assistants improved stakeholder engagement by providing real-time updates and automating repetitive administrative tasks. These innovations significantly improved project velocity and reduced overhead costs [2-3, 31]

Meanwhile, Business Analytics allowed IT leaders to pivot strategies based on evolving metrics. Dashboards powered by Power BI and Tableau offered real-time views of key performance indicators, enabling more dynamic and informed decision-making. Predictive analytics were applied to anticipate project delays, forecast budget overruns, and assess risk exposure. These insights allowed managers to proactively mitigate issues and recalibrate resource plans [32-33]. From a strategic perspective, the pandemic led to the democratization of technology. With employees working from home, organizations had to decentralize access to project data and systems. This shift led to increased adoption of self-service analytics and AI-driven knowledge bases, empowering non-technical users to make data-informed decisions. Such empowerment contributed to faster response times and greater project ownership across departments. Another major

trend was the acceleration of cloud migration. Cloud computing facilitated scalability, security, and collaboration factors that became vital in remote project environments. AI and analytics platforms offered as Software-as-a-Service (SaaS) enabled businesses to deploy intelligent tools without heavy upfront investment, ensuring both accessibility and agility [15-16, 18].

However, this rapid digitization also brought new challenges. Cybersecurity threats escalated as the attack surface expanded with remote access. Project teams had to coordinate cybersecurity protocols with digital deployment strategies. Moreover, digital fatigue and collaboration inefficiencies emerged as productivity bottlenecks. These challenges highlighted the need for AI-enhanced workload balancing, sentiment analysis for employee well-being, and behavioral analytics for performance optimization [34-36].

Industries such as healthcare, retail, and finance showcased exemplary transformation stories. For instance, U.S. healthcare providers adopted AI-powered telemedicine platforms to manage patient workflows, while retailers leveraged predictive analytics for inventory forecasting amid supply chain disruptions. Banks used intelligent automation for remote onboarding and fraud detection demonstrating how technology underpinned resilience and continuity [37]. Importantly, organizations that had pre-existing digital maturity fared better during the crisis. A survey by McKinsey found that firms with advanced analytics capabilities were 1.5 times more likely to report revenue growth than their less mature counterparts. This highlights the value of long-term investment in AI and BA as a buffer against systemic shocks. Post-pandemic, the emphasis has shifted from survival to optimization. Organizations are now refining their digital transformation initiatives to be more strategic and future-proof. Project portfolios are being reassessed based on business impact, feasibility, and ROI. AI and BA are at the core of this assessment, enabling leaders to prioritize initiatives with the highest potential value [35, 36-39].

In conclusion, the pandemic accelerated the evolution of IT project management, making it more data-driven, automated, and resilient. AI and Business Analytics were instrumental in this transformation, enabling organizations to manage uncertainty with greater precision. As we transition into a new normal, the lessons learned during the pandemic will shape the future of IT project execution one that is intelligent, agile, and centered on value creation. The next section will explore how these technologies contribute to building organizational agility in the long term.

4 ORGANIZATIONAL AGILITY USIING INTELLIGENT TECHNOLOGIES

In today's rapidly evolving digital economy, organizational agility has emerged as a cornerstone of business resilience and growth. Defined as an organization's ability to respond quickly and effectively to environmental changes, agility is increasingly fueled by intelligent technologies—particularly Artificial Intelligence (AI) and Business Analytics (BA). In the post-pandemic context, the urgency to innovate, accelerate decision-making, and pivot operational strategies is greater than ever. This section examines how AI and BA enhance organizational agility across strategic, operational, and human capital dimensions [13, 16, 31]. Agile organizations are marked by responsiveness, innovation, and customer-centricity. The Boston Consulting Group found that such organizations are twice as likely to outperform competitors in both revenue growth and digital innovation. Their competitive edge lies in leveraging real-time data and predictive insights to make rapid, evidence-based decisions.

AI and BA enable this agility in multiple ways. First, they support continuous monitoring of key performance indicators, enabling proactive responses. Predictive analytics can anticipate demand fluctuations or supply chain disruptions, allowing companies to adjust production schedules or reallocate resources. For example, during COVID-19, hospitals used AI to forecast patient surges and optimize bed capacity in response to emerging variants [38-39]. Second, intelligent technologies empower agile strategic planning. AI-enabled scenario analysis allows leaders to simulate potential futures and assess the probable impact of strategic choices an essential capability in a world shaped by geopolitical volatility, climate change, and shifting consumer trends. Cloud-based dashboards provide executives with real-time operational and financial data, strengthening dynamic leadership [13, 34, 40].

Operational agility is another key benefit. Intelligent process automation can reroute workflows, handle repetitive tasks, and adjust service delivery based on live customer interactions. Chatbots and virtual assistants equipped with sentiment analysis adapt engagement strategies in real time; Walmart, for instance, uses such systems to rapidly address customer feedback, increasing satisfaction and loyalty [11, 15, 41]. Similarly, AI-powered supply chain systems optimize inventory and logistics in response to traffic, weather, or political events—a capability that proved critical during pandemic-related vaccine and goods distribution challenges [41]. At the human capital level, AI and BA foster a more adaptive workforce. Predictive talent management systems identify skill gaps, recommend targeted training, and forecast attrition risks. Natural language processing tools streamline recruitment by matching candidates to roles based on experience and behavioral traits. The result is a more agile, data-literate workforce equipped to respond to evolving needs. These technologies also enhance cross-functional collaboration by breaking down data silos. For example, Microsoft Teams integrated with Power BI enables marketing, sales, and operations teams to work from shared, real-time insights aligning objectives and accelerating decision-making [23, 40].

However, achieving true agility requires more than tools; it demands cultural transformation. Organizations must embrace change, encourage experimentation, and reward data-driven innovation. Leadership plays a pivotal role by investing in digital literacy, ensuring transparency in AI use, and aligning incentives with agile values. Agile organizations also use AI and BA to co-create value with customers and partners. Real-time feedback loops and AI-driven personalization allow companies to address consumer needs with precision. In finance, for example, AI-powered analytics now deliver personalized financial advice based on spending patterns, strengthening customer retention [1, 13,

19]. Even the public sector is adopting agile principles. U.S. government agencies, such as the General Services Administration (GSA), have integrated AI into agile frameworks to enhance service delivery, reduce fraud, and manage complex IT. These shifts are setting new benchmarks for responsiveness and citizen-focused governance. In summary, AI and Business Analytics are powerful enablers of organizational agility in the post-pandemic era enhancing decision-making, streamlining operations, personalizing services, and empowering employees. Their success, however, depends on a supportive culture, strong leadership, and a commitment to ethical and inclusive technology adoption. The following section will explore the ethical considerations, risks, and governance challenges that accompany this digital transformation journey.

5 CHALLENGES

While Artificial Intelligence (AI) and Business Analytics (BA) have accelerated digital transformation in the post-pandemic era, their widespread adoption introduces complex ethical, legal, and governance challenges. U.S. organizations must address concerns around data privacy, algorithmic bias, model transparency, and accountability particularly as intelligent systems become embedded in IT project management and strategic decision-making [1, 13, 32]. Data privacy is a primary concern. The pandemic drove a significant increase in data collection across healthcare, retail, and education. While this facilitated rapid innovation, it also heightened risks of personal information misuse. AI models trained on sensitive data can compromise privacy if not governed by rigorous policies. Incidents such as the Cambridge Analytica scandal and recent healthcare data breaches illustrate the consequences of inadequate safeguards [39, 41]. Robust data governance frameworks are essential to mitigate these risks. Algorithmic bias poses another major challenge. AI systems, often assumed to be objective, can perpetuate biases embedded in training datasets. This is especially problematic in hiring, healthcare, and finance, where biased algorithms risk reinforcing systemic inequalities.
Model transparency is also a pressing issue. Advanced machine learning models, particularly deep neural networks, often operate as "black boxes," limiting the ability to understand or challenge their outputs. In finance and public administration, such opacity can erode trust and hinder accountability. The growing demand for Explainable AI (XAI) has led to the development of tools like LIME and SHAP, which offer interpretable outputs. However, these tools remain imperfect when applied to highly complex models [41-43]. Regulatory governance of AI and BA in the U.S. is fragmented, with sector-specific guidelines but no unified national policy. Agencies such as the Federal Trade Commission (FTC) have issued guidance on fairness and transparency, yet enforceable standards remain limited. The European Union's AI Act presents a contrasting risk-based approach, offering a potential model for future U.S. regulation [26, 29, 31]
To address these challenges, organizations should adopt ethical AI principles encompassing consent, fairness, accountability, and user agency embedding these into system design, deployment, and monitoring. Interdisciplinary ethics boards can oversee high-risk projects, ensuring alignment with both internal standards and evolving regulations. Corporate governance structures must adapt as well. Boards of directors require digital fluency to effectively oversee AI initiatives. Chief Information Officers (CIOs) and Chief Data Officers (CDOs) should be empowered to implement governance frameworks that integrate legal, compliance, and operational priorities. Collaboration with legal teams is essential to anticipate regulatory changes and mitigate litigation risk. Transparency-by-design should be a core practice. Clear documentation of model purpose, data sources, performance metrics, and limitations fosters trust and facilitates audits. Proactive communication with stakeholders especially employees and customers, can help manage expectations and perceptions.
Beyond internal measures, public–private collaboration is essential for setting industry-wide standards. Partnerships among industry groups, academia, and government can promote guidelines, audits, and best practice sharing. Initiatives such as the National AI Initiative Act (2020) and the National Institute of Standards and Technology (NIST) are important steps toward a coordinated governance ecosystem [27, 28, 41]. The pandemic also highlighted the need for digital ethics in workforce management. AI applications for employee monitoring, productivity tracking, or recruitment must respect worker rights, avoid fostering toxic work cultures, and include transparent policies and consent mechanisms. Finally, ethical AI strategies must anticipate future labor market impacts. While AI can enhance agility and performance, automation risks displacing certain jobs. Organizations should invest in reskilling programs, support workforce transitions, and pursue inclusive transformation strategies. In summary, the rapid post-pandemic expansion of AI and BA requires a comprehensive ethical and governance framework. Addressing privacy, bias, transparency, and accountability is both a moral obligation and a strategic imperative for sustainable digital transformation. The final section will present strategic recommendations and a roadmap for advancing transformation in an ethically responsible and future-ready manner.

6 RECOMMENDATIONS AND FUTURE OUTLOOK

To sustain the momentum of digital transformation in the post-pandemic era, organizations must adopt forward-looking strategies that integrate Artificial Intelligence (AI), Business Analytics (BA), and Management Information Systems (MIS) into the core of business operations. The following strategic recommendations aim to enhance IT project success, foster organizational agility, and position the U.S. as a leader in the ethical and sustainable use of intelligent technologies.

6.1 Develop a National Digital Transformation Strategy

Government agencies and business leaders should jointly create a unified digital strategy aligned with national development goals. This framework should promote AI literacy, expand digital infrastructure, and enforce robust data governance policies. Drawing on models such as the European Commission's AI Act and Singapore's AI governance framework, a U.S. strategy should establish sector-specific AI roles, ethical principles, and operational standards [36-41].

6.2 Institutionalize AI Ethics and Governance Training

Digital ethics training must become a standard requirement for leadership at all levels. CIOs, project managers, and data scientists should receive ongoing education in AI fairness, explainability, and compliance. Partnerships with universities and think tanks can ensure that curricula address both technical competencies and practical governance challenges.

6.3 Strengthen Public–Private Partnerships

Collaboration among government, industry, and academia is essential to accelerate responsible innovation. Public–private partnerships can facilitate secure data sharing, create regulatory sandboxes for AI testing, and fund ethical technology development. Expanding initiatives like the National AI Research Resource (NAIRR) would provide SMEs and state agencies with access to critical data and computing resources.

6.4 Invest in Scalable and Interoperable MIS Platforms

MIS architectures must evolve to handle real-time analytics, cloud-native integration, and secure, cross-department collaboration. Investing in modular, interoperable MIS solutions will reduce data silos and support coordinated decision-making across agencies, enterprises, and jurisdictions.

6.5 Prioritize Cybersecurity Resilience

As digital infrastructure expands, so does its exposure to cyber threats. AI-driven security tools—such as anomaly detection, predictive threat modeling, and automated incident response—should be embedded in core systems. Collaboration between the U.S. Cybersecurity and Infrastructure Security Agency (CISA) and technology providers can help establish national AI cybersecurity standards.

6.6 Integrate Predictive Analytics into Policy Design

Government agencies should embed predictive analytics into policymaking processes across public health, environmental planning, economic forecasting, and regulatory development. Data-driven models and simulations can enable proactive, evidence-based governance.

6.7 Advance Workforce Transformation and Digital Equity

The automation-driven shift in labor markets must be met with targeted reskilling and upskilling programs. Federal and state-level initiatives should prioritize training for marginalized communities to bridge the digital divide. Expanding programs such as AI for Good and digital apprenticeships can promote inclusive economic growth.

6.8 Establish Metrics for Digital Transformation Maturity

A standardized set of performance indicators covering AI adoption, IT project success rates, customer satisfaction, and workforce engagement should be developed to track progress. Regular benchmarking will support continuous improvement and inform adaptive strategy adjustments.

6.9 Promote Responsible AI Innovation

AI systems should be developed using inclusive datasets, tested for bias, and subjected to regular audits. Transparent stakeholder feedback loops engaging customers, employees, and regulators will help ensure that AI systems meet ethical and societal expectations.

6.10 Embed Agility into Organizational Culture

A culture of experimentation, cross-functional collaboration, and rapid iteration should be cultivated across all business units. Agile frameworks should extend beyond software development to operational and strategic planning, empowering teams with real-time analytics and decision-making autonomy. The next phase of digital transformation will be characterized by the convergence of technologies, sectors, and global governance standards. AI and BA will drive advancements in smart cities, personalized healthcare, autonomous logistics, and sustainable innovation. Organizations that invest today in ethical, scalable, and inclusive systems will be best positioned to lead tomorrow's digital economy. As AI capabilities expand, explainability, accountability, and equity will remain central to its societal impact. The future

of digital transformation is not defined by technology alone, but by the leadership, inclusivity, and trust that guide its use. By implementing these strategic recommendations, the U.S. can leverage AI and Business Analytics to achieve resilient, agile, and ethically grounded growth in an increasingly dynamic global landscape.

7 CONCLUSION

The abrupt disruptions of the COVID-19 pandemic prompted companies and public agencies to accelerate their adoption of Artificial Intelligence (AI), Business Analytics (BA), and Management Information Systems (MIS) as essential tools for ensuring continuity, enhancing agility, and strengthening resilience. As this review has shown, the post-pandemic era has catalyzed the integration of intelligent systems across all levels of enterprise and governance. AI and BA have become indispensable for managing uncertainty, predicting trends, and optimizing processes. From automating routine decision-making to enhancing strategic foresight, these technologies now play a central role in IT project management. The integration of MIS has further enabled organizations to synchronize operations with rapidly changing market demands through centralized, interoperable, and data-driven platforms. Together, these innovations are redefining best practices in project execution, performance monitoring, and service delivery. The pandemic also accelerated a shift from linear, hierarchical decision-making models to agile, collaborative frameworks. Organizations that embraced digital agility were able to adapt more effectively to supply chain disruptions, workforce mobility, and evolving consumer behaviors. This adaptability was driven by predictive analytics, which delivered real-time insights to support business continuity and operational pivots. Thus, post-pandemic digital transformation represents more than a technological upgrade it signifies a cultural and leadership reorientation toward adaptability and innovation. However, the growing sophistication of these technologies raises pressing ethical and governance concerns. Data privacy, algorithmic fairness, model transparency, and responsible innovation must remain central to digital strategy. Trust, accountability, and inclusiveness are critical to ensuring that the benefits of AI and BA are equitably distributed. The U.S. must proactively develop regulatory frameworks that align AI development and deployment with democratic values and the public interest. To fully realize the promise of post-pandemic digital transformation, organizations need strategies that align technology adoption with workforce development, public policy, and ethical governance. Investments in digital infrastructure should be matched by education and reskilling initiatives to ensure broad participation in the digital economy. Public–private partnerships, international collaboration, and regulatory harmonization will be vital in shaping a future where technology advances both innovation and social good. In sum, the synergy of AI, BA, and MIS offers a transformative pathway to sustainable economic growth and organizational resilience. The United States stands at a pivotal moment to leverage its technological leadership in fostering an inclusive, secure, and agile society. By embedding intelligence into the core of operations and policymaking, post-pandemic America can emerge not only stronger, but also smarter, more equitable, and better prepared for the challenges of an interconnected global future.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

REFERENCES

[1] Ashik A A M, Rahman M M, Hossain E, et al. Transforming U.S. Healthcare Profitability through Data-Driven Decision Making: Applications, Challenges, and Future Directions. European Journal of Medical and Health Research, 2023, 1(3): 116-125. DO: 10.59324/ejmhr.2023.1(3).21.

[2] National Institute of Standards and Technology (NIST). Framework for managing AI risks. 2020.

[3] Barikdar C R, Hassan J, Saimon A S M, et al. Life Cycle Sustainability Assessment of Bio-Based and Recycled Materials in Eco-Construction Projects. Journal of Ecohumanism, 2022, 1(2): 151. DOI: 10.62754/joe.v1i2.6807.

[4] F B Khair, M K Ahmed, M K Hossain, et al. Sustainable Economic Growth Through Data Analytics: The Impact of Business Analytics on U.S. Energy Markets and Green Initiatives. 2024 International Conference on Progressive Innovations in Intelligent Systems and Data Science (ICPIDS), Pattaya, Thailand, 2024: 108-113. DOI: 10.1109/ICPIDS65698.2024.00026

[5] Hossain D, Alasa DK, Jiyane G. Water-based fire suppression and structural fire protection: strategies for effective fire control. International Journal of Communication Networks and Information Security (IJCNIS), 2023, 15(4): 485-94. https://ijcnis.org/index.php/ijcnis/article/view/7982.

[6] Hossain E, Ashik A A M, Rahman M M, et al. Big data and migration forecasting: Predictive insights into displacement patterns triggered by climate change and armed conflict. Journal of Computer Science and Technology Studies, 2023, 5(4): 265–274. DOI: 10.32996/jcsts.2023.5.4.27.

[7] Hossain E, Shital K P, Rahman M S, et al. Machine learning-driven governance: Predicting the effectiveness of international trade policies through policy and governance analytics. Journal of Trends in Financial and Economics, 2024, 1(3): 50–62. DOI: 10.61784/jtfe3053.

[8] Hossain S, Bhuiyan M M R, Islam M S, et al. Big Data Analysis and prediction of COVID-2019 Epidemic Using Machine Learning Models in Healthcare Sector. Journal of Ecohumanism, 2024, 3(8): 14468. DOI: 10.62754/joe.v3i8.6775.

[9] Islam S, Hossain E, Rahman M S, et al. Digital Transformation in SMEs: Unlocking Competitive Advantage through Business Intelligence and Data Analytics Adoption. 2023, 5 (6): 177-186. DOI: 10.32996/jbms.2023.5.6.14.
[10] Jahid Hassan, Clinton Ronjon Barikdar, Evha Rozario, et al. Emerging Trends and Performance Evaluation of Eco -Friendly Construction Materials for Sustainable Urban Development. Journal of Mechanical, Civil and Industrial Engineering, 2022, 2(2): 80-90. DOI: 10.32996/jmcie.2021.2.2.11.
[11] Miah Md Alamgir, Rozario Evha, Khair Fahmida Binte, et al. Harnessing Wearable Health Data and Deep Learning Algorithms for Real-Time Cardiovascular Disease Monitoring and Prevention, Nanotechnology Perceptions, 2019, 15(3): 326-349,. DOI: 10.62441/nano-ntp.v15i3.5278.
[12] Manik M M T G. Multi-Omics Integration with Machine Learning for Early Detection of Ischemic Stroke Through Biomarkers Discovery. Journal of Ecohumanism, 2023, 2(2): 175–187. DOI: 10.62754/joe.v2i2.6800.
[13] Rahman M S, Islam S, Khan S I, et al. Redefining marketing and management strategies in digital age: Adapting to consumer behavior and technological disruption. Journal of Information Systems Engineering and Management, 2024, 9(4): 1–16. DOI: 10.52783/jisem.v9i4.32.
[14] Sultana S, Karim F, Rahman H, et al. A Comparative Review of Machine Learning Algorithms in Supermarket Sales Forecasting with Big Data. Journal of Ecohumanism, 2024, 3(8): 14457. DOI: 10.62754/joe.v3i8.6762.
[15] Tanvir A, Juie B J A, Tisha N T, Rahman M M. Synergizing big data and biotechnology for innovation in healthcare, pharmaceutical development, and fungal research. International Journal of Biological, Physical and Chemical Studies, 2020, 2(2): 23–32. DOI: 10.32996/ijbpcs.2020.2.2.4.
[16] Rahman M M, Juie B J A, Tisha N T, et al. Harnessing predictive analytics and machine learning in drug discovery, disease surveillance, and fungal research. Eurasia Journal of Science and Technology, 2022, 4(2): 28-35. DOI: 10.61784/ejst3099.
[17] McKinsey & Company. How COVID-19 has pushed companies over the technology tipping point—and transformed business forever. 2021. https://www.mckinsey.com/.
[18] Manik M M T G, Saimon Abu Saleh Muhammad, Miah Md Alamgir, et al. Leveraging Ai-Powered Predictive Analytics for Early Detection of Chronic Diseases: A Data-Driven Approach to Personalized Medicine. Nanotechnology Perceptions, 2021, 17(3): 269-288. DOI: 10.62441/nano-ntp.v17i3.5444.
[19] Manik M M T G, Hossain Sazzat, Ahmed Md Kamal, et al. Integrating Genomic Data and Machine Learning to Advance Precision Oncology and Targeted Cancer Therapies. Nanotechnology Perceptions, 2022, 18(2): 219-243, DOI: 10.62441/nano-ntp.v18i2.5443.
[20] Khan S I, Rahman M S, Ashik A A M, et al. Big Data and Business Intelligence for Supply Chain Sustainability: Risk Mitigation and Green Optimization in the Digital Era. European Journal of Management, Economics and Business, 2024, 1(3): 262-276. DOI: 10.59324/ejmeb.2024.1(3).23.
[21] Bulbul IJ, Zahir Z, Tanvir A, et al. Comparative study of the antimicrobial, minimum inhibitory concentrations (MIC), cytotoxic and antioxidant activity of methanolic extract of different parts of Phyllanthus acidus (l.) Skeels (family: Euphorbiaceae). World Journal of Pharmacy and Pharmaceutical Sciences, 2018, 8(1): 12-57. DOI: 10.20959/wjpps20191-10735.
[22] Hossain D, Alasa DK. Fire detection in gas-to-liquids processing facilities: challenges and innovations in early warning systems. International Journal of Biological, Physical and Chemical Studies, 2024b, 6(2): 7-13. DOI: 10.32996/ijbpcs.2024.6.2.2.
[23] Hossain D, Asrafuzzaman M, Dash S, et al. Multi-Scale Fire Dynamics Modeling: Integrating Predictive Algorithms for Synthetic Material Combustion in Compartment Fires. Journal of Management World, 2024(5): 363-374. DOI: 10.53935/jomw.v2024i4.1133.
[24] Zuboff S. The age of surveillance capitalism: The fight for a human future at the new frontier of power. PublicAffairs, 2019.
[25] Lundberg S M, Lee S I. A unified approach to interpreting model predictions. Advances in Neural Information Processing Systems, 2017, 30.
[26] Ribeiro M T, Singh S, Guestrin C. Why should I trust you? Explaining the predictions of any classifier. Proceedings of the 22nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, 2016: 1135–1144.
[27] Hossain D. Fire dynamics and heat transfer: advances in flame spread analysis. Open Access Research Journal of Science and Technology, 2022, 6(2): 70-5. DOI: 10.53022/oarjst.2022.6.2.0061.
[28] Hossain D. A fire protection life safety analysis of multipurpose building. 2021. https://digitalcommons.calpoly.edu/fpe_rpt/135/.
[29] Alasa DK, Hossain D, Jiyane G. Hydrogen Economy in GTL: Exploring the role of hydrogen-rich GTL processes in advancing a hydrogen-based economy. International Journal of Communication Networks and Information Security (IJCNIS), 2025, 17(1): 81–91. https://www.ijcnis.org/index.php/ijcnis/article/view/8021.
[30] Islam S, Khan S I, Ashik A A M, et al. Big data in economic recovery: A policy-oriented study on data analytics for crisis management and growth planning. Journal of Computational Analysis and Applications (JoCAAA), 2024, 33(7): 2349–2367. https://www.eudoxuspress.com/index.php/pub/article/view/3338.
[31] Juie B J A, Kabir J U Z, Ahmed R A, et al. Evaluating the impact of telemedicine through analytics: Lessons learned from the COVID-19 era. Journal of Medical and Health Studies, 2021, 2(2): 161–174. DOI: 10.32996/jmhs.2021.2.2.19.

[32] Golec J, Peric M. Digital transformation in public administration: The role of AI and data analytics. Public Sector Innovation Journal, 2022, 28(2): 45–63.
[33] Manik M M T G. Biotech-Driven Innovation in Drug Discovery: Strategic Models for Competitive Advantage in the Global Pharmaceutical Market. Journal of Computational Analysis and Applications (JoCAAA), 2020, 28(6): 41–47. https://eudoxuspress.com/index.php/pub/article/view/2874.
[34] Manik M M T G, Bhuiyan Mohammad Muzahidur Rahman, Moniruzzaman Mohammad, et al. The Future of Drug Discovery Utilizing Generative AI and Big Data Analytics for Accelerating Pharmaceutical Innovations, Nanotechnology Perceptions, 2018, 14(3): 120-135. DOI: 10.62441/nano-ntp.v14i3.4766.
[35] Manik M M T G, Moniruzzaman Mohammad, Islam Md Shafiqul, Bhuiyan, et al. The Role of Big Data in Combatting Antibiotic Resistance Predictive Models for Global Surveillance, Nanotechnology Perceptions, 2020, 16(3): 361-378. DOI: 10.62441/nano-ntp.v16i3.5445.
[36] Gartner. Top Strategic Technology Trends for 2021. 2021. https://www.gartner.com/.
[37] European Commission. Proposal for a Regulation laying down harmonized rules on Artificial Intelligence (AI Act). 2021. https://digital-strategy.ec.europa.eu/en/policies/european-approach-artificial-intelligence.
[38] Manik M M T G. Multi-Omics System Based on Predictive Analysis with AI-Driven Models for Parkinson's Disease (PD) Neurosurgery. Journal of Medical and Health Studies, 2021, 2(1): 42-52. DOI: 10.32996/jmhs.2021.2.1.5.
[39] Das K, Ayim BY, Borodynko-Filas N, et al. Genome editing (CRISPR/Cas9) in plant disease management: challenges and future prospects. Journal of Plant Protection Research, 2023, 63: 159–172. DOI: 10.24425/jppr.2023.145761.
[40] Manik M M T G. An Analysis of Cervical Cancer using the Application of AI and Machine Learning. Journal of Medical and Health Studies, 2021, 3(2): 67-76. DOI: 10.32996/jmhs.2022.3.2.11.
[41] Deloitte Insights. Organizing for the future: Nine trends in workforce transformation. 2021. https://www2.deloitte.com/.
[42] Tanvir A, Jo J, Park SM. Targeting Glucose Metabolism: A Novel Therapeutic Approach for Parkinson's Disease. Cells, 2024, 13: 1876. DOI: 10.3390/cells13221876.
[43] Hossain D, Alasa DK. Numerical modeling of fire growth and smoke propagation in enclosure. Journal of Management World, 2024a(5): 186-96. DOI: 10.53935/jomw.v2024i4.1051.