Journal of Business and Future Economy
Vol. 1, No. 3, pp. 63-75
Summer 2024

JBFE

Opportunities and Challenges in the Transition to Autonomous and Adaptive Enterprises in the Era of Industry 6.0

Tina Javidipour[1*]

[1]*Faculty of Industrial Engineering, Iran University of Science and Technology, Tehran, Iran*

Abstract

This research explores the transformative potential of Industry 6.0, a paradigm shift characterized by autonomy, adaptability, and human-centric innovation. Leveraging advanced technologies such as Artificial Intelligence of Everything (AIoE), blockchain, quantum computing, and digital twins, Industry 6.0 redefines business ecosystems by integrating automation with ethical and sustainable practices. AIoE, exemplifies this synergy, enabling real-time operations and predictive decision-making. The study identifies key opportunities, including operational efficiency, personalized customer engagement, and resilient supply chains, while addressing challenges such as data privacy, workforce transformation, and high implementation costs. Ethical AI and human-centric design emerge as critical enablers, ensuring fairness and inclusivity. By adopting strategic frameworks and fostering innovation ecosystems, businesses can navigate complexities and thrive in this transformative era. This research provides a comprehensive roadmap for enterprises to achieve resilience and sustainability in the dynamic landscape of Industry 6.0.

Keywords: Industry 6.0, Artificial Intelligence of Everything (AIoE), Autonomous and Adaptive Enterprises, Ethical AI, Human-Centric Design

1- Introduction

The rapidly evolving landscape of technology is redefining the way businesses operate, pushing boundaries and reshaping industries. As we enter the era of Industry 6.0, marked by the convergence of advanced technologies and human-centric innovations, businesses are compelled to rethink their strategies to stay competitive. Industry 6.0 goes beyond the automation and interconnectivity of Industry 4.0 and the smart integration of Industry 5.0, emphasizing autonomy, adaptability, and the seamless collaboration between machines, humans, and artificial intelligence.

[*] Corresponding author: tina_javidipour@ind.iust.ac.ir

In this context, the concept of autonomous and adaptive enterprises emerges as a cornerstone of future technology-based businesses (Movahed et al., 2024).

Autonomous and adaptive enterprises leverage cutting-edge technologies such as artificial intelligence (AI), the Internet of Things (IoT), blockchain, and quantum computing to operate with minimal human intervention. These enterprises are characterized by their ability to learn, self-optimize, and respond to dynamic market conditions in real time. They represent a paradigm shift from traditional business models, prioritizing agility, personalization, and resilience. Furthermore, the integration of ethical AI, sustainable practices, and decentralized systems ensures that these businesses align with the evolving expectations of consumers, regulators, and stakeholders in a rapidly digitizing world (Nozari & Aliahmadi, 2022).

The transition to such enterprises presents unparalleled opportunities for innovation and growth. From predictive analytics that drive customer insights to blockchain-enabled transparency in supply chains, businesses are empowered to deliver superior value propositions. For instance, adaptive enterprises can leverage digital twins and advanced simulation tools to optimize processes, reduce costs, and enhance decision-making. Additionally, these technologies foster inclusivity, enabling businesses to cater to diverse markets and address global challenges such as climate change and social inequality (Nozari et al., 2024).

However, this transformation is not without challenges. Data privacy and security concerns, workforce displacement, regulatory compliance, and the high cost of technological adoption are significant hurdles. Ethical dilemmas surrounding AI biases and decision-making autonomy further complicate the transition. For businesses to succeed, they must develop robust frameworks that balance technological innovation with ethical considerations and long-term sustainability. Collaboration between academia, industry, and policymakers will play a crucial role in addressing these challenges and shaping the regulatory landscape to foster innovation while safeguarding societal interests (Movahed et al., 2023).

This review aims to explore the opportunities and challenges in building autonomous and adaptive enterprises in the context of Industry 6.0. It provides a comprehensive analysis of emerging technologies and their potential to redefine business operations and strategies. Furthermore, it delves into the ethical, social, and economic implications of this transition, offering insights into how businesses can navigate this complex landscape effectively. By examining the interplay of technology, human values, and business innovation, this article aspires to provide a roadmap for enterprises looking to thrive in the era of Industry 6.0 (Ghahremani-Nahr et al., 2023).

As technology continues to evolve, the pursuit of autonomy and adaptability will not only shape the future of businesses but also redefine societal norms and expectations. This transformation underscores the need for interdisciplinary research and collaboration to unlock the full potential of emerging technologies while addressing their inherent challenges. Ultimately, autonomous and adaptive enterprises represent the next frontier in technology-based businesses, paving the way for a more resilient, inclusive, and sustainable future (Ghaedi et al., 2024).

2- Technological Pillars of Autonomous and Adaptive Enterprises

The foundation of autonomous and adaptive enterprises lies in the integration of advanced technologies that enable automation, real-time decision-making, and continuous optimization. These technological pillars are reshaping traditional business operations and setting the stage for a new era of innovation and efficiency. The key technologies driving this transformation include Artificial Intelligence (AI), the Internet of Things (IoT), blockchain, quantum computing, and digital twins, among others (Nozari, 2023).

AI serves as the brain of autonomous enterprises, enabling systems to analyze vast amounts of data, learn from patterns, and make informed decisions without human intervention. Machine learning (ML), a subset of AI, powers predictive analytics, customer behavior modeling, and supply chain optimization. Moreover, advancements in natural language processing (NLP) allow businesses to interact seamlessly with customers and stakeholders through chatbots and virtual assistants, enhancing user experience and operational efficiency (Nozari et al., 2024).

The IoT connects devices, sensors, and systems, creating an ecosystem where real-time data flows seamlessly across the enterprise. This connectivity enables predictive maintenance, resource optimization, and enhanced supply chain visibility. For example, IoT sensors in manufacturing facilities can detect anomalies and trigger automatic corrective actions, reducing downtime and operational costs. The ability to gather and analyze data from various touchpoints allows businesses to make proactive decisions, ensuring adaptability in dynamic environments (Movahed et al., 2024; Foukolaei et al., 2024).

Blockchain technology provides a decentralized, secure, and transparent framework for transactions and data management. Its applications in autonomous enterprises range from enhancing supply chain traceability to ensuring data integrity and reducing fraud. Smart contracts, a feature of blockchain, enable automated and self-executing agreements, eliminating the need for intermediaries and reducing operational bottlenecks (Tavakkoli-Moghaddam et al., 2024).

Quantum computing represents a leap forward in computational power, solving complex problems that are currently beyond the reach of classical computers. This technology holds immense potential for optimizing processes, such as portfolio management, risk analysis, and logistics planning. In autonomous enterprises, quantum computing can accelerate decision-making and provide innovative solutions to previously intractable challenges (Nozari, 2024).

Digital twins are virtual replicas of physical systems or processes, enabling real-time monitoring, simulation, and optimization. By leveraging digital twins, businesses can test scenarios, predict outcomes, and fine-tune operations without disrupting actual processes. This capability enhances agility and reduces the risks associated with implementing new strategies or technologies (Movahed et al., 2024).

The true power of these technologies lies in their integration and interoperability. Autonomous and adaptive enterprises require a seamless flow of information between systems, powered by robust data architectures and cloud-based platforms. This interconnectedness ensures that all

components of the enterprise work in harmony, enabling real-time responsiveness and continuous improvement.

3- The Evolution from Industry 4.0 to Industry 6.0: A Paradigm Shift

The progression of industrial revolutions has profoundly transformed businesses and societies, from mechanization in Industry 1.0 to the advanced interconnected ecosystems of Industry 4.0. While Industry 4.0 focused on automation, interconnectivity, and real-time data analysis, Industry 5.0 emphasized human-centric and sustainable approaches. Now, Industry 6.0 emerges as a new paradigm, integrating autonomy, adaptability, and human values, propelled by transformative technologies and innovative frameworks (Nozari, 2024).

Industry 6.0 represents a shift toward creating ecosystems where humans, machines, and AI collaborate seamlessly to tackle complex challenges. Unlike its predecessors, Industry 6.0 prioritizes self-sustaining, adaptive systems capable of responding dynamically to changes in the environment. This concept is discussed extensively in Hamed Nozari's "Advanced Businesses in Industry 6.0" (2023), which positions Industry 6.0 as a blend of cutting-edge technology and human-centered innovation, designed to address economic, social, and environmental challenges comprehensively (Najafi and Nozari, 2024).

At the heart of Industry 6.0 is Artificial Intelligence of Everything (AIoE)**,** a groundbreaking innovation introduced by Hamed Nozari. AIoE integrates AI, IoT, and advanced computational systems into a cohesive framework, enabling enterprises to achieve unparalleled adaptability, predictive decision-making, and resource optimization (Nozari, 2023). AIoE facilitates the creation of real-time, self-adjusting systems that enhance operational efficiency while maintaining ethical and sustainable practices (Nozari et al., 2024).

For instance, AIoE enables autonomous manufacturing processes where IoT-connected devices monitor production in real time, AI predicts maintenance needs, and blockchain ensures supply chain transparency. This level of integration allows businesses to anticipate disruptions, reduce waste, and improve customer responsiveness (Xu et al., 2021).

The book "Building Smart and Sustainable Businesses With Transformative Technologies" (2022) highlights how Industry 6.0 leverages advanced technologies such as blockchain, quantum computing, and digital twins to enable sustainable and adaptive business models. Blockchain ensures transparency and trust in transactions, while quantum computing accelerates complex problem-solving, particularly in logistics and resource allocation (Mukhopadhyay et al., 2022). Digital twins, virtual replicas of physical systems, provide real-time insights and predictive capabilities, enabling businesses to simulate and optimize processes before implementing them.

Industry 4.0 prioritized efficiency through automation and digitalization, whereas Industry 6.0 shifts the focus to autonomy, resilience, and inclusivity. Technologies like AIoE and blockchain empower enterprises to anticipate and respond to rapid changes in market conditions, regulatory requirements, and societal needs (Bahrin et al., 2016). Furthermore, the human-centric approach of Industry 6.0 ensures that technological advancements align with ethical and sustainable goals,

addressing concerns about workforce displacement and environmental impact (Duflou et al., 2021).

While Industry 6.0 promises significant advancements, challenges such as data privacy, ethical AI, and workforce transformation must be addressed. Collaboration between academia, policymakers, and industry is essential to establish frameworks that maximize the benefits of these technologies while mitigating potential risks (Schwab, 2017; Zeraati Foulolaei et al., 2017).

Industry 6.0 represents a transformative era that redefines business ecosystems through autonomy, adaptability, and sustainability. By integrating innovations like AIoE, blockchain, and digital twins, it offers a path forward for businesses to thrive in an increasingly complex world. As highlighted by Nozari (2023) and Mukhopadhyay et al. (2022), this paradigm shift underscores the need for interdisciplinary collaboration and continuous innovation to navigate the challenges and opportunities of the future.

4- Key Opportunities in Building Future Technology-Based Businesses

The emergence of transformative technologies under Industry 6.0 presents unprecedented opportunities for businesses to innovate and thrive. These opportunities extend across multiple domains, reshaping operations, customer engagement, and sustainability initiatives.

One of the most significant opportunities lies in leveraging technologies like Artificial Intelligence of Everything (AIoE), blockchain, and digital twins to optimize operations. AIoE, introduced by Hamed Nozari, enables businesses to integrate AI and IoT for real-time monitoring, predictive maintenance, and process automation. For instance, digital twins allow organizations to simulate and optimize manufacturing processes, reducing waste and improving efficiency (Nozari, 2023).

Future businesses can harness AI and machine learning (ML) to deliver highly personalized experiences. By analyzing customer data, AI systems can predict preferences, recommend tailored products, and create dynamic pricing models. This level of personalization not only boosts customer satisfaction but also enhances loyalty and long-term engagement (Mukhopadhyay et al., 2022). Chatbots and virtual assistants powered by natural language processing (NLP) further enrich the customer experience by providing instant and accurate support.

Blockchain technology revolutionizes supply chains by providing end-to-end transparency and traceability. Smart contracts automate transactions, ensuring faster and error-free operations. This is particularly critical in industries like pharmaceuticals, where ensuring the authenticity of products is paramount. Furthermore, AI-powered predictive analytics enable businesses to anticipate disruptions and make proactive adjustments, fostering resilience in volatile markets (Xu et al., 2021).

Transformative technologies open avenues for new business models, such as subscription-based services, pay-per-use systems, and decentralized platforms. For instance, businesses can utilize AIoE and IoT to offer smart, connected products that continuously evolve based on user feedback. These models not only enhance value for customers but also create new revenue streams for enterprises (Schwab, 2017).

Industry 6.0 emphasizes sustainability, offering businesses the tools to align operations with environmental goals. Technologies like AIoE and digital twins help monitor and minimize energy consumption, optimize resource use, and reduce emissions. By adopting circular economy principles, businesses can create closed-loop systems that recycle and repurpose materials, contributing to global sustainability targets (Duflou et al., 2021).

The interconnected nature of Industry 6.0 technologies allows businesses to reach previously inaccessible markets. AI-powered translation, virtual reality (VR), and augmented reality (AR) facilitate seamless communication and collaboration across geographical and cultural barriers, enabling inclusive growth.

In summary, Industry 6.0 technologies present businesses with unparalleled opportunities to innovate and excel. By embracing these tools strategically, organizations can enhance operational efficiency, foster deeper customer relationships, and lead the way in sustainability and ethical practices.

5- Challenges and Risks in the Transition to Autonomy and Adaptability

While the transition to autonomous and adaptive enterprises offers immense potential, it is accompanied by significant challenges and risks that businesses must address to fully capitalize on the benefits of Industry 6.0.

The integration of AIoE and IoT technologies increases the volume of data generated and shared across networks. This poses a heightened risk of cyberattacks and data breaches. Ensuring robust cybersecurity measures and compliance with regulations like GDPR is critical for protecting sensitive customer and business data (Xu et al., 2021).

AI systems often face scrutiny over biases in algorithms, lack of transparency, and accountability in decision-making. These ethical challenges can erode trust and lead to unintended consequences, such as discrimination or social inequality. Businesses must implement ethical AI frameworks to ensure fairness, explainability, and inclusivity in their AI applications (Nozari, 2023).

The automation and adaptability brought by Industry 6.0 technologies may render certain job roles obsolete, leading to workforce displacement. Simultaneously, businesses face resistance from employees reluctant to adopt new systems. Reskilling and upskilling programs are essential to equip workers with the necessary skills and to foster acceptance of these transformative changes (Schwab, 2017).

Adopting Industry 6.0 technologies often requires substantial investment in infrastructure, training, and system integration. For small and medium-sized enterprises (SMEs), these costs can be prohibitive, limiting their ability to compete with larger corporations. Governments and industry bodies need to provide financial support and incentives to encourage widespread adoption (Mukhopadhyay et al., 2022).

The effectiveness of autonomous enterprises depends on seamless integration and interoperability between various technologies, platforms, and systems. However, achieving this integration is often

challenging due to diverse standards, legacy systems, and vendor dependencies. Businesses must adopt flexible and scalable architectures to overcome these obstacles (Bahrin et al., 2016).

The rapid pace of technological advancement often outpaces regulatory frameworks, creating uncertainty for businesses. For example, blockchain and AI technologies raise questions about intellectual property, liability, and cross-border data flows. Policymakers need to establish clear and adaptive regulations that balance innovation with societal protections (Duflou et al., 2021).

While autonomy is a key feature of Industry 6.0, over-reliance on technology can lead to a loss of human oversight in critical areas. Striking a balance between automation and human involvement is vital to ensure accountability and ethical decision-making in adaptive systems (Nozari, 2023).

In conclusion, the transition to autonomy and adaptability under Industry 6.0 brings both transformative potential and significant challenges. By addressing these risks strategically and collaboratively, businesses can unlock the full potential of Industry 6.0 while mitigating its pitfalls.

6- The Role of Ethical AI and Human-Centric Design in Future Enterprises

In the era of Industry 6.0, the integration of Artificial Intelligence (AI) and human-centric design principles has become critical for the success of future enterprises. Ethical AI ensures fairness, accountability, and transparency in decision-making processes, addressing concerns about biases and unintended consequences in automated systems. Coupled with human-centric design, these principles aim to create technologies that are not only efficient but also inclusive and aligned with societal values (Oskounejad & Nozari, 2024).

Ethical AI is foundational to autonomous and adaptive enterprises. It mitigates risks associated with biased algorithms, lack of transparency, and data privacy violations. A survey conducted by McKinsey in 2023 revealed that 76% of organizations prioritize ethical AI principles**,** citing trust as a major factor influencing customer and stakeholder engagement. Furthermore, companies adopting ethical AI frameworks report higher user satisfaction and compliance with global regulations (Taghipour et al., 2023).

Human-centric design in Industry 6.0 emphasizes collaboration between humans and machines, focusing on enhancing user experience, inclusivity, and adaptability. For example, AI systems tailored for user preferences significantly improve efficiency and engagement, particularly in customer-facing industries. Studies indicate that businesses employing human-centric design achieve a 25% improvement in product adoption rates compared to those relying solely on traditional approaches (Deloitte, 2022).

Data plays a pivotal role in ensuring ethical AI implementation. Transparency in data collection, processing, and usage is essential to maintaining public trust. According to Gartner, 64% of enterprises identified lack of data transparency as a barrier to successful AI adoption**,** underscoring the need for robust ethical frameworks.

Figure 1 illustrates how organizations distribute their focus across critical areas of ethical AI implementation:

1. Bias Mitigation (40%)
2. Data Privacy and Security (30%)
3. Transparency and Explainability (20%)
4. Fair Decision-Making (10%)

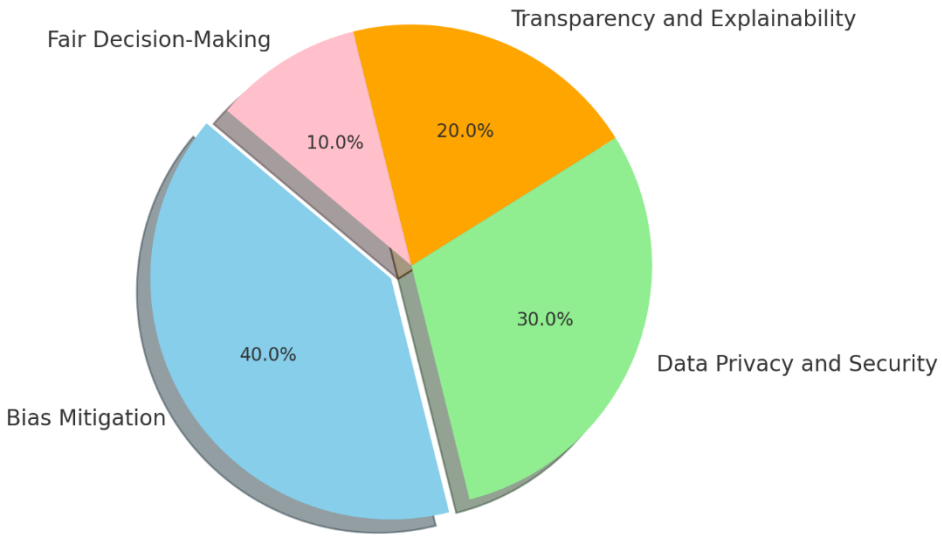

Figure 1: Key Areas of Focus in Ethical AI Adoption (2023)

7- Strategies for Successful Implementation of Adaptive Business Models

The transition to adaptive business models under Industry 6.0 requires strategic planning, robust frameworks, and the integration of advanced technologies. Adaptive businesses are characterized by their agility, responsiveness to change, and ability to optimize operations in real time. This section explores the critical strategies for implementing adaptive business models, supported by recent research, statistical data, and visual aids.

1. Leveraging Artificial Intelligence and Machine Learning

Artificial intelligence (AI) and machine learning (ML) are foundational to adaptive enterprises. These technologies enable businesses to process vast amounts of data, predict market trends, and automate decision-making. According to a report by McKinsey (2023**),** 63% of enterprises adopting AI report significant improvements in operational efficiency, highlighting its critical role in adaptability (Nahr et al., 2021).

AI-driven tools also enhance customer engagement by providing personalized recommendations and dynamic responses. For example, businesses using AI for customer segmentation saw an **18% increase in conversion rates** compared to those using traditional methods (Deloitte, 2022).

2. Developing Real-Time Data Ecosystems

Adaptive business models rely heavily on real-time data ecosystems, integrating IoT sensors, cloud platforms, and edge computing. These systems ensure continuous data collection and analysis, enabling businesses to respond to market changes dynamically. Gartner (2023) estimates that **78% of enterprises investing in IoT technologies achieve faster decision-making**, underscoring the importance of a robust data infrastructure.

3. Building Resilient Supply Chains with Blockchain

Blockchain technology offers transparency, security, and efficiency in managing adaptive supply chains. Its ability to provide real-time updates and automate transactions through smart contracts reduces delays and improves trust among stakeholders. A PwC study (2022) found that **blockchain-enabled supply chains reduce fraud by 27% and improve delivery accuracy by 15%**.

4. Investing in Workforce Transformation

The shift to adaptive models necessitates workforce transformation. Reskilling and upskilling programs ensure employees are equipped to leverage new technologies. According to the World Economic Forum (2023), **50% of the global workforce requires reskilling by 2025**, with AI and data literacy being top priorities.

Companies with active reskilling programs report higher employee satisfaction and productivity, reducing resistance to change and fostering innovation (Schwab, 2017).

5. Emphasizing Ethical and Sustainable Practices

Sustainability and ethical considerations are integral to adaptive models. Customers increasingly prefer businesses that align with environmental and social values. A Nielsen survey (2023) revealed that **73% of global consumers are willing to pay a premium for sustainable products**, pushing businesses to adopt green technologies and reduce their carbon footprint.

Digital twins, a key technology in Industry 6.0, help businesses simulate and optimize resource use, reducing waste and energy consumption. Furthermore, ethical AI frameworks ensure fairness, transparency, and inclusivity, building trust among stakeholders (Nozari, 2023).

6. Implementing Scalable and Interoperable Systems

Scalability and interoperability are critical to ensuring that adaptive business models can evolve with technological advancements. Flexible architectures and standardized protocols enable seamless integration of new tools and technologies. According to Accenture (2023), businesses with scalable systems are **40% more likely to achieve long-term growth** compared to those with rigid infrastructures.

7. Collaborative Partnerships and Innovation Ecosystems

Collaboration with academic institutions, technology providers, and regulatory bodies accelerates the implementation of adaptive models. Innovation ecosystems foster knowledge sharing and resource pooling, driving faster adoption of Industry 6.0 technologies. IBM's 2022 report highlights that **87% of successful adaptive businesses attribute their success to strong partnerships**.

Implementing adaptive business models requires a multidimensional approach involving technology adoption, workforce transformation, sustainability, and collaboration. By investing in AI, blockchain, real-time data ecosystems, and ethical practices, businesses can achieve the agility and resilience needed to thrive in the Industry 6.0 era. Supported by statistical evidence and frameworks, these strategies offer a roadmap for enterprises to navigate the complexities of future markets successfully.

8- Conclusion

The advent of Industry 6.0 signifies a transformative shift in the way businesses operate, innovate, and interact with their ecosystems. Rooted in the principles of autonomy, adaptability, and human-centricity, this era offers unprecedented opportunities for enterprises to redefine their strategies and build resilient, sustainable models. By embracing cutting-edge technologies such as Artificial Intelligence of Everything (AIoE), blockchain, quantum computing, and digital twins, businesses can achieve unparalleled levels of efficiency, personalization, and scalability.

The foundation of Industry 6.0 lies in leveraging transformative technologies to create autonomous and adaptive enterprises. AIoE, introduced by Hamed Nozari, exemplifies this integration by combining AI, IoT, and advanced computational systems to enable seamless, real-time operations. Ethical AI, a cornerstone of this paradigm, ensures fairness, transparency, and inclusivity, addressing concerns related to biases and unintended consequences. Similarly, human-centric design prioritizes user experiences, inclusivity, and societal well-being, paving the way for businesses that align with both consumer expectations and ethical considerations.

Real-time data ecosystems and IoT-driven systems empower businesses to monitor and optimize operations dynamically, fostering agility in an unpredictable market. Blockchain enhances supply chain transparency and trust, while quantum computing accelerates problem-solving in logistics, financial modeling, and beyond. Digital twins facilitate simulation and optimization, reducing risks and driving innovation in design and manufacturing processes.

The transition to Industry 6.0 presents immense opportunities, such as increased operational efficiency, personalized customer engagement, and innovative business models. Sustainability initiatives, enabled by green technologies and circular economy principles, align enterprises with global environmental goals. Moreover, collaboration between businesses, academia, and policymakers creates innovation ecosystems that accelerate technological adoption and foster knowledge sharing.

However, this transformation is not without challenges. Issues such as data privacy, cybersecurity threats, ethical dilemmas in AI, and workforce displacement must be addressed proactively. Workforce transformation through reskilling and upskilling is critical to ensure employees can

effectively leverage new technologies. Additionally, the high implementation costs of Industry 6.0 technologies pose a barrier for small and medium-sized enterprises (SMEs), necessitating government support and industry partnerships.

For businesses to thrive in the Industry 6.0 landscape, a strategic and holistic approach is essential. This involves investing in robust infrastructure, fostering a culture of innovation, and prioritizing ethical and sustainable practices. Interoperable and scalable systems enable seamless integration of emerging technologies, ensuring long-term adaptability. By addressing regulatory and compliance challenges, enterprises can navigate uncertainties and build trust with stakeholders.

Future research and development should focus on refining AIoE applications, enhancing blockchain scalability, and exploring the potential of quantum computing. Policymakers and regulators play a crucial role in creating frameworks that balance innovation with societal protections, enabling businesses to adopt new technologies responsibly.

Industry 6.0 is not merely an evolution of previous industrial revolutions but a paradigm shift that redefines the very fabric of business and society. It is a call to action for enterprises to embrace autonomy, adaptability, and human-centric values. By leveraging the opportunities presented by transformative technologies and addressing the associated challenges, businesses can unlock their full potential and contribute to a future that is not only technologically advanced but also equitable, sustainable, and resilient.

As businesses transition to this new era, they must recognize that the success of Industry 6.0 lies in collaboration, innovation, and ethical leadership. This is not just a technological revolution—it is a societal transformation that holds the promise of shaping a more inclusive and sustainable world.

References

Foukolaei, P. Z., Asari, F. A., Khazaei, M., Gholian-Jouybari, F., & Hajiaghaei-Keshteli, M. (2024). From responsible sourcing of wastes to sustainable energy consumption in the blue hydrogen supply chain: Case of nearshoring in Nuevo Leon. International Journal of Hydrogen Energy, 77, 1387-1400.

Ghaedi, M., Foukolaei, P. Z., Asari, F. A., Khazaei, M., Gholian-Jouybari, F., & Hajiaghaei-Keshteli, M. (2024). Pricing electricity from blue hydrogen to mitigate the energy rebound effect: A case study in agriculture and livestock. International Journal of Hydrogen Energy, 84, 993-1003.

Ghahremani-Nahr, J., Nozari, H., Rahmaty, M., Zeraati Foukolaei, P., & Sherejsharifi, A. (2023). Development of a novel fuzzy hierarchical location-routing optimization model considering reliability. Logistics, 7(3), 64.

Movahed, A. B., Aliahmadi, A., Parsanejad, M., & Nozari, H. (2023). A systematic review of collaboration in supply chain 4.0 with meta-synthesis method. Supply Chain Analytics, 100052.

Movahed, A. B., Movahed, A. B., & Nozari, H. (2024). Marketing 6.0 Conceptualization. In Advanced Businesses in Industry 6.0 (pp. 15-31). IGI Global.

Movahed, A. B., Movahed, A. B., & Nozari, H. (2024). Opportunities and challenges of smart supply chain in Industry 5.0. Information Logistics for Organizational Empowerment and Effective Supply Chain Management, 108-138.

Movahed, A. B., Movahed, A. B., Nozari, H., & Rahmaty, M. (2024). Security Criteria in Financial Systems in Industry 6.0. In Advanced Businesses in Industry 6.0 (pp. 62-74). IGI Global.

Nahr, J. G., Nozari, H., & Sadeghi, M. E. (2021). Green supply chain based on artificial intelligence of things (AIoT). International Journal of Innovation in Management, Economics and Social Sciences, 1(2), 56-63.

Najafi, E., & Nozari, H. (2024). Examining Dimensions and Critical Success Factors of Supply Chains Based on the Blockchain and Internet of Things (B-IoT). In Analytical Decision Making and Data Envelopment Analysis: Advances and Challenges (pp. 281-294). Singapore: Springer Nature Singapore.

Nozari, H. (2024). Green Supply Chain Management based on Artificial Intelligence of Everything. Journal of Economics and Management, 46, 171-188.

Nozari, H. (2024). Supply Chain 6.0 and Moving Towards Hyper-Intelligent Processes. In Information Logistics for Organizational Empowerment and Effective Supply Chain Management (pp. 1-13). IGI Global.

Nozari, H. (Ed.). (2023). Building Smart and Sustainable Businesses with Transformative Technologies. IGI Global.

Nozari, H., & Aliahmadi, A. (2022). Lean supply chain based on IoT and blockchain: Quantitative analysis of critical success factors (CSF). Journal of Industrial and Systems Engineering, 14(3), 149-167.

Nozari, H., Ghahremani-Nahr, J., Rahmaty, M., & Bayanati, M. (2024). A Framework for Smart and Resilient Supply Chains Based on Blockchain and the Internet of Things. In Blockchain-based Internet of Things (pp. 73-86). Chapman and Hall/CRC.

Nozari, H., Szmelter-Jarosz, A., & Rahmaty, M. (2024). Smart Marketing Based on Artificial Intelligence of Things (AIoT) and Blockchain and Evaluating Critical Success Factors. In Smart and Sustainable Interactive Marketing (pp. 68-82). IGI Global.

Nozari, H., Tavakkoli-Moghaddam, R., & Dolgui, A. (2024, September). Analysis of Critical Success Factors of Sustainable and Resilient Aioe-based Supply Chain in Industry 5.0. In IFIP International Conference on Advances in Production Management Systems (pp. 76-90). Cham: Springer Nature Switzerland.

Oskounejad, M. M., & Nozari, H. (Eds.). (2024). Advanced Businesses in Industry 6.0. IGI Global.

Taghipour, A., Foukolaei, P. Z., Ghaedi, M., & Khazaei, M. (2023). Sustainable Multi-Objective Models for Waste-to-Energy and Waste Separation Site Selection. Sustainability, 15(22), 15764.

Tavakkoli-Moghaddam, R., Nozari, H., Bakhshi-Movahed, A., & Bakhshi-Movahed, A. (2024). A Conceptual Framework for the Smart Factory 6.0. In Advanced Businesses in Industry 6.0 (pp. 1-14). IGI Global.

Zeraati Foulolaei, P., Madhoshi, M., Aghajani, H., & Yahyazadeh Far, M. (2017). Developing a local model to evaluate the impact of information technology capabilities on the performance of pharmaceutical firms using the mediating role of supply chain approach (Case study: Pharmaceutical Firms in Iran). Journal of Information Technology Management, 9(4), 829-850.