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| RESEARCH ARTICLE

AI-Driven Sustainable Architectures in Modern Information Systems: Aligning Technological Infrastructure with Financial Risk Management and Green Consumer Dynamics

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| ABSTRACT
AI based sustainable architectures is an emerging interdisciplinary approach that combines sustainable design principles, modern information systems, financial risk management and artificial intelligence, solving modern environmental and economic challenges. The study examines the potential of AI technologies to improve the design optimization, resource efficiency, and life cycle sustainability in the fields of architecture and construction. AI helps in informed decision-making by leveraging data-driven modeling, predictive analytics, and intelligent automation, which minimizes environmental effects and enhances building performance in areas such as material selection, energy management, and structural planning. The study also explores the potential of smart systems, the Internet of Things (IoT) and digital twin technologies in the further development of sustainable construction methods. These technologies enable monitoring, predictive maintenance and adaptive control of building systems in real-time, which leads to lower operating costs and better energy efficiency. Furthermore, the study emphasizes that lifecycle aspects such as maintenance, deconstruction, and material re-use are crucial, contributing to the principles of circular economy in the built environment. In addition, the conversation includes topics of financial risk management and green consumerism. AI can improve risk assessments by analyzing credit, market, and operational risks in real-time, as well as integrating environmental, social, and governance (ESG) considerations into financial decision-making. Moreover, AI has the potential to shape consumer behavior by facilitating personalized sustainability communication and improving green marketing efforts, which foster sustainable consumption. Additionally, AI plays a role in influencing consumer behavior by enabling personalized sustainability communication and enhancing green marketing strategies, promoting sustainable consumption.

| KEYWORDS

Artificial intelligence, sustainable architecture, IoT integration, financial risk management, green consumer behavior.

| ARTICLE INFORMATION

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1. Introduction

AI-Driven Sustainable Architectures in Modern Information Systems is a novel paradigm that integrates artificial intelligence (AI) capabilities, sustainable architectural concepts, and cutting-edge information systems to tackle the environmental, economic, and technological challenges of today's societies [Wang, 2025]. The world is becoming more and more urban, climate change and resource depletion are putting pressure on natural and built environments with an ever increasing impact, and the need for innovative and sustainable solutions is becoming more pressing than ever. To address this, AI-powered systems are becoming more prevalent in the architecture, engineering, construction, and information technology industries, helping enhance efficiency, optimize resources, and foster sustainability [Qudrat-Ullah, 2025]. Traditional sustainable architecture has been about designing and building buildings which have a low impact on the environment, while using as little energy as possible, and providing maximum comfort for the occupants and the least amount of waste of resources. But, with the growing complexity of modern construction projects, as well as a need to create infrastructure that is environmentally friendly, it is necessary to use approaches that are more sophisticated than traditional approaches to design. AI's computational power provides architects, engineers and decision-makers with the ability to process large amounts of information, discover patterns, and produce optimized designs that are both economically viable and environmentally responsible [Alserafy, 2023]. AI has revolutionized the way in which sustainable architectural projects are planned, designed, implemented and managed in today's information systems. AI systems can use machine learning algorithms, predictive analytics, and intelligent automation to analyze various design options, predict energy usage, and suggest materials with minimal environmental effects. These capabilities allow professionals to rely on data to make decisions across the entire building lifecycle, from design and construction through to operation and maintenance and eventually building decommission [Sharfuddin, 2025]. Consequently the sustainable architecture is getting more accurate, more efficient and more responsive to varying environmental conditions. The primary benefits of AI sustainable buildings include their energy efficiency. Buildings consume a large proportion of global energy, and generate a large proportion of global greenhouse gas emissions. Information systems can be powered by AI to track energy consumption in real-time, forecast energy trends, and adjust building operations accordingly, all for the purpose of finding and maximizing efficiency. Smart heating, ventilation, air conditioning and lighting systems can adjust their function dynamically depending on the occupancy and the environment, which decreases waste and operating costs [Danish, 2025]. These intelligent systems play an important role in meeting the sustainability goals and enhancing the comfort and productivity of the occupants. In addition to energy management, AI can also be applied to optimizing resources and minimizing environmental risks. Intelligent algorithms can be used to analyse construction materials, supply chains and waste management to find ways of using less resource and minimising environmental impact. Using predictive models can evaluate the long-term performance of building materials under different environmental conditions, and it can help choose more durable and sustainable materials. AI powered sustainable architectures aren't just limited to construction, but are also impacting financial risk management and organizational decision making [Choudhury, 2020]. AI-powered information systems have the ability to assess the financial risk from sustainability investments, climate-related uncertainties as well as operational inefficiencies. These systems enable organizations to make informed decisions about resource allocation and create resilient strategies for future growth by offering accurate forecasts and scenario analyses. The interconnection of sustainability and financial intelligence facilitates business model development which harmonize profitability with environmental stewardship. In addition, AI is reshaping consumer behavior and market dynamics by promoting greater awareness of sustainability issues. AI-driven analytics are becoming more common among organizations to gather insights about consumer preferences, forecast buying habits, and create customized green marketing strategies [Ding, 2024]. Such learnings enable enterprises to create products and services that meet consumer preferences for sustainability and enhance customer engagement and loyalty. With the increase in public concern about the environment, AI-powered information systems are increasingly vital to sustainable consumption and production. The use of intelligent technologies in sustainable design can lead to the development of resilient, efficient, and sustainable systems, which can help achieve economic development and global sustainability goals.

2. AI-Driven Sustainable Architectures

AI for Sustainable Architecture is a game-changing solution that combines the power of artificial intelligence with sustainable architectural principles to optimize building processes, reduce environmental impact, and foster innovation in the field of architecture, engineering, and construction (AEC) [Baduge, 2022]. The new paradigm allows architects, engineers and planners to create “intelligent solutions” that optimize building performance with a minimal impact on the environment. The use of AI-driven systems allows for the development of sustainable structures that are both energy-efficient and environmentally conscious, while also incorporating advanced computational features for enhanced performance and functionality. AI is increasingly vital in today's sustainable design landscape, enabling informed decision-making across the entire lifecycle of a building. AI algorithms can analyze large and complex datasets to explore different design options, simulate various environmental conditions, and determine the best design that meets performance, cost, and sustainability goals [Bank, 2011]. These abilities enable the designer to make decisions about building orientation, the materials, energy systems, and resource allocation. Therefore, buildings can be built to make the most of natural lighting, increase their thermal efficiency, minimize their energy use and make the occupants more comfortable. AI's application in the architecture field is a game-changer when it comes to managing resources and running the business efficiently. An intelligent design tool can simulate the building performance prior to construction and can detect possible inefficiencies and correct them in the planning stage. AI systems can also streamline construction processes, minimize material waste, and boost productivity [Castro, 2021]. These efficiencies not only contribute to cost savings in construction, but also help minimize the environmental impact of building activities. With the mounting concerns related to climate change, diminishing resources, and swift urbanization, sustainability has emerged as a critical issue in modern architecture (Table 1). Sustainable design strategies are playing a more significant role as buildings use a considerable amount of energy and contribute a significant portion of greenhouse gas emissions worldwide.

Table 1. Applications of AI technologies in sustainable architecture and their associated outcomes.

AI Technology	Application Area	Major Function	Benefits	References
Machine Learning	Building design optimization	Analyze design alternatives and predict performance	Improved energy efficiency and sustainable design	[4,9]
IoT and Smart Sensors	Building management	Real time monitoring of energy use and environmental conditions	Reduced energy consumption and operating costs	[5,38]
Digital Twin Technology	Urban planning and infrastructure	Simulate building and city performance	Enhanced sustainability and resilience	[39,40]
Robotics and Automation	Construction activities	Automate repetitive and hazardous tasks	Improved productivity and workplace safety	[14,41]
Predictive Analytics	Resource and lifecycle management	Forecast material use and maintenance requirements	Reduced waste and prolonged infrastructure lifespan	[16,38]

3. Methodologies, Construction Techniques, and Financial Risk Management

The advent of AI, the Internet of Things (IoT), and sophisticated digital tools is revolutionizing the way buildings are built and financial risks are managed [Tao, 2024].AI, Internet of Things (IoT), and cutting-edge digital technologies are reshaping the construction landscape and financial risk management approach. These innovations are helping organizations to move forward to become more efficient, safer, and to use resources more effectively and to make informed strategic decisions. The combination of intelligent technologies and the construction and financial planning processes is opening up new opportunites for sustainable growth and operational excellence as industries continue to adopt digital transformation [Behera, 2025]. Today, data, automation and intelligent decision-making systems guide modern construction methodologies. The conventional construction methods are typically labor-intensive, time-consuming, and resource-intensive. Artificial Intelligence has brought new solutions in the planning, execution and management of projects in the entire construction value chain. Integrating Management Information Systems in marketing with AI driven systems enables organizations to analyze historical and real time data, anticipate project delays, optimize schedules, enhance resource management, and strengthen consumer engagement and business growth through more accurate forecasting and data driven decision making [Papia, 2022]. This enables the construction of projects more efficiently, while maintaining high quality and sustainability standards. Advanced digital tools also enable architects, engineers, contractors and project managers to work together more effectively in achieving project goals, with greater accuracy and coordination. Automation has become an integral part of the construction industry today. AI-powered equipment, autonomous machinery and robotics are now being used to automate repetitive, complex and dangerous tasks on construction sites [Park, 2025]. These technologies enhance accuracy, consistency and productivity, and decrease the risks of manual work. Activities like excavation, material moving, brick laying, checking structures, and monitoring sites can be carried out with great precision by automated systems. Construction activities are also assisted by other technologies, such as drones and computer vision, which provide a means of checking on the work and its safety conditions in real-time. These technologies not only help to improve the safety of the workplace but also reduce the risk of human error and ensure more efficient project completion (Figure 1) [Ahmad, 2021]. Construction waste is one of the most important advantages of intelligent construction methods. The wastes produced by construction and demolition activities are significant and impose significant strain on landfills and natural resources. Waste reduction in construction involves careful planning, waste of materials and recycling efforts. AI helps to cut down on waste by optimizing material forecasting, inventory control, and project coordination. Predictive models like machine learning can be used to more closely approximate material needs, minimizing overordering and waste [Choudhury, 2025]. Moreover, digital construction technologies enable material re-use and re-cycling by monitoring material use all along the building life-cycle. The practices are aligned with sustainability goals and will help to conserve resources, reduce environmental impacts, and improve overall project efficiency.

Figure 1. How AI improves construction techniques and helps for future connection [Lee, 2024]

4. Types of Financial Risks and the Impact of Sustainability on Risk Management

Financial institutions are faced with a constantly evolving landscape with different types of risk that can have profound impacts on organizational performance, profitability and long-term stability [Choudhury, 2025]. Of these risks, the most salient are the three main ones that are faced by financial institutions: Credit risk, Market risk and Operational risk. The use of AI has revolutionized the way risks are identified, evaluated, and managed, making predictions more accurate and proactive measures more effective. Sustainability and environmental, social and governance (ESG) factors have gained prominence and strengthened the financial risk management landscape, leading organizations to consider both financial and sustainability risks [Effoduh, 2024]. Financial institutions face credit risk as one of the biggest risks as this occurs if borrowers do not pay their financial obligations. Historical data, manual review and narrow datasets were key to traditional credit assessments, leading to inconsistent assessments and slow decision making. Today, thanks to the power of AI systems that process vast amounts of structured and unstructured data to evaluate borrower behavior, capacity to repay, and financial stability, the process has been significantly enhanced. Machine-learning algorithms can detect non-obvious trends and indications that might not be discerned by traditional evaluation techniques [Lin, 2025]. AI ensures that credit risk assessments are more accurate, reliable, and fair, while also saving time and reducing costs. Market risk is another important category that can impact the financial institutions and investors. This risk is due to changes in economic conditions, commodity prices, stock prices, foreign exchange rates, etc. of the market. These factors can impact investment portfolios, financial performance, and the profitability of an organization, and can change rapidly [Ali, 2024]. AI can aid in market risk management by keeping a constant watch on market trends, sifting through vast amounts of data, and providing predictive insights. Artificial intelligence (AI) can be used to help identify trends, forecast potential losses, and aid decision-makers in creating a plan for risk mitigation (Table 2). These features allow businesses to react swiftly to market fluctuations and stay more financially stable. In the past few years, sustainability has more and more been incorporated into financial risk management strategies. ESG is now recognized as being an important driver of financial performance and long-term sustainability of the organisation. Financial risks for business and investors can arise from climate change, scarcity of resources, social inequalities and governance failures [Haque, 2020]. Because of this, financial institutions are also beginning to integrate ESG factors into their risk assessment systems, to more fully appreciate possible risk areas. Sustainability's incorporation into financial risk management is a step toward responsible investment and value creation over the long-term. Investors, regulators, and stakeholders are increasingly taking into account sustainable business practices, as companies that perform well in terms of ESG are generally better equipped to navigate future risks and market shifts.

Table 2. AI Contributions to Financial Risk Management and Green Consumer Dynamics

Domain	AI Application	Primary Objective	Major Outcome	References
Credit Risk Management	Machine learning based risk assessment	Evaluate borrower behavior and financial stability	Faster and more accurate credit decisions	[19]
Market Risk Management	Predictive analytics	Monitor market trends and forecast risks	Improved financial resilience	[20]
ESG Integration	Sustainability based risk assessment	Incorporate environmental and social factors	Long term value creation and responsible investment	[21,44]
Green Marketing	Personalized sustainability campaigns	Promote eco friendly products	Increased consumer engagement	[26,46]
Consumer Behavior Analysis	AI driven analytics	Predict preferences and purchasing patterns	Enhanced sustainable consumption	[23,24]

5. Green Consumer Dynamics

Green consumer dynamics is the changing consumer trends in attitude, preference and purchasing behavior with respect to environmental sustainability and social responsibility [Chen, 2025]. The climate change, resource depletion, pollution and environmental degradation are all issues that consumers are becoming aware of, and they are taking into account sustainability when making their decisions. This transformation has changed the expectations of the market and has spurred companies to include sustainable approaches and values in their brand, services, and goods. AI has come into its own as a tool to understand and shape these evolving consumer behaviors, which helps organisations to better promote sustainability and engage environmentally conscious consumers. AI plays a powerful role in shaping consumer behavior by providing personalization, better customer experiences and enabling consumers to make informed decisions (Figure 2) [Çetin, 2021]. AI systems can leverage advanced data analytics and machine learning algorithms to analyze consumer preferences, purchase history, online interactions, and behavioral patterns, providing highly personalized recommendations. From a sustainability perspective, these technologies allow organisations to better communicate the environmental benefits and give consumers the information they need about eco-friendly products and services [Chen, 2021]. The personalized sustainability message creates sustainable awareness of the consumers and boosts their trust in the product, thereby making them more likely to buy it. Management Information Systems in contemporary business provide strategic advantages for sustainable growth by integrating AI powered tools such as virtual assistants, recommendation systems, and customer service automation that deliver real time product information, sustainability insights, and environmental impact assessments, while also addressing future challenges related to digital transformation and evolving consumer expectations [Choudhury, 2023]. These features enhance transparency and aid consumers in informed decision-making. AI can make sustainability information more accessible, minimize uncertainty and boost consumer trust in sustainable products, leading to an increased adoption of sustainable practices in consumption. Green marketing is a key tactic for companies to attract eco-conscious consumers. Environmental themes are increasingly playing a part in business's marketing communications, with the sustainability of the product being a major factor in consumer purchases [Chen, 2024]. Transparency, authenticity, and environmental benefits are the key points of effective green marketing strategies. By leveraging AI, companies can craft personalized campaigns that mirror consumer preferences, significantly improving their chances of reaching the right target audience. By leveraging predictive analytics and behaviour insights, companies can gain insights into consumer preferences and design sustainability content to resonate with people to increase engagement and impact. Green consumerism is a new trend that can be a lucrative opportunity and a challenge to businesses [Sharfuddin, 2023]. On the other hand, the fact that sustainable products are increasing in demand opens the door to innovation, to be differentiated and to build customer loyalty in the long term.

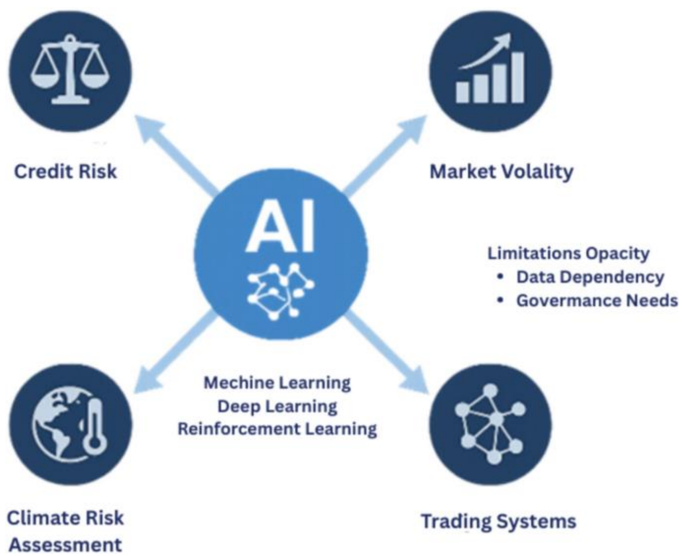

Figure 2. Artificial Intelligence Applications for Advancing Sustainable Green Finance [Farghali, 2023]

6. Case Studies, Challenges, and Limitations

Case studies are essential for showcasing how AI is being used in the field of sustainable architecture and contemporary information systems. They offer insight into the trends and emerging technologies that are revolutionizing the construction industry, including the use of AI in organizations, architectural practices, educational institutions and construction companies [Deng, 2023]. Case studies show how AI can be applied in practice, highlighting its potential and limitations in architectural design, construction management, financial considerations, and sustainable development projects. The practical implementation of AI in architecture and design shows its potential to enhance project results through greater design accuracy, minimized timeline, and resource optimization. The advanced AI-powered design platforms allow architects and engineers to test a variety of design options, simulate building performance and explore the most sustainable options before construction works commence [Deutsch, 2017]. These features add to cost savings, better project coordination, and lower impacts to the environment. There are numerous reports of organizations that have adopted AI in planning and construction achieving improved efficiency in building processes, better resource management, and enhanced sustainability results across the building lifecycle. AI's impact on sustainable architecture is profound, particularly through aiding in decision-making processes focused on environmental sustainability [Dizlek, 2022]. Intelligent systems can process large data sets that include details about building products, energy usage, environment, and lifespan costs. AI can help architects choose materials and construction techniques that have the lowest possible carbon footprint and environmental impact. Moreover, the use of AI can aid the circular economy principles, by making the possibility to design buildings that can be deconstructed, its materials recovered, reused, and recycled in the future. Data Driven

Management Information Systems leveraging Artificial Intelligence enhance sustainable business performance and operational efficiency while extending AI's influence beyond technological transformation to educational institutions and professional practices by fostering data driven decision making, interdisciplinary collaboration, and digital skill development [Md-Sharfuddin, 2025]. This interdisciplinary combination of traditional design skills and knowledge of AI, data analysis, sustainability and digital technologies is becoming more prevalent in universities, research institutes and architectural firms. The new models are emerging as a result of the recognition that the 21st century architect and engineer should have both technical and environmental skills. Case studies of educational programs have been used to highlight the need for curriculum change to ensure that graduates have the skills to be effective in increasingly digital and sustainability-focused industries [Friess, 2023]. Long-term research on AI in various projects can also provide insights into optimal practices and factors that can affect the successful implementation of AI. While AI-powered sustainable architecture offers great potential benefits, there are also many challenges and limitations in adoption and implementation. The complexity of AI systems is one of the key challenges. Architectural design and construction is a highly detailed and interdependent process, demanding precision, creativity and knowledge of context.

7. Discussion

One of the most important advances in recent information systems and in the architecture, engineering and construction (AEC) field is the integration of a new technology known as artificial intelligence (AI) in sustainable architectural practices [Lin, 2025]. The world is facing a growing number of challenges, including climate change, urbanization, resource scarcity, and environmental damage, that are more and more pressing.The challenges of climate change, urbanisation, resource depletion and environmental degradation are growing in intensity and organisations are looking for innovative solutions that can balance economic development with environmental sustainability [Hossin, 2023]. The results of this study clearly show that the AI-based sustainable architectures offer a holistic solution for tackling these challenges, integrating intelligent technologies, advanced information systems, financial risk management strategies and green consumer engagement within a consolidated sustainability-based approach. One of the major insights from this analysis is the transformative impact of AI on sustainable building design and life cycle management [Li, 2024]. However, traditional architectural design processes are usually limited in their manual calculation, historical experience and simulation capabilities, which may result in the ineffectiveness to determine the most sustainable solutions. AI systems, on the other hand, have the capability to analyze a massive amount of environmental, structural and operational data to provide optimized design alternatives. Artificial Intelligence driven Management Information Systems enhance social equity, economic sustainability, and cost management by integrating predictive modelling and simulation tools that allow architects to evaluate energy consumption, material usage, carbon footprints, and operational impacts before construction, thereby supporting sustainable and data driven decision making [Choudhury, 2024]. This function can greatly improve the quality of decision making and help to develop environmentally responsible and economically viable buildings.

The discussion also emphasizes the significance of sustainable architecture in addressing the urgent environmental challenges. Buildings use a significant percentage of the world's energy and the emissions from their use drive a significant share of global GHGs, making them an important object of sustainability interventions [Zeng, 2025]. The use of AI in sustainable design helps with better material choice, optimizing energy use, and resource conservation. With the use of smart systems, sensors, machine learning algorithms, and automated controls, buildings can be continuously monitored, and their operational parameters can be adjusted as needed. This results in reduction of energy loss, operational efficiency, environmental impacts can be minimised over the building's life cycle. The analysis also highlights that sustainability is not just about the design of the building, but also the maintenance and operation of the building, and its end-of-life management. AI and IoT-powered proactive maintenance solutions enable companies to keep track of building systems around the clock, and to detect problems before they become a huge problem [Wang, 2025]. Predictive maintenance can enhance operational efficiencies, minimize resource usage, and prolong the life of infrastructure assets. Likewise, the sustainable demolition and deconstruction methods allow for the recovery and reuse of valuable materials, thereby minimizing waste production and promoting circular resource flows. The adoption of technological infrastructure, including AI, IoT, digital twins, and smart building systems, has added to the organizations' ability to meet sustainability goals [Ghadami, 2021]. A smart building is a building that uses interconnected sensors and smart building management systems to optimize energy use, control building environmental conditions and enhance building occupant comfort. At the city scale, digital twin technologies can help city planners simulate the performance of infrastructure systems, assess development scenarios, and make decision based on data to improve sustainability and resilience of the urban area [Peng, 2024]. The technologies highlighted in this paper are examples of how the modern information system can be used as an enabler for sustainable development at the building scale and the urban scale.

Yet another key takeaway is the changing approaches and building methods enabled by AI. The construction sector is notorious for its inefficiencies, safety risks and significant waste production. To meet these challenges, the introduction of robotics, automation and AI-guided equipment has already begun to increase accuracy, reduce labour-intensive work and increase safety in the workplace [Hu, 2023]. Automated construction methods not only boost productivity but also play a role in sustainability by reducing material waste and resource usage. The advances indicate that AI in construction has the capacity to transform the way construction is done and contribute to ecological goals. Another domain where AI has proven to be valuable is financial risk management. Another field that AI has proven to be valuable in risk management is financial risk management. Financial markets are becoming more complex, and the role of sustainability is gaining significance, so companies in developing countries need a more advanced method of risk assessment and decision-making [Hossain, 2025]. Risk management systems powered by AI can facilitate instant risk analysis of financial data, risk detection, and development of predictive analysis and insights to aid proactive risk mitigation. Advanced analytics and machine learning can be used to improve credit risk assessments, market monitoring, fraud detection, and operational risk management. This makes AI a part of increased financial stability and enhancing organisational resilience in dynamic or challenging environments [Wang, 2025]. As the concept of sustainability becomes more deeply entrenched in financial decision-making processes, there is a growing focus on sustainability and its links to risk management, with the concept of environmental, social, and governance (ESG) considerations being increasingly incorporated into financial evaluation. Sustainability-related risks and opportunities are now a growing part of investors, regulators and stakeholders' expectations for organizations when formulating their business strategies [Islam, 2024]. The incorporation of ESG principles in financial risk management frameworks is an example of a broader shift in the transition towards responsible investment and sustainable value creation. AI technologies can play a significant role in this transformation, as they can process sustainability data more effectively and provide greater insights to help guide decision-making that will consider financial, environmental, and social goals [Jørgensen, 2025]. Another issue to be included in the discussion is the green consumer dynamics. In recent years, consciousness has grown among consumers about the environment and there is a growing demand for sustainable products and services. Personalized communication, targeted marketing and transparency about sustainability attributes are just some of the ways AI is influencing consumers' behavior. By harnessing AI-driven insights, businesses can gain a deeper understanding of consumer preferences, forecast buying trends, and craft strategies that encourage sustainable consumer decisions [46]. Effective implementation of green marketing and sustainable business practices is likely to provide businesses with a competitive edge in the market as sustainability becomes an important buying criterion. The impact of sustainable consumer engagement on society should not be forgotten. Education programs and communication campaigns for sustainability can help to influence actions beyond buying and selling. Organizations can help shift the culture toward sustainability by increasing awareness of the environment and encouraging sustainable behavior or consumption patterns [Pimenow, 2024]. Additionally, ethical concerns about algorithmic bias, transparency, and accountability need to be addressed to ensure the responsible and fair use of AI technologies. The conversation highlights the potential of AI in shaping sustainable architectures and their ability to provide a holistic and future-oriented solution to current environmental, economic, and technological challenges. Intelligent technologies, sustainable design ideas, financial risk management approaches and green consumer engagement combine to give opportunities to organisations to do better and help them achieve wider sustainability goals [Danish, 2023]. Continuous development and maturation of AI technologies will be crucial in the future of the integration of AI technologies into modern information systems for future resilient, efficient and environmentally friendly development. Achievement of these benefits will rely on the capacity of organisations, policy makers, researchers and industry to overcome challenges and promote innovation and cross-disciplinary collaboration.

9. Conclusion

AI-driven sustainable architectures represent a powerful convergence of intelligent technologies, sustainable design principles, financial risk management, and green consumer engagement. The integration of AI, IoT, automation, and advanced analytics enables organizations to optimize resource utilization, enhance energy efficiency, improve decision-making, and reduce environmental impacts throughout the building lifecycle. Additionally, AI supports more effective financial risk assessment and promotes sustainable consumer behavior through personalized engagement and data-driven insights. Despite challenges related to technology, data governance, workforce readiness, and regulation, continued innovation and collaboration will enable AI-driven systems to play a central role in achieving long-term sustainability and resilience.

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Author Contributions

M.A.H. Conceptualization, methodology, literature review, data curation, formal analysis, visualization, writing original draft preparation, project administration, and corresponding author responsibilities. S.T.A. Conceptualization, literature review, validation, critical review and editing, supervision, interpretation of findings, and writing review and editing. All authors contributed to the development of the manuscript, reviewed and approved the final version, and agree to be accountable for all aspects of the work.

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