İKTİSADİ İDARİ VE SİYASAL ARAŞTIRMALAR DERGİSİ
JOURNAL OF ECONOMICS BUSINESS AND POLITICAL RESEARCHES

e-ISSN: 2564-7466 | Cilt:9, Sayı:25, Ekim 2024
https://dergipark.org.tr/tr/pub/iktisad | Vol:9, No:25, October 2024

Artificial Intelligence, Smart Applications and Sustainable Consumption: A Theoretical Overview

♦♦♦

Yapay Zekâ, Akıllı Uygulamalar ve Sürdürülebilir Tüketim: Teorik Bir Bakış

https://doi.org/10.25204/iktisad.1461652

Sinem SARGIN*

Article Info

Paper Type: Review Paper

Received: 01.04.2024

Accepted: 23.09.2024

Abstract

Sustainable consumption means consuming natural resources consciously, considering future generations. In today's technological age, artificial intelligence and smart applications are used to achieve sustainability goals. In this context, this article examines the impact of artificial intelligence (AI) and smart applications on promoting sustainable consumption behavior. Providing a comprehensive theoretical framework, this article explores how AI technologies support informed decision-making, maximize resource management, and deliver positive environmental impact across a variety of industries. Through a variety of examples, from energy management plans to environmentally friendly retail platforms, the effects of artificial intelligence and smart applications on sustainable consumption are highlighted. This article includes examples of smart applications used to promote sustainable consumption around the world and in Türkiye. Natural challenges that need to be overcome, such as algorithmic biases, data privacy issues and the digital divide, are also mentioned. The article offers recommendations for Türkiye, highlighting the importance of financing digital infrastructure, data privacy laws, digital literacy initiatives and innovation ecosystems, with the aim of emphasizing the importance of artificial intelligence (AI) and smart applications for sustainable consumption.

Keywords: *Artificial intelligence, smart applications, sustainable consumption.*

Makale Bilgileri

Makale Türü: Derleme Makale

Geliş Tarihi: 01.04.2024

Kabul Tarihi: 23.09.2024

Öz

Sürdürülebilir tüketim, doğal kaynakların gelecek nesilleri de düşünmek suretiyle bilinçli bir şekilde tüketilmesi anlamına gelmektedir. Günümüz teknoloji çağında, sürdürülebilirlik hedeflerine ulaşmak amacıyla yapay zekâ ve akıllı uygulamalardan yararlanılmaktadır. Bu kapsam çerçevesinde çalışmada, bu makalede, yapay zekanın (AI) ve akıllı uygulamaların sürdürülebilir tüketim davranışını teşvik etmedeki etkisi incelenmektedir. Kapsamlı bir teorik çerçeve sunan bu çalışma, yapay zekâ teknolojilerinin bilinçli karar almayı nasıl desteklediğini, kaynak yönetimini en üst düzeye nasıl çıkardığını ve çeşitli endüstrilerde olumlu çevresel etkiyi nasıl sağladığını araştırmaktadır. Enerji yönetimi planlarından çevreye duyarlı perakende platformlarına kadar çeşitli örnekler aracılığıyla, sürdürülebilir tüketim üzerinde yapay zekanın ve akıllı uygulamaların etkileri vurgulanmaktadır. Bu çalışmada, dünyada ve Türkiye'de sürdürülebilir tüketimi teşvik etmek için kullanılan akıllı uygulama örneklerine yer verilmiştir. Bununla birlikte algoritmik önyargılar, veri gizliliği sorunları ve dijital uçurum gibi aşılması gereken doğal zorluklardan da söz edilmektedir. Çalışma, sürdürülebilir tüketim için yapay zekanın (AI) ve akıllı uygulamaların elzem olduğunu belirtmek amacıyla, dijital altyapının, veri gizliliği yasalarının, dijital okuryazarlık girişimlerinin ve inovasyon ekosistemlerinin finansmanının önemini vurgulayan Türkiye'ye yönelik öneriler sunmaktadır.

Anahtar Kelimeler: *Yapay zekâ, akıllı uygulamalar, sürdürülebilir tüketim.*

Atıf/ to Cite (APA): Sargın, S. (2024). Artificial intelligence, smart applications and sustainable consumption: a theoretical overview. *Journal of Economics Business and Political Researches, 9*(25), 803-820. https://doi.org/10.25204/iktisad.1461652

*ORCİD Res. Asst. Dr., Nuh Naci Yazgan University, Department of Business Administration, ssargin@nny.edu.tr

1. Introduction

The intersection of sustainable consumption and artificial intelligence (AI) has become a viable approach to tackle environmental issues in recent years. Artificial intelligence (AI)-powered smart apps are transforming many facets of our lives, including resource use. The potential of AI, smart apps, and sustainable consumption to promote positive environmental effects and a more sustainable future is explored in this article.

In a time of unparalleled technical progress and rising environmental awareness, the convergence of artificial intelligence (AI) and sustainable consumption presents a glimmer of hope for tackling the most critical issues of our day. Rethinking conventional consumption habits and embracing creative solutions that balance economic growth with environmental stewardship are vital given the growing global population and impending resource shortages.

The revolutionary potential of AI and smart applications is at the core of this paradigm shift. These technologies are changing the way we interact with our surroundings and use resources because of their capacity to analyze massive volumes of data, identify patterns, and make well-informed decisions. Artificial intelligence (AI)-driven smart applications are accelerating a significant shift towards sustainability in a number of industries, from streamlining supply chains and empowering customers to improving energy efficiency and transforming transportation networks.

The problem that this study aims to address is the urgent need to tackle environmental issues through the integration of artificial intelligence (AI) and sustainable consumption practices. The study explores the potential of AI-powered smart applications to drive a significant shift towards sustainability across various sectors, including resource management, energy efficiency, and consumer behavior. It highlights the challenges posed by the growing global population and resource shortages, emphasizing the necessity to rethink conventional consumption habits and adopt innovative solutions that balance economic growth with environmental stewardship.

In this article, it is aimed to explore the complex relationships that exist between artificial intelligence, smart applications, and sustainable consumption, as well as the opportunities and synergies that may be created to promote a more just and ecologically conscious society. Through an analysis of AI's contribution to efficiency gains, informed decision-making, and resource allocation optimization, it becomes clear that these technologies have the capacity to spur a change in consumption habits that prioritize ecological sustainability, social justice, and economic prosperity.

Through the utilization of data-driven insights, tailored suggestions, and predictive analytics, these applications facilitate the navigation of intricate sustainability concerns and promote significant change on a large scale for individuals, enterprises, and politicians. But, despite the enthusiasm and promise surrounding AI-driven sustainability solutions, it is critical to recognize and take into account the inherent difficulties and concerns. Navigating the ethical and social elements of AI deployment is vital to realizing its full potential for positive impact, from ethical concerns regarding data privacy and algorithmic biases to the imperative of ensuring fair access and inclusive participation.

Furthermore, with this article it is showed how AI-powered smart apps are transforming a variety of industries, from supply chain logistics and consumer behavior to energy management and transportation, through a thorough examination of real-world examples and upcoming trends. Upon reviewing the relevant literature and conducted research, it becomes evident that there is a dearth of theoretical articles about artificial intelligence-powered smart applications and their effects on sustainable consumption behavior. It is anticipated that this paper will benefit marketing managers and the literature in this way.

This paper makes a significant contribution to the literature by exploring the intersection of artificial intelligence (AI) and sustainable consumption, a relatively under-explored area. It provides a theoretical overview of how AI-powered smart applications can influence consumer behavior towards more sustainable practices. By integrating insights from diverse fields, including AI,

sustainable consumption, and policy considerations, the paper offers a comprehensive analysis of how AI can enhance sustainability across various sectors. Moreover, the study highlights the potential of AI technologies to optimize energy consumption, improve resource management, reduce waste, and integrate renewable energy sources. It also emphasizes AI's role in advancing the Sustainable Development Goals (SDGs) by facilitating poverty reduction, infrastructure development, and economic growth in emerging economies. Moreover, the paper addresses the ethical considerations of AI deployment, such as data privacy, algorithmic biases, and ensuring fair access. By analyzing real-world examples and upcoming trends, the paper demonstrates how AI-powered smart applications are transforming industries like supply chain logistics, consumer behavior, energy management, and transportation. This analysis provides valuable insights for marketing managers and contributes to the literature by offering a theoretical framework for understanding AI's impact on sustainable consumption behavior. The article also explores the landscape of smart applications in Türkiye, highlighting how these technologies are being leveraged to promote sustainable consumption practices and address the country's unique environmental challenges and opportunities.

2. Theoretical Framework

2.1. The Role of Artificial Intelligence on Sustainable Consumption Behavior

Artificial intelligence is essential in changing conventional consumption patterns into more sustainable ones because of its capacity to analyze enormous volumes of data and extract insights. Through AI, organizations can enhance sustainability across various sectors. AI technologies enable the optimization of energy consumption, resource management, waste reduction, and the integration of renewable energy sources, fostering sustainable practices (Dikshit et al., 2023; Adewale et al., 2024; Adewumi et al., 2024; Chandratreya, 2024). Moreover, AI contributes to improving energy efficiency, reducing carbon footprints, and addressing key challenges in sectors like energy, transportation, and marketing (Hermann, 2023; Dikshit et al., 2023; Tomar and Grover, 2023). The application of AI in smart buildings, electrical engineering, and energy sectors leads to enhanced operational efficiency, energy optimization, and the advancement of sustainability goals (Dikshit et al., 2023; Muniandi et al., 2024; Chandratreya, 2024; Tomar and Grover, 2023).

Furthermore, AI supports the achievement of Sustainable Development Goals (SDGs) by facilitating poverty reduction, infrastructure development, and economic growth in emerging economies (Mhlanga, 2021). The ethical considerations of sustainable AI are gaining prominence, emphasizing the importance of addressing environmental impacts, energy consumption, and fairness issues associated with AI technologies (Bossert and Hagendorff, 2023; Xiao, 2023; Naeeni and Nouhi, 2023). AI's role in promoting sustainable consumption is also highlighted, particularly in areas like food consumption patterns and greenwashing practices (Kindylidi and Cabral, 2021; Diachkova et al., 2022).

Through improving many facets of society, artificial intelligence (AI) is becoming more widely acknowledged for its important role in encouraging sustainable consumerism. Research has demonstrated the importance of artificial intelligence (AI) in accomplishing the Sustainable Development Goals (SDGs) (Vinuesa et al., 2020). It might have a favorable impact on how consumers behave in terms of sustainability (White et al., 2019). For example, apps that track and analyze personal carbon footprints encourage users to make more environmentally friendly choices. AI-powered platforms can suggest sustainable products or services to consumers based on their buying habits. It has been discovered that the use of AI in chemical processes and sustainable resource management advances efforts toward sustainable development (Kamkar et al., 2024). The collaboration between AI and humans is reshaping international business dynamics towards sustainable production and consumption (Hasan and Ojala, 2024). For instance, IBM's Watson uses AI to help companies in various industries analyze massive volumes of data to improve decision-making processes. In retail, Watson can predict consumer trends, helping businesses stock products

more sustainably and reduce overproduction. Besides, DHL uses AI to optimize delivery routes, which not only reduces delivery times but also cuts down on fuel consumption and carbon emissions. Their AI-powered tools analyze traffic patterns, weather conditions, and vehicle load capacities to suggest the most efficient routes. Moreover, initiatives sponsored by multilateral organizations aim to educate citizens on the benefits of AI for sustainable development and improving quality of life (Ally and Perris, 2022).

In line with Sustainable Development Goal 12, artificial intelligence (AI) can be used to boost output, save costs, and promote ethical production and consumption (Amani and Sarkodie, 2022). In agriculture, AI-driven systems like CropX use sensors and data analytics to optimize water usage and crop yields. By analyzing soil conditions and weather data, CropX provides precise watering recommendations, which increase crop productivity while conserving water. AI is employed in the energy sector to optimize grid operations and reduce costs. For instance, GE Renewable Energy uses AI to increase the efficiency of wind turbines by adjusting blade positions in real-time based on wind data. This optimization leads to significant cost savings and maximizes energy production. The fashion industry benefits from AI in enhancing sustainability through platforms like Thread Genius, which analyzes fashion trends and consumer behaviors to advise brands on what to produce, reducing overproduction and waste. Additionally, AI can trace garment supply chains, ensuring that materials are ethically sourced and workers are fairly treated. Building confidence in AI and machine learning is crucial to achieving health-related sustainable development goals, as highlighted by the lessons learned during the COVID-19 pandemic (Mhlanga, 2022). The growing usage of digital technology and AI applications offers important insights for enhancing both the environment and quality of life (Donati et al., 2022). Although artificial intelligence (AI) has the potential to increase productivity in business, government, and urban management, more research is required to pinpoint the precise ways in which AI may support environmental sustainability (Yigitcanlar, 2021).

Environmental imperatives and sustainable development goals are perceived to be impacted by AI's function in sustainable consumption from a marketing standpoint (Hermann, 2023). According to Lee (2021), artificial intelligence (AI) is a disruptive technology that can provide insightful solutions to social issues, such as sustainability. Sustainability is just one of the many industries that artificial intelligence (AI) has the potential to transform, as seen by the notable increase in its application in chemistry (Baum et al., 2021).

AI has a wide range of effects on sustainable consumption, including better resource management, encouraging ethical production methods, and changing consumer behavior. Societies can work toward accomplishing sustainable development goals and tackling environmental concerns by properly utilizing AI technologies.

2.2. Smart Applications and Sustainable Consumption Behavior

Smart apps use AI to improve the sustainability, accessibility, and effectiveness of a range of services and goods. These applications, which range from eco-friendly retail platforms to smart transportation and energy management systems, use cutting-edge technology to simplify workflows and lessen their environmental impact. In order to promote energy conservation and cost savings, smart home gadgets, for example, automatically modify settings based on occupancy patterns, weather, and energy costs. This optimizes energy usage.

Artificial intelligence (AI)-powered smart apps can manage resources more effectively and encourage eco-friendly behavior, which has a big influence on sustainable consumption patterns. For example, Rachio Smart Sprinkler Controller uses AI to manage watering schedules based on local weather conditions, type of vegetation, and soil moisture levels. This intelligent watering system helps reduce unnecessary water use, conserving water resources and supporting sustainable gardening practices. Moreover, apps like BlaBlaCar use AI to facilitate carpooling, matching drivers with passengers who need to travel in the same direction. This shared transportation model reduces the

number of vehicles on the road, lowers carbon emissions, and encourages a shift towards more sustainable travel habits. AI has emerged as a transformative technology with the potential to significantly impact sustainable development. By leveraging AI, smart apps can effectively manage resources and promote eco-friendly behavior, thereby influencing sustainable consumption patterns (Vinuesa et al., 2020). The utilization of AI technology enables the construction of more efficient systems, promotes sustainable resource usage, and aids in waste reduction and management (Sova et al., 2023). Moreover, AI can enhance biodiversity, conserve water and energy resources, power smart cities, and contribute to mitigating climate change when implemented ethically for sustainability (Camaréna, 2021).

In the context of energy management, AI-driven systems have revolutionized the landscape for smart buildings, offering opportunities to optimize energy consumption, enhance operational efficiency, and advance sustainability goals (Muniandi et al., 2024). Additionally, the application of AI in the building lifecycle holds promise for enhancing sustainability by reducing energy consumption and greenhouse gas emissions (Adewale et al., 2024). AI also plays a crucial role in energy efficiency optimization by enabling advanced analysis and control of energy systems (Olatunde et al., 2024).

Furthermore, AI-powered mobile apps contribute significantly to smart city ecosystems by offering advantages in urban mobility, public safety, energy management, and environmental monitoring (Bayashot, 2024). AI's impact on renewable energy efficiency and management has been notable, with advanced control mechanisms empowered by AI improving the coordination of diverse energy sources for seamless integration into power grids (Adewumi et al., 2024).

Smart meters with AI capabilities can affect customers' habits for sustainable energy use (Yan et al., 2018). Smart meters enable users to make educated decisions regarding their energy consumption, resulting in more environmentally friendly behaviors, by giving them access to real-time data and insights. Similar to this, AI solutions are being investigated in the fishing sector to support sustainable practices (Honarmand Ebrahimi et al., 2021).

AI technologies are crucial for promoting sustainability and efficiency in the context of smart and sustainable cities (Yigitcanlar and Cugurullo, 2020). AI can improve urban planning, boost green technology, and optimize resource utilization by evaluating data and patterns. Additionally, digital platforms driven by AI are being created to enable carbon-neutral services and management (Liao et al., 2023). By monitoring and minimizing environmental effects, these platforms use AI to promote sustainable practices.

AI is also essential for power consumption predictions, which is necessary for smart grid planning and sustainable energy use. Accurate forecasts can be produced to optimize energy distribution and consumption by using AI algorithms. Furthermore, by enhancing sustainability and accessibility, artificial intelligence helps create smarter cities (Yigitcanlar et al., 2020). Systematic reviews have yielded insights into the potential of artificial intelligence to promote sustainable urban development.

In general, there is a lot of promise for encouraging sustainable consumption practices through the incorporation of AI into smart applications. Industries and towns may optimize resource management, lessen their influence on the environment, and work toward a more sustainable future by utilizing AI.

Here are a few examples from around the world of smart applications that promote sustainable purchasing habits:

AI-powered smart apps are transforming energy management and empowering users to maximize efficiency and cut down on waste. “The Nest Learning Thermostat”, for instance, uses machine learning algorithms to examine occupancy patterns and modify temperature settings appropriately, saving a substantial amount of energy. In a similar vein, AI is integrated into smart

grid technologies to dynamically balance supply and demand, supporting the integration of renewable energy sources and system stability. “MeterPlug” is a smart gadget and companion software that provides real-time electricity consumption monitoring.

AI-powered transportation choices are encouraging sustainable travel and changing mobility habits. AI algorithms are used by ride-sharing services like “Uber” and “Lyft” to maximize route planning, decrease emissions, and alleviate congestion. AI is used by electric vehicle (EV) makers like Tesla to provide autonomous driving features that increase safety and efficiency while lowering dependency on fossil fuels.

By increasing efficiency and lowering environmental impact, smart apps are changing the way supply chain management is done. AI is used, for example, by IBM's Watson Supply Chain to anticipate disruptions, optimize inventory levels, and cut waste all the way through the supply chain. Provenance and other blockchain-based platforms offer transparency and traceability, enabling customers to make knowledgeable decisions regarding the provenance and sustainability of products.

By offering tailored recommendations and environmentally favorable options, AI-powered retail platforms encourage sustainable consumption. One smartphone app that helps users make ethical and ecologically conscious purchases is called “Good on You”. It rates fashion labels according to these criteria. In a similar vein, “Loop” provides reusable packaging for home goods and uses AI to streamline operations and reduce packaging waste. By motivating users to do ecologically beneficial acts in their daily lives, “JouleBug” gamifies sustainable living. Users of “CarbonCure” can monitor the carbon footprint of daily activities like energy use, eating decisions, and transportation. Users can lessen their environmental impact by making informed decisions and being given information about their personal carbon emissions.

By streamlining recycling procedures and cutting landfill trash, artificial intelligence (AI) technologies are fostering innovation in waste management. “Recycle.ai” is an AI-driven garbage sorting system that accurately detects and classifies recyclable materials using computer vision. Real-time garbage level monitoring is made possible by smart bins with sensors and connectivity, which also make resource allocation and collection routes more effective.

AI-powered platforms encourage sustainable farming methods and reduce food waste in order to improve food sustainability. For instance, “Too Good to Go” reduces food waste and supports local communities by allowing customers to purchase surplus food from grocery shops and restaurants at a discount. “Farmwave” uses artificial intelligence (AI) and machine learning to increase agricultural output while reducing the need for chemicals, promoting sustainable farming methods. “GreenChoice” gives consumers information on the environmental effects of different food products, enabling them to make sustainable decisions when they shop for groceries. Customers are empowered to make more environmentally friendly food choices by being able to evaluate items based on criteria including water usage, carbon footprint, and organic certifications.

By maximizing resource utilization and prolonging product lifecycles, AI-powered initiatives facilitate the shift towards a circular economy. “The Circulars”, for instance, is an international platform that honors creative approaches to the circular economy, such as AI-powered programs that encourage recycling, remanufacturing, and product reuse. These projects use AI to promote systemic change in the direction of a more regenerative and sustainable economic paradigm.

These illustrations show the many ways artificial intelligence (AI) is being used to encourage sustainable consumption in a range of industries. Smart applications enable people, organizations, and communities to make informed decisions and have a positive environmental impact by utilizing technology, data, and creativity. This opens the door to a more resilient and sustainable future.

Smart applications that support environmentally conscious consumerism are also becoming more and more popular in Türkiye. They provide creative ways to solve environmental problems and support social and economic advancement. With the help of smartphone apps customers can keep an

eye on and manage their energy usage in real time. These apps let users remotely control their home equipment for maximum efficiency, give individualized recommendations for energy-saving techniques, and provide insights into how much electricity is being used. These applications help to lower electricity consumption and promote energy efficiency by giving users the power to make educated decisions about how much energy they use. For instance, users will be able to monitor data like electricity use and mode of transportation within a specific time frame and compute their carbon footprint by inputting activity on the "You Protect" plug-in, which has been introduced to the Enerjisa Mobile application.

Customers who practice sustainable habits can earn step points using the "Yapı Kredi Step" application, and they can donate their points to social responsibility projects. Users can access real-time information on public transportation timetables, routes, and rates with the use of smart software "Moovit". This software contributes to a decrease in air pollution, carbon emissions, and traffic congestion in metropolitan areas by promoting the use of public transportation instead of private vehicles. Furthermore, several applications provide functions such as integration with bike and ride-sharing programs to encourage the use of sustainable alternative forms of transportation.

Through "Çöp Taksi" consumers can arrange for garbage collectors to pick up recyclables like glass, plastic, and paper. Çöp Taksi lessens landfill trash and promotes sustainable waste management practices by streamlining the recycling process.

Users can connect with nearby recycling facilities, waste collection stations, and environmental organizations through digital platforms such as "Waste Log". These apps offer information about recycling regulations, appropriate waste disposal techniques, and waste reduction programs. These platforms help reduce landfill trash and preserve natural resources by making recycling supplies more accessible and encouraging appropriate waste management practices.

Features like "Hepsiburada" and "Trendyol" allow customers to find and buy environmentally friendly products on e-commerce platforms. These apps might have sustainability labels, eco-friendly certification filters, and product ratings that take the environment into account and stimulate demand for ecologically friendly products and support sustainable consumption habits by giving users the power to make sustainable purchasing decisions.

Using Internet of Things (IoT) sensors and data analytics, several Turkish municipalities have adopted smart water management systems to track water consumption, find leaks, and improve irrigation in public areas. In order to minimize water waste and advance sustainable water management techniques, these technologies make it possible to implement effective water conservation measures including smart irrigation scheduling and automated shut-off valves.

Mobile apps such as "Fazla Gıda" (Excess Food) link food companies with excess inventory to customers and charitable organizations. By making it easier to donate extra food to food banks, charities, and local communities, these applications reduce food waste. These apps help Türkiye's food insecurity problems and decrease food waste by encouraging food rescue and redistribution initiatives.

2.3. Effect of AI-driven Smart Applications on Sustainable Consumption

Through a variety of methods, customers can be empowered by AI-driven smart applications to make more sustainable decisions in their daily lives. Customers can choose more ecologically friendly options by learning about the environmental impact of their purchases through the integration of environmental impact evaluations into product labeling and e-commerce platforms (Kindylidi and Cabral, 2021). Customers are able to make decisions that are in line with sustainability goals because to the openness with which information is provided. Furthermore, recommendation engines driven by AI make recommendations for sustainable products based on user preferences, encouraging environmentally conscious purchasing practices and cultivating a sustainable culture (Michels et al.,

2022). The Done Good browser extension uses AI to recommend sustainable and ethical alternatives while consumers shop online. By analyzing user preferences and shopping behavior, the app suggests products from companies that are committed to environmentally friendly practices and fair labor conditions.

Furthermore, the contribution of AI to the accomplishment of the Sustainable Development Goals (SDGs) is important to consider. AI can facilitate the accomplishment of multiple objectives including all SDGs (Vinuesa et al., 2020). AI's capacity for prediction and data analysis helps to improve sustainability initiatives. Additionally, AI certification procedures can influence consumers' decisions to buy by giving them confidence about the sustainability and ethical standards of items (Blösser and Weihrauch, 2024). AI-driven product certification gives consumers the power to select products that suit their sustainability choices and beliefs. IBM's Food Trust uses AI and blockchain technology to trace the provenance of food items throughout the supply chain. Consumers can scan a QR code on a product to access detailed information about its origin, handling, and ethical standards. This transparency builds consumer trust and influences purchasing decisions towards more sustainable options. Textile Genesis employs AI to track and verify the journey of textiles from fiber to finished product. By providing a platform that certifies textiles based on sustainability and ethical standards, it allows consumers to verify the ecological footprint and labor conditions involved in the production of their clothing. Besides, Certain AI systems are developed to analyze product compositions and their environmental impacts automatically, assisting in the generation of eco-labels that certify products as green or sustainable. This automation can extend to complex products like cleaning agents or cosmetics, where ingredient sourcing and ecological impact are significant considerations.

To enable customers to make ecologically friendly selections when purchasing online, digital nudging techniques have also been used (Michels et al., 2022). Even if they do not initially have strong sustainability preferences, customers are guided towards more sustainable choices through subliminal cues and prompts. This nudging technique makes use of AI to favorably sway consumer behavior in favor of sustainability. Sustainable supply chains are directly related to sustainable consumption, and artificial intelligence (AI) is essential for streamlining processes and lessening environmental effect. Reducing the environmental impact of goods and services requires supply chains to integrate sustainable practices. Applications powered by artificial intelligence (AI) have the power to completely transform supply chain sustainability by enhancing productivity, transparency, and environmental performance. Walmart uses AI to better predict demand and manage inventory levels across its stores. This minimizes overstocking and reduces waste, ensuring products are distributed efficiently and sustainably. By accurately forecasting demand, Walmart can also optimize its transportation routes, thus decreasing its carbon footprint. UPS utilizes its AI-powered ORION (On-Road Integrated Optimization and Navigation) system to optimize delivery routes. This system analyzes daily delivery volumes and real-time traffic information to provide drivers with the most efficient routes, significantly reducing miles driven and fuel consumed. Google Cloud's AI tools help companies assess the environmental impact of their supply chains. By analyzing data on suppliers' practices, these tools can identify opportunities for reducing emissions and suggest changes that make sourcing more sustainable. And Siemens uses AI to monitor and control energy usage in manufacturing and logistics operations. Their AI systems analyze energy consumption patterns to optimize usage and reduce emissions, contributing to more energy-efficient supply chain processes.

Several studies highlight the significant role of AI in enhancing supply chain resilience, performance, and sustainability (Belhadi et al., 2021; Hao and Demir, 2023; Olan et al., 2024; Eyo-Udo, 2024). AI-driven innovations offer opportunities to develop resilient supply chains capable of responding to disruptive events and improving long-term performance (Belhadi et al., 2021). By leveraging AI technologies such as analytics, forecasting, and optimization, sustainable supply chain financing can be achieved, leading to improved environmental and social outcomes (Olan et al.,

2021). Furthermore, the integration of AI and blockchain in supply chains can pave the way for sustainability and data monetization, benefiting various stakeholders (Tsolakis et al., 2023).

AI applications in supply chain management extend beyond operational efficiency to strategic innovation and sustainability (Eyo-Udo, 2024). From demand forecasting to supplier relationship management, AI offers avenues to streamline operations, reduce costs, and enhance customer satisfaction (Joel et al., 2024). By providing insights into risks, vulnerabilities, and opportunities within the supply chain, AI-driven analytics enable data-driven decision-making to mitigate environmental and social impacts (Reynolds, 2024). Moreover, AI algorithms play a crucial role in transforming the manufacturing sector and global supply chains by enabling predictive maintenance, quality control, and sustainability practices (Dijmărescu, 2023).

The potential of AI in supply chain sustainability is further emphasized by its ability to identify and address supply chain challenges, vulnerabilities, and solutions effectively (Singh et al., 2023). AI can act as a controller, coordinator, and integrator in sustainable supply chain systems, contributing to resilience and sustainability efforts (Bowen et al., 2024). By predicting disruptions and ensuring stable systems, AI-driven data analytics play a pivotal role in developing sustainable supply chains (Wehlmann, 2024). Additionally, the integration of AI with other technologies like the Internet of Things (IoT) and blockchain enhances sustainable sourcing, logistics, and operations within supply chains (Chen, 2024). Artificial intelligence (AI) can improve supply chain operations by identifying inefficiencies, reducing waste, and streamlining procedures by analyzing large amounts of data. Supply chain managers can make well-informed decisions that encourage more sustainable practices by utilizing AI algorithms.AI greatly improves supply chain traceability and transparency, enabling customers to make knowledgeable decisions based on a product's sustainability features. Supply chain participants can promote a culture of sustainable consumerism by using AI-powered systems to track and verify the provenance, manufacturing processes, and environmental impact of items (Tsolakis et al., 2023).

AI can also help supply chains adopt the concepts of the circular economy, which promotes waste reduction and resource efficiency. AI-driven systems can identify opportunities for recycling, remanufacturing, and sustainable disposal methods by analyzing data on product lifespan and consumption trends (Moktadir et al., 2018). This method not only lessens the impact on the environment but also turns waste materials into valuable commodities.

2.4. Challenges and Considerations of Smart Applications

Although AI and smart applications present a wealth of opportunities to promote sustainable consumption, there are a number of obstacles and factors that need to be taken into account. In order to guarantee fair access and moral application of AI technology, data privacy problems, algorithmic biases, and digital divide issues need to be carefully considered. Data privacy problems are a critical concern when implementing AI technologies. The use of AI necessitates the collection and processing of vast amounts of data, raising significant questions about individual privacy and the potential misuse of personal information (Yu et al., 2024). To address this, it is essential to establish privacy-preserving architectures for AI applications, emphasizing the importance of data security and privacy concerns (Padmanaban, 2024).

Algorithmic biases represent another obstacle that needs to be carefully considered. AI systems have the potential to perpetuate existing biases and discrimination, highlighting the importance of ensuring accountability, transparency, and ethical deployment of AI systems (Radanliev et al., 2024). Moreover, in the context of healthcare, integrating AI applications brings risks and challenges to human rights and medical ethics, necessitating a balance between privacy and progress (Wang et al., 2022; Williamson and Prybutok, 2024).

The digital divide is a significant factor that must be taken into account to ensure fair access to AI technologies. As AI becomes more prevalent across various sectors, including education and healthcare, it is crucial to address issues related to equitable access to technology and ensure that AI-driven tools and platforms benefit all segments of society (Akintayo et al., 2024; He, 2024). In order to leverage AI and smart applications to encourage sustainable consumption, it is imperative to tackle issues like digital divide, algorithmic biases, and data privacy. These problems may prevent ethical AI technology use and fair access (Adesipo et al., 2020). Access to smart technology may be impeded for vulnerable populations, including low-income households and rural areas, by connectivity problems and a lack of technical expertise. Furthermore, users may be discouraged from utilizing smart applications that collect and evaluate user data due to concerns about data security and privacy (Visvizi and Lytras, 2018). Devices like Amazon Echo and Google Home collect data on user preferences and daily routines to provide personalized services. However, incidents where these devices have inadvertently recorded conversations and transmitted them have raised significant privacy concerns, leading some consumers to avoid using these products. Apps that offer navigation and location-based services, such as Google Maps and Waze, require access to real-time location data. While providing convenience, the continuous tracking of location can be seen as intrusive, and the misuse or unauthorized sale of this data to third parties has led to privacy concerns among users. mart utility meters, which are used to monitor electricity, gas, or water usage, send detailed data to utility providers to enable more efficient resource management. However, there have been concerns about how securely this data is stored and who else might have access to it, deterring some households from adopting such technology.

AI algorithmic biases have the potential to exacerbate injustices and unequal results, hence restricting inclusivity and diversity. Amazon once used an AI recruitment tool that inadvertently learned to favor male candidates over female candidates for technical job roles. The bias arose because the AI was trained on historical hiring data that reflected male dominance in the tech sector. This led to the perpetuation of gender disparity in job selections, hindering diversity in the workplace. Studies have shown that facial recognition technologies, such as those used by law enforcement and security agencies, have higher error rates when identifying individuals from minority ethnic groups. For instance, MIT Media Lab researchers found that certain algorithms had error rates of up to 34% for dark-skinned women, compared to 0.8% for light-skinned men, raising significant concerns about racial bias and the potential for wrongful identifications (Buolamwini and Gebru, 2018). To mitigate prejudice and provide equitable treatment for all users, strategies such as algorithmic transparency, diversified dataset representation, and bias detection techniques can be implemented (Zavratnik et al., 2018). For smart applications to improve accessibility and encourage sustainable consumption options, especially in underserved areas, dependable infrastructure and internet connectivity are essential (Adamowicz and Zwolińska-Ligaj, 2020).

Promoting sustainable consumption practices involves more than just technology; it also entails influencing people's attitudes and routines. Eco-friendly behaviors and conscientious consumption choices can be promoted by education, awareness campaigns, and incentives that are specific to the local environment (Kar et al., 2019). Because technology is developing so quickly, it is necessary to monitor and regulate it constantly in order to prevent unexpected consequences and protect the interests of society and the environment (Cowie et al., 2020). For the responsible development and implementation of smart applications, it is essential to update and enforce rules pertaining to data privacy, consumer rights, and environmental sustainability (Bosworth et al., 2020).

To effectively solve sustainability concerns, multidisciplinary approaches that incorporate insights from environmental science, economics, social sciences, and technology are required. In order to achieve sustainable consumption goals, cooperation between academics, decision-makers, corporations, and civil society can encourage innovation and group action (Visvizi and Lytras, 2019). Comprehensive answers to complex sustainability concerns can be developed by encouraging interdisciplinary collaboration and collaborations across sectors (Wilfred et al., 2019).

According to White et al. (2019), one major obstacle to the adoption of sustainable practices is consumers' innate need to possess material commodities. Patagonia's "Don't Buy This Jacket" campaign, which discourages excessive consumption by urging consumers to think twice before purchasing new items. The campaign highlights the environmental costs of production and encourages the repair and reuse of old gear. This strategy promotes sustainability and aligns consumer behavior with environmental values. Loop, a shopping platform, partners with brands to offer products in reusable containers that customers return when empty. This model reduces waste and educates consumers about the environmental benefits of reducing single-use packaging, promoting a more sustainable way of consuming goods. Strategies that stress the need of making sustainable decisions and draw attention to the advantages of eco-friendly products are needed to overcome this obstacle. Many supermarkets and stores offer rewards and discounts for customers who bring their own bags, choose bulk food options, or participate in recycling programs. These incentives make sustainable choices more appealing and beneficial to the consumer, encouraging eco-friendly behavior. Influencers and celebrities often partner with eco-conscious brands to promote sustainable products to their large followings. These endorsements can significantly raise awareness about the benefits of eco-friendly products and influence consumer preferences and behaviors towards sustainability.

Furthermore, there are issues with data security, privacy, and infrastructure development when integrating smart technology into urban smart mobility (Paiva et al., 2021). Promoting environmentally friendly transportation options requires smart mobility solutions that place a high priority on sustainability and environmental effect. To improve the sustainable use of e-commerce, it is necessary to solve trust concerns and payment methods in particular locations in order to continue consumer acceptance of e-commerce platforms (Amofah and Chai, 2022). Fostering sustainable e-commerce operations requires establishing consumer trust and providing safe payment methods.

In order to promote online buying behavior and financial gains, the COVID-19 pandemic has highlighted the significance of efficient e-commerce platform management and the necessity of improved relationships between merchants and customers (Tran, 2021). For e-commerce operations to be viable, it is imperative to balance user confidence, connectivity issues, and governmental rules (Akintoye et al., 2022). Furthermore, obstacles like "green fatigue" must be overcome in order to encourage consumer participation in sustainable behaviors through smart applications (Le, 2020). "Green fatigue" refers to a phenomenon where consumers become tired or overwhelmed by constant messages and demands to engage in environmentally friendly or sustainable behaviors. This can happen when people feel bombarded with complex information, guilt-inducing statistics about the environment, or when they perceive that their individual actions have little impact. The overload of green messaging can lead to apathy or resistance towards adopting sustainable behaviors, as individuals may feel that maintaining such practices is either too challenging or ineffective (Strother and Fazal, 2011). Amazon, for instance, has implemented robust data protection measures and complies with global data protection regulations like GDPR to build user trust. They also offer clear information on their sustainability practices to align with governmental standards for environmental responsibility, ensuring users feel confident about their purchases. The Think Dirty app educates consumers about the potentially toxic ingredients in personal care and household products by allowing them to scan product barcodes. It provides easy-to-understand ratings for health impacts, helping users make sustainable choices without feeling overwhelmed by too much complex information, thus combating green fatigue. Innovative strategies that maintain consumer involvement and a dedication to sustainable practices are needed to address these issues.

Generating positive emotions and impulsive purchase behaviors in the context of mobile shopping platforms requires an understanding of consumer behavior determinants and the application of marketing tactics based on platform characteristics (Liu et al., 2019). Sustainable consumption habits can be promoted by adjusting marketing tactics to reflect the values and preferences of the target audience.

In general, for smart applications to effectively encourage sustainable consumption behavior, they must address issues with infrastructure development, privacy concerns, trust issues, and customer behavior. Through surmounting these obstacles and taking essential factors into account, smart applications have the potential to significantly impact the promotion of a sustainable culture.

3. Discussion & Conclusion

The convergence of artificial intelligence, smart applications, and sustainable consumerism exhibits significant potential in tackling urgent environmental issues and advancing a fairer and prosperous future. Through leveraging artificial intelligence (AI) to improve resource efficiency, empower customers, and strengthen supply chain sustainability, we may move toward a circular economy in which financial success is independent of environmental deterioration. By embracing innovation and teamwork, we can leverage artificial intelligence's revolutionary potential to create a more resilient and sustainable environment for future generations.

The unification of smart software and artificial intelligence (AI) offers a revolutionary chance to change environmentally conscious consumer behavior and tackle urgent environmental issues. Through the utilization of artificial intelligence, these technologies enable people, organizations, and societies to make knowledgeable choices, enhance resource administration, and promote favorable environmental outcomes in diverse fields.

Artificial intelligence (AI)-driven smart applications use data-driven insights, personalized recommendations, and predictive analytics to help users make eco-friendly decisions, encourage sustainable mobility, improve supply chain efficiency, and use energy more efficiently. Artificial intelligence has a wide range of uses in encouraging sustainable consumption patterns, as seen by real-world examples ranging from eco-friendly shopping platforms to energy management systems.

However, there are also inherent difficulties and factors to take into account with the enormous potential of AI-driven sustainability solutions. It is imperative to tackle concerns like data privacy, algorithmic biases, the digital divide, and legal frameworks in order to guarantee fair access, moral implementation, and conscientious creation of smart apps. To fully utilize AI in driving sustainable consumption, it is important to cultivate behavior change and interdisciplinary collaboration.

It will be crucial to collaborate, innovate, and exercise ethical leadership as we move toward a more sustainable future. In order to ensure a healthy planet for future generations, we can create a world where sustainable consumption is not just an ideal but a realistic reality by utilizing AI technologies in conjunction with human inventiveness and group action.

This study underscores the transformative potential of integrating artificial intelligence (AI) with smart applications to address pressing environmental challenges and foster sustainable consumption behaviors. By harnessing AI's capabilities to optimize resource management, enhance energy efficiency, and guide consumer choices, we can move towards a more sustainable future that balances economic prosperity with ecological preservation. The convergence of AI and sustainable consumption offers a unique opportunity to innovate traditional practices and embrace a circular economy model where growth does not come at the expense of the environment. AI-driven smart applications empower individuals, organizations, and societies by providing data-driven insights, personalized recommendations, and predictive analytics that facilitate informed decision-making and encourage eco-friendly practices across various sectors. Throughout the study, real-world examples demonstrated the diverse applications of AI in promoting sustainable consumption—from energy management systems and supply chain optimizations to eco-friendly retail platforms and sustainable mobility solutions. These cases illustrate AI's potential to drive significant change and contribute to the achievement of the Sustainable Development Goals (SDGs). However, the study also highlights critical challenges and considerations that must be addressed to fully realize AI's potential in promoting sustainability. Issues such as data privacy, algorithmic biases, the digital divide, and the

need for robust regulatory frameworks are pivotal to ensuring ethical implementation and widespread accessibility of AI technologies. Overcoming these obstacles requires a collaborative effort among policymakers, businesses, academics, and civil society to foster an environment conducive to innovation and ethical AI deployment.

For Türkiye, embracing AI-driven solutions for sustainable consumption necessitates investments in digital infrastructure, enhancing digital literacy, and fostering innovation ecosystems. By prioritizing data privacy, promoting interdisciplinary collaboration, and encouraging public-private partnerships, Türkiye can leverage AI to address its unique socio-economic and environmental challenges effectively. Türkiye faces both possibilities and problems when it comes to addressing the convergence of smart applications, artificial intelligence (AI), and sustainable consumption. To close the digital divide between urban and rural areas, Türkiye should give priority to investments in digital infrastructure. This entails increasing the availability of smartphones and other smart devices, enhancing network dependability, and extending internet connectivity. Improving digital infrastructure will make it possible for smart applications that encourage sustainable consumption behavior to be adopted more widely across the nation's many regions. It's also critical to cultivate an innovative and cooperative culture among corporations, government agencies, civil society organizations, and researchers. Encouraging interdisciplinary collaboration and partnerships can drive the development of AI-driven solutions tailored to Türkiye's unique socio-economic and environmental context. Co-creation of sustainable consumption projects can be facilitated by public-private partnerships, which can use the resources and knowledge of various stakeholders.

To foster trust among consumers of smart applications, Türkiye should also give top priority to data privacy and security protocols. Enforcing compliance standards and putting strong data protection policies into place helps preserve user privacy and allay worries about data breaches or misuse. To foster trust in AI-driven solutions that support sustainable consumption, open information about data collection, storage, and usage procedures is crucial.

The purpose of investing in digital literacy programs and skills development initiatives is to equip citizens with the necessary knowledge and skills to utilize smart applications efficiently. User adoption and engagement can be increased by offering training on how to use digital platforms, understand data-driven insights, and make wise decisions about sustainable consumption. Focused educational initiatives can encourage behavior change and increase public knowledge of the advantages of AI-driven sustainability solutions. It's also critical to establish precise legal frameworks that control the creation, use, and utilization of AI technology in support of sustainable consumption. Environmental requirements, consumer protection, algorithmic biases, and ethical issues should all be covered by these rules. Türkiye's legislative framework can be improved to comply with global best practices and developing trends in AI governance by cooperation with foreign organizations. Türkiye ought to support regional innovation hubs and start-ups developing AI-powered sustainable consumption solutions. Impactful initiatives can be developed and scaled up more quickly when entrepreneurs and innovators receive funding, mentoring, and incubator support.

There are certain constraints to take into account, even if this study offers insightful information about artificial intelligence (AI), smart apps, and sustainable consumption. First off, the study's focus on theoretical frameworks, real-world examples, and recommendations unique to Türkiye may have resulted in a narrow scope. Therefore, it's possible that the advice won't apply to every situation or area. Further investigation and examination in other socio-economic and cultural settings may be necessary in order to extrapolate the study's suggestions outside of its purview. Second, this article addresses interdisciplinary topics, including AI, sustainable consumption, and policy considerations, which are inherently complex and multifaceted. Integrating insights from diverse fields and synthesizing complex information into coherent analysis and recommendations can be challenging. Furthermore, not all ethical and social issues pertaining to AI-driven smart applications that support sustainable consumption may be fully covered by the study. More in-depth research and conversation

may be necessary on topics including digital inequality, algorithmic biases, privacy concerns, and societal effects.

This paper is a theoretical overview. Future research should consider more empirical studies that analyze the real-world impacts of AI on sustainable consumption behaviors across different sectors and regions. Conducting case studies and pilot projects can provide valuable insights into the practical challenges and benefits of AI-driven solutions. Additionally, exploring the role of AI in influencing consumer behavior through behavioral economics and psychology could offer a deeper understanding of how AI technologies can effectively promote sustainable choices. To gather a thorough grasp of AI's involvement in sustainable consumption, future studies may use mixed-methods research approaches that combine qualitative and quantitative methods. Rich insights into the mechanisms influencing behavior modification as well as the wider socio-economic effects of AI deployment can be obtained by using this integrated approach. Future research endeavors could potentially employ user-centric methodologies to investigate customers' attitudes, actions, and perceptions about AI-powered sustainable consumption solutions. Collaborative efforts involving stakeholders from academia, industry, and government can drive the development of AI-driven solutions tailored to specific needs and challenges, fostering a sustainable and equitable future.

References

Adamowicz, M., and Zwolińska-Ligaj, M. (2020). The “smart village” as a way to achieve sustainable development in rural areas of Poland. *Sustainability, 12*(16), 1-28. https://doi.org/10.3390/su12166503

Adesipo, A., Fadeyi, O., Kuca, K., Krejcar, O., Maresova, P., Selamat, A., and Adenola, M. (2020). Smart and climate-smart agricultural trends as core aspects of smart village functions. *Sensors, 20*(21), 1-22. https://doi.org/10.3390/s20215977

Adewale, B. A., Ene, V. O., Ogunbayo, B. F., and Aigbavboa, C. O. (2024). Application of artificial intelligence (AI) in sustainable building lifecycle; a systematic literature review. Buildings 2024 (Preprints) https://doi.org/10.20944/preprints202405.2113.v1

Adewumi, A., Okoli, C. E., Usman, F. O., Olu-lawal, K. A., and Soyombo, O. T. (2024). Reviewing the impact of AI on renewable energy efficiency and management. *International Journal of Science and Research Archive, 11*(1), 1518-1527. https://doi.org/10.30574/ijsra.2024.11.1.0245

Akintayo, O. T., Eden, C. A., Ayeni, O. O., and Onyebuchi, N. C. (2024). Integrating AI with emotional and social learning in primary education: Developing a holistic adaptive learning ecosystem. *Computer Science & IT Research Journal, 5(*5), 1076-1089. https://doi.org/10.51594/csitrj.v5i5.1116

Akintoye, I. R., Ajayi, M., Joshua, A., and Okunlola, A. F. (2022). Business sustainability through e-commerce: a myth or reality in Nigeria. *Business: Theory and Practice, 23*(2), 408–416. https://doi.org/10.3846/btp.2022.16657

Ally, M., and Perris, K. (2022). Artificial intelligence in the fourth industrial revolution to educate for sustainable development. *Canadian Journal of Learning and Technology, 48*(4), 1-20. https://doi.org/10.21432/cjlt28287

Amani, M. A., and Sarkodie, S. A. (2022). Mitigating spread of contamination in meat supply chain management using deep learning. *Scientific Reports, 12*(1), 1-10. https://doi.org/10.1038/s41598-022-08993-5

Amofah, D. O., and Chai, J. (2022). Sustaining consumer e-commerce adoption in Sub-Saharan Africa: Do trust and payment method matter? *Sustainability, 14*(14), 1-20. https://doi.org/10.3390/su14148466

Baum, Z. J., Yu, X., Ayala, P. Y., Zhao, Y., Watkins, S. P., and Zhou, Q. (2021). Artificial intelligence in chemistry: Current trends and future directions. *Journal of Chemical Information and Modeling, 61*(7), 3197–3212. https://doi.org/10.1021/acs.jcim.1c00619

Bayashot, Z. (2024). The contribution of AI-powered mobile apps to smart city ecosystems. *Journal of Software Engineering and Applications, 17*(03), 143-154. https://doi.org/10.4236/jsea.2024.173008

Belhadi, A., Mani, V., Kamble, S., Khan, S., and Verma, S. (2021). Artificial intelligence-driven innovation for enhancing supply chain resilience and performance under the effect of supply chain dynamism: An empirical investigation. *Annals of Operations Research, 333*(2-3), 627-652. https://doi.org/10.1007/s10479-021-03956-x

Blösser, M., and Weihrauch, A. (2024). A consumer perspective of AI certification – the current certification landscape, consumer approval and directions for future research. *European Journal of Marketing, 58*(2), 441–470. https://doi.org/10.1108/EJM-01-2023-0009

Bossert, L., and Hagendorff, T. (2023). The ethics of sustainable AI: why animals (should) matter for a sustainable use of ai. *Sustainable Development, 31*(5), 3459-3467. https://doi.org/10.1002/sd.2596

Bosworth, G., Price, L., Collison, M., and Fox, C. (2020). Unequal futures of rural mobility: Challenges for a "Smart Countryside." *Local Economy: The Journal of the Local Economy Policy Unit, 35*(6), 586–608. https://doi.org/10.1177/0269094220968231

Bowen, G., Jahankhani, H., and Nawaz, I. Y. (2024). Black swan events: Mitigating disruption to a supply chain using blockchain and artificial intelligence. Preprints. https://doi.org/10.20944/preprints202403.1119.v1

Buolamwini, J., and Gebru, T. (2018). Gender shades: Intersectional accuracy disparities in commercial gender classification. In *Conference on Fairness, Accountability and Transparency* (pp. 77-91). PMLR.

Camaréna, S. (2021). Engaging with artificial intelligence (AI) with a bottom-up approach for the purpose of sustainability: Victorian farmers market association, Melbourne Australia. *Sustainability, 13*(16), 9314. https://doi.org/10.3390/su13169314

Chandratreya, A. (2024). AI-powered innovations in electrical engineering: Enhancing efficiency, reliability, and sustainability. *Journal of Electrical Systems, 20*(2), 1580-1587. https://doi.org/10.52783/jes.1463

Chen, R. (2024). Sustainable supply chain management as a strategic enterprise innovation. Advances in Economics Management and Political Sciences, *85*(1), 24-29. https://doi.org/10.54254/2754-1169/85/20240831

Cowie, P., Townsend, L., and Salemink, K. (2020). Smart rural futures: Will rural areas be left behind in the 4th industrial revolution? *Journal of Rural Studies*, 79, 169–176. https://doi.org/10.1016/j.jrurstud.2020.08.042

Diachkova, A., Tikhonov, S., Tomyuk, O., and Tikhonova, N. (2022). Criteria for assessing food consumption patterns in the Brics countries in accordance with sustainable development goals. *Bio Web of Conferences, 42*, 04005. https://doi.org/10.1051/bioconf/20224204005

Dijmărescu, E. (2023, 8-10 June). AI trends: Salient aspects for the manufacturing sector and its global supply chain. R. Pamfilie, V. Dinu, C. Vasiliu, D. Pleșea, L. Tăchiciu (Eds). In *9th BASIQ International Conference on New Trends in Sustainable Business and Consumption*, (pp. 168-175). Constanța, Romania. https://doi.org/10.24818/basiq/2023/09/053

Dikshit, S., Atiq, A., Shahid, M., Dwivedi, V., and Thusu, A. (2023). The use of artificial intelligence to optimize the routing of vehicles and reduce traffic congestion in urban areas. *EAI Endorsed Transactions on Energy Web, 10*, 1-13. https://doi.org/10.4108/ew.4613

Donati, F., Dente, S. M. R., Li, C., Vilaysouk, X., Froemelt, A., Nishant, R., Liu, G., Tukker, A., and Hashimoto, S. (2022). The future of artificial intelligence in the context of industrial ecology. *Journal of Industrial Ecology, 26*(4), 1175–1181. https://doi.org/10.1111/jiec.13313

Eyo-Udo, N. (2024). Leveraging artificial intelligence for enhanced supply chain optimization. *Open Access Research Journal of Multidisciplinary Studies, 7*(2), 001-015. https://doi.org/10.53022/oarjms.2024.7.2.0044

Hao, X. and Demir, E. (2023). Artificial intelligence in supply chain decision-making: An environmental, social, and governance triggering and technological inhibiting protocol. *Journal of Modelling in Management, 19*(2), 605-629. https://doi.org/10.1108/jm2-01-2023-0009

Hasan, R. and Ojala, A. (2024). Managing artificial intelligence in international business: Toward a research agenda on sustainable production and consumption. *Thunderbird International Business Review, 66*(2), 151-170. https://doi.org/10.1002/tie.22369

He, Q. (2024). Popularization of AI for psychological as well as educational applications. *Lecture Notes in Education Psychology and Public Media, 42*(1), 112-117. https://doi.org/10.54254/2753-7048/42/20240815

Hermann, E. (2023). Artificial intelligence in marketing: friend or foe of sustainable consumption? *AI & Society, 38*, 1975-1976. https://doi.org/10.1007/s00146-021-01227-8

Honarmand Ebrahimi, S., Ossewaarde, M. and Need, A. (2021). Smart fishery: A systematic review and research agenda for sustainable fisheries in the age of AI. *Sustainability, 13*(11), 6037, 1-20. https://doi.org/10.3390/su13116037

Joel, O. S., Oyewole, A. T., Odunaiya, O. G., and Soyombo, O. T. (2024). Leveraging artificial intelligence for enhanced supply chain optimization: A comprehensive review of current practices and future potentials. *International Journal of Management & Entrepreneurship Research, 6(*3), 707-721. https://doi.org/10.51594/ijmer.v6i3.882

Kamkar, M., Leonard, K. C., Ferrer, I., Loo, S. C. J., Biddinger, E. J., Brady, D., Carrier, D. J., Gathergood, N., Han, H., Hermans, I., Hii, K. K. M., Hwang, B. J., Loh, W., Meier, M. A. R., Marr, A. C., Newton, G. N., Srubar, W. V., Yan, N., Tam, M. K., Chen, J., Moores, A. H., Subramaniam, B., Licence, P. and Serrano, J. F. (2024). Artificial intelligence (AI) for sustainable resource management and chemical processes. ACS *Sustainable Chemistry and Engineering, 12*(8), 2924–2926. https://doi.org/10.1021/acssuschemeng.4c01004

Kar, A. K., Ilavarasan, V., Gupta, M. P., Janssen, M. and Kothari, R. (2019). Moving beyond smart cities: Digital nations for social innovation and sustainability. *Information Systems Frontiers, 21*(3), 495–501. https://doi.org/10.1007/s10796-019-09930-0

Kindylidi, I. and Cabral, T. S. (2021). Sustainability of AI: The case of provision of information to consumers. *Sustainability, 13*(21), 1-14. https://doi.org/10.3390/su132112064

Le, T. (2020). Strength from the past: How nostalgia and self-construal affect consumers' willingness to continue participating in sustainable behavior. *American Journal of Industrial and Business Management, 10*(02), 432–450. https://doi.org/10.4236/ajibm.2020.102029

Lee, K. (2021). A systematic review on social sustainability of artificial intelligence in product design. *Sustainability, 13*(5), 1-29. https://doi.org/10.3390/su13052668

Liao, H. T., Pan, C.-L. and Zhang, Y. (2023). Smart digital platforms for carbon neutral management and services: Business models based on ITU standards for green digital transformation. *Frontiers in Ecology and Evolution*, 11, 1-10. https://doi.org/10.3389/fevo.2023.1134381

Liu, L., Liu, R., Lee, M. and Chen, J. (2019). When will consumers be ready? A psychological perspective on consumer engagement in social media brand communities. *Internet Research, 29*(4), 704–724. https://doi.org/10.1108/IntR-05-2017-0177

Mhlanga, D. (2021). Artificial intelligence in the industry 4.0, and its impact on poverty, innovation, infrastructure development, and the sustainable development goals: Lessons from emerging economies?. *Sustainability, 13*(11), 5788. https://doi.org/10.3390/su13115788

Mhlanga, D. (2022). The role of artificial intelligence and machine learning amid the COVID-19 Pandemic: What lessons are we learning on 4IR and the sustainable development goals. *International Journal of Environmental Research and Public Health, 19*(3), 1-22. https://doi.org/10.3390/ijerph19031879

Michels, L., Ochmann, J., Günther, S. A., Laumer, S. and Tiefenbeck, V. (2022). Empowering consumers to make environmentally sustainable online shopping decisions: A digital nudging approach, *Proceedings of the 55th Hawaii International Conference on System Sciences,* 4707-4716. https://doi.org/10.24251/HICSS.2022.574

Moktadir, M. A., Rahman, T., Rahman, M. H., Ali, S. M. and Paul, S. K. (2018). Drivers to sustainable manufacturing practices and circular economy: A perspective of leather industries in Bangladesh. *Journal of Cleaner Production*, 174, 1366–1380. https://doi.org/10.1016/j.jclepro.2017.11.063

Muniandi, B., Maurya, P. K., Bhavani, C. H., Kulkarni, S., Yellu, R. R., and Chauhan, N. (2024). AI-driven energy management systems for smart buildings. *Power System Technology, 48*(1), 322-337. https://doi.org/10.52783/pst.280

Naeeni, S. K., and Nouhi, N. (2023). The environmental impacts of AI and digital technologies. *AI and Tech in Behavioral and Social Sciences, 1*(4), 11-18. https://doi.org/10.61838/kman.aitech.1.4.3

Olan, F., Arakpogun, E., Jayawickrama, U., Suklan, J., and Liu, S. (2024). Sustainable supply chain finance and supply networks: the role of artificial intelligence. *IEEE Transactions on Engineering Management*, *71*, 13296-13311. https://doi.org/10.1109/tem.2021.3133104

Olan, F., Liu, S., Suklan, J., Jayawickrama, U., and Arakpogun, E. (2021). The role of artificial intelligence networks in sustainable supply chain finance for food and drink industry. *International Journal of Production Research, 60*(14), 4418-4433. https://doi.org/10.1080/00207543.2021.1915510

Olatunde, T. M., Okwandu, A. C., Akande, D. O., and Sikhakhane, Z. Q. (2024). Reviewing the role of artificial intelligence in energy efficiency optimization. *Engineering Science & Technology Journal, 5*(4), 1243-1256. https://doi.org/10.51594/estj.v5i4.1015

Padmanaban, H. (2024). Privacy-preserving architectures for AI/ML applications: Methods, balances, and illustrations. *JAIGS, 3*(1), 66-85. https://doi.org/10.60087/jaigs.vol03.issue01.p85

Paiva, S., Ahad, M., Tripathi, G., Feroz, N. and Casalino, G. (2021). Enabling technologies for urban smart mobility: Recent trends, opportunities and challenges. *Sensors, 21*(6), 1-41. https://doi.org/10.3390/s21062143

Radanliev, P., Santos, O., Brandon-Jones, A., and Joinson, A. (2024). Ethics and responsible AI deployment. *Frontiers in Artificial Intelligence, 7*, 1-17. https://doi.org/10.3389/frai.2024.1377011

Reynolds, S. (2024). Exploring the influence of corporate social responsibility on supply chain sustainability in renewable energy. Preprints. https://doi.org/10.20944/preprints202405.1888.v1

Singh, R., Modgil, S., and Shore, A. (2023). Building artificial intelligence enabled resilient supply chain: a multi-method approach. *Journal of Enterprise Information Management, 37*(2), 414-436. https://doi.org/10.1108/jeim-09-2022-0326

Sova, O., Bieliaieva, N., Antypenko, N., and Drozd, N. (2023). Impact of artificial intelligence and digital HRM on the resource consumption within sustainable development perspective. *E3s Web of Conferences, 408*, 01006. https://doi.org/10.1051/e3sconf/202340801006

Strother, J. B., and Fazal, Z. (2011). Can green fatigue hamper sustainability communication efforts?. In 2011 IEEE International Professional Communication Conference (pp. 1-6). IEEE. https://doi.org/10.1109/IPCC.2011.6087206

Tomar, P., and Grover, V. (2023). Transforming the energy sector: Addressing key challenges through generative AI, digital twins, AI, data science and analysis. *EAI Endorsed Transactions on Energy Web, 10*. https://doi.org/10.4108/ew.4825

Tran, L. T. T. (2021). Managing the effectiveness of e-commerce platforms in a pandemic. *Journal of Retailing and Consumer Service*s, 58, 1-9. https://doi.org/10.1016/j.jretconser.2020.102287

Tsolakis, N., Schumacher, R., Dora, M., and Kumar, M. (2023). Artificial intelligence and blockchain implementation in supply chains: a pathway to sustainability and data monetisation? *Annals of Operations Research, 327*(1), 157–210. https://doi.org/10.1007/s10479-022-04785-2

Vinuesa, R., Azizpour, H., Leite, I., Balaam, M., Dignum, V., Domisch, S., Felländer, A., Langhans, S. D., Tegmark, M., and Fuso Nerini, F. (2020). The role of artificial intelligence in achieving

the Sustainable Development Goals. *Nature Communications, 11*(1), 1-10. https://doi.org/10.1038/s41467-019-14108-y

Visvizi, A., and Lytras, M. (2018). It's not a fad: smart cities and smart villages research in European and global contexts. *Sustainability, 10*(8), 1-10. https://doi.org/10.3390/su10082727

Visvizi, A., and Lytras, M. D. (2019). Sustainable smart cities and smart villages research: Rethinking security, safety, well-being, and happiness. *Sustainability, 12*(1), 1-4. https://doi.org/10.3390/su12010215

Wang, C., Zhang, J., Lassi, N., and Zhang, X. (2022). Privacy protection in using artificial intelligence for healthcare: Chinese regulation in comparative perspective. *Healthcare, 10*(10), 1878. https://doi.org/10.3390/healthcare10101878

Wehlmann, C. Z. (2024). Resilient and Sustainable AI. Positioning paper on the relation of AI, resilience and sustainability. In: Zinke-Wehlmann, C., Friedrich, J. (Eds), *First Working Conference on Artificial Intelligence Development for a Resilient and Sustainable Tomorrow* (pp. 5-19). Informatik aktuell. Springer Vieweg, Wiesbaden. https://doi.org/10.1007/978-3-658-43705-3_2

White, K., Habib, R., and Hardisty, D. J. (2019). How to shift consumer behaviors to be more sustainable: A literature review and guiding framework. *Journal of Marketing, 83*(3), 22–49. https://doi.org/10.1177/0022242919825649

Wilfred, P., Milner-Gulland, E. J., and Travers, H. (2019). Attitudes to illegal behaviour and conservation in western Tanzania. *Oryx, 53*(3), 513-522. https://doi.org/10.1017/S0030605317000862

Williamson, S. M., and Prybutok, V. (2024). Balancing privacy and progress: A review of privacy challenges, systemic oversight, and patient perceptions in AI-driven healthcare. *Applied Sciences, 14*(2), 675. https://doi.org/10.3390/app14020675

Xiao, D. (2023). Neuroscience-inspired continuous learning: A sustainable approach to AI energy challenge. Preprints. https://doi.org/10.31219/osf.io/twn9q

Yan, K., Wang, X., Du, Y., Jin, N., Huang, H., and Zhou, H. (2018). Multi-step short-term power consumption forecasting with a hybrid deep learning strategy. *Energies, 11*(11), 1-15. https://doi.org/10.3390/en11113089

Yigitcanlar, T. (2021). Greening the artificial intelligence for a sustainable planet: An editorial commentary. *Sustainability, 13*(24), 1-9. https://doi.org/10.3390/su132413508

Yigitcanlar, T. and Cugurullo, F. (2020). The sustainability of artificial intelligence: An urbanistic viewpoint from the lens of smart and sustainable cities. *Sustainability, 12*(20), 1-24. https://doi.org/10.3390/su12208548

Yigitcanlar, T., Desouza, K., Butler, L., and Roozkhosh, F. (2020). Contributions and risks of artificial intelligence (AI) in building smarter cities: İnsights from a systematic review of the literature. *Energies, 13*(6), 1-38. https://doi.org/10.3390/en13061473

Yu, S., Carroll, F., and Bentley, B. L. (2024). Insights into privacy protection research in AI. *IEEE Access, 12*, 41704-41726. https://doi.org/10.1109/access.2024.3378126

Zavratnik, V., Kos, A., and Stojmenova Duh, E. (2018). Smart villages: Comprehensive review of initiatives and practices. *Sustainability, 10*(7), 1-14. https://doi.org/10.3390/su10072559