Digital Economy and Sustainable Economic Development: Insights from Developing Nations

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Abstract
This review paper examines the relationship between the digital economy and sustainable economic development, with a specific focus on developing nations. It synthesizes existing literature to explore how digital technologies such as artificial intelligence, big data, digital platforms, and fintech contribute to economic growth, social inclusion, and environmental sustainability. The study highlights that the digital economy enhances productivity, fosters innovation, and expands market access, while also improving access to financial services, education, and public services. It further emphasizes the critical role of entrepreneurship and small and medium-sized enterprises (SMEs) as key drivers in translating digital transformation into sustainable outcomes through digital ecosystems and platform-based business models. The review identifies key enabling factors, including digital infrastructure, supportive policies, institutional quality, innovation, and human capital, which collectively determine the effectiveness of digitalization in achieving sustainability goals. However, it also recognizes significant challenges such as the digital divide, limited access to finance, weak institutional frameworks, cybersecurity risks, and increasing inequality, which may hinder inclusive development. By integrating insights across economic, social, and environmental dimensions, the study provides a comprehensive understanding of the digital–sustainability nexus. The findings suggest that a balanced and inclusive approach, supported by strong governance and strategic policy interventions, is essential to harness the full potential of the digital economy for achieving sustainable and inclusive development in developing countries.

Keywords: Digital Economy; Sustainable Economic Development; Developing Nations; Digital Entrepreneurship; SMEs and Innovation

1. Introduction

The emergence and growth of the digital economy have completely changed the economic landscape of the world redefining conventional production, distribution, and consumption patterns. The digital economy has emerged as one of the core pillars of the contemporary economies due to the development of information and communication technologies (ICT), artificial intelligence, big data analytics, cloud computing, and digital platforms. It has the greatest impact especially on developing countries, where digital technologies present unprecedented ways of breaking through structural obstacles, contributing to more effective economic performance, and speeding up the process of development (Dahlman et al., 2016; Trade, 2024). With the growing adoption of digital solutions in the economic systems of nations, the digital economy is not only transforming the business landscapes but also redefining the way to sustainable economic development.

The recognition of sustainable economic development as a policy objective has been a major challenge to the developing nations since it focuses on the harmonious living between economic growth, social inclusion, and protection of the environment. Such countries usually have various issues such as poverty, unemployment, inequality, poor infrastructure, and environmental degradation. In this respect, the digital economy is a great opportunity to solve these problems by making economic activities more inclusive and productive. Online solutions help to reach global markets, fintech solutions can be used to promote financial inclusion, and digital solutions can be more productive in areas like agriculture, manufacturing, and service industries (Oloyede et al., 2023; Ong, 2025). As a result, it is becoming common to consider digitalization as a driving force behind the realisation of the Sustainable Development Goals (SDGs), especially ones that are connected to economic growth, innovation, and less inequalities (Bocean, 2025).

The impact of the digital economy on innovation and entrepreneurship is one of the most outstanding achievements of digital economy. Digital technologies keep entry barriers minimal in case of new businesses, and small and medium-sized enterprises (SMEs) can also grow and expand at an accelerated rate. Digitalization gives SMEs a chance to enhance the efficiency of their operations, increase the size of their client base, and transform their business models in developing countries, where SMEs represent an important part of the economic framework. As an example, e-commerce services enable small enterprises to operate in foreign markets, whereas mobile banking and financial technologies help entrepreneurs to access

new financial resources that did not exist previously (Mohammedi et al., 2025; An et al., 2024). Not only do these developments spur economic growth, but they also help to include social groups through reducing unemployment as well as helping marginalised groups in society.

In spite of such encouraging trends, the interdependence between the digital economy and sustainable economic development is quite complicated and multifaceted. Although digitalization can potentially improve productivity and inclusivity, it can also increase the preexisting inequalities in case the access to digital technologies is uneven. Digital divide, which implies the differences in access to the internet, digital skills and technological infrastructure, remains a major threat in most developing countries (Triplett, 2025). The digital aspect of the poor frequently has a disproportional impact on rural populations, women, and low-income groups, so the digital economy cannot bring inclusive growth (Oloyede et al., 2023; Trade, 2024). Moreover, the problem of digital trust and privacy as well as service reliability also continues to be a pressing issue in emerging economies (Yeboah-Boateng and Appiah-Nketiah, 2016).

The second challenge is the increasing worry on cybersecurity risks in regard to digital transformation. With business and economies growing an increasing dependence on digital systems, they are becoming more susceptible to cyber attacks like data breaches, fraud, and system failures. The risks are notably high when it comes to SMEs, as they simply do not have the resources and skills to establish strong cybersecurity protocols (Awan et al., 2025; Benjamin et al., 2024). It has been shown that a large portion of SMEs is unprepared, underfunded, and uninformed about cybersecurity risks, which may compromise their engagement in the digital economy and influence the resilience of the economy in general (Junior et al., 2023). Also, cybersecurity crisis is now a key element in business continuity and resiliency during the digital age (Saeed et al., 2023).

The second major problem is that current literature about the digital economy and sustainable development is fragmented. Although there is a considerable amount of literature on the economic effects of digitalization, a separate line of research on the topic of sustainability, there is a comparative dearth of studies that cut across these two areas, especially regarding developing countries. In addition, the contribution of entrepreneurship and SMEs as the major source of digital transformation and sustainable development has not been adequately highlighted in most research. This gap demonstrates the necessity of a thorough synthesis of the current knowledge to have a better understanding of how the digital economy is helping to achieve sustainable results (Ong, 2025; Mohammedi et al., 2025).

Moreover, policy and institutional settings are important factors that influence the success of digital transformation. In the developing countries, governments are putting more money in digital infrastructure, regulation systems, and innovation systems to facilitate digital growth. Nevertheless, poor governance, uncertainty in the regulatory environment and institutional ineffectiveness may undermine the successful execution of digital strategies. The relationship between digitalization, the institutional forces and sustainability is hence crucial in designing effective policies that can ensure that the digital economy is more beneficial rather than risky (Dahlman et al., 2016; Tiwari et al., 2025).

It is against this backdrop that the present review paper will seek to develop a synthesis of the available literature about the digital economy and sustainable economic development as it is applied to developing countries. The research aims to discuss the impact of digital technologies on the economic, social, and environmental aspects of sustainability and determine the primary forces and obstacles that impact this correlation. In addition, it highlights the significance of entrepreneurship and SMEs as key actors in the process of mediation of the translation of digital developments into sustainable development results. This review can add to the comprehensive perspective of the digital-sustainability nexus by incorporating the insights of different strands of literature (An et al., 2024; Bocean, 2025).

The paper has been organised in such a way that it offers a coherent and thorough study of the topic. The conceptual background of the digital economy and sustainable economic development follows this introduction section, defining the main concepts and concepts underpinning it. The following sections discuss the connexions between digitalization and sustainability in economic, social, and environmental aspects. The importance of entrepreneurship and SMEs is then elaborated upon and how they contribute to digital transformation and a sustainable growth. This is to be followed by analysing the major forces and obstacles to the digital economy in the developing countries. Appropriate theoretical perspectives have also been reviewed in the paper to give more in-depth analytical framework. Lastly, a combined conceptual framework is suggested, and the paper will be concluded with an analysis of the research gaps, policy implications, and future research directions.

2. Conceptual Foundations

2.1 Digital Economy

The digital economy has undergone a great transformation in the recent decades moving away

the services where the internet is in the centre of this service to a wider scope that involves all the economic processes facilitated by the digital technologies. The digital economy has been initially linked to e-commerce and online exchange but is currently a sophisticated system of work based on the implementation of advanced technologies into production distribution systems and consumption (Bukht and Heeks, 2017). It is an indication of the increasing significance of data in terms of becoming a major economic asset, as well as the transition to knowledge-based and innovation driven economies.
The digital economy consists of a few fundamental elements that define what it is like and what effect it may have. The basic infrastructure is the information and communication technologies (ICT) which provides connectivity and the transfer of information beyond the geographic limits. Online platforms, including e-commerce markets and social media platforms, are used to connect producers and consumers, building new business models and value chains. New technologies, such as artificial intelligence (AI) and big data analysis, can improve the work of a decision-making process, efficiency, and personalised service (Gokhberg et al., 2023). Financial services have been disrupted by fintech innovations, such as mobile banking and digital payment systems, which make them more accessible and less costly in terms of transactions. The latter is especially relevant to developing countries, which have experienced an increase in the speed of digital transformation in economic activities and innovation processes (Budiarto and Nordin, 2024). Also, global agencies like UNCTAD have highlighted the significance of the digital economy in promoting global trade and development (Canton, 2021).

2.2 Sustainable Economic Development

Sustainable economic development is said to be a comprehensive view of growth which is balanced towards both economic advancement and social justice and environmental safeguarding. It is also based on the concept of the so-called triple bottom line that has to focus on the economic feasibility, social inclusion, and environmental sustainability at the same time. This is a strategy that acknowledges that the economic growth will not be the only way to promote long-term growth but it should consider other problems that include inequality, depletion of resources and degradation of the environment.
Sustainability on the economic aspect dwells on the steady and inclusive economical growth, creation of jobs, and enhanced standards of living. The social aspect focuses on equality, universal access to fundamental services, poverty alleviation, and empowerment of the sidelined groups. Meanwhile, the environmental aspect emphasises responsible use of resources, reduction of pollution and maintenance of the ecosystems to the future generations. These dimensions are too closely related and they need combined policy measures to achieve balanced development results. The United Nations has also been influential in ensuring sustainable development based on its frameworks like the Sustainable Development Goals (SDGs) which gives a global agenda to deal with economic, social, and environmental issues (Guterres, 2020).
Moreover, the global development institutions have emphasised the need to enhance health, well-being, and social status as a form of sustainability development, especially in the developing world where the vulnerabilities are more eminent (World Health Organisation, 2023). Such views help to support the notion that sustainable economic development should be inclusive and multi-dimensional, combining economic development with human development and environmental management.

2.3 Developing Nations Context

The developing countries are a special situation where digital economy and sustainable economic development interplay. Structural issues that have been identified to prevail in these countries include poor infrastructure, lack of access to technology, poor institutional framework, and inequality in income and education. The barriers to adoption and diffusion of digital technologies can be institutional gaps such as poor governance and regulatory limitations. On the same note, a lack of digital infrastructure including poor internet access and inconsistent connectivity limits the participation of individuals and businesses in the digital economy (Oughton, 2021).
Nonetheless, even in the country of developing countries, there are also considerable opportunities to capitalise on the opportunities of the digital transformation. Among such advantages, there is the existence of a possibility of so-called digital leapfrogging where nations can avoid the conventional stages of growth and directly move to the implementation of highly sophisticated technologies. As an illustration, the development of the broadband networks and the mobile connexion has allowed the rapid development of digital services, especially in the areas with underdeveloped traditional systems (Oughton, 2021). This change is beneficial to entrepreneurship, increased market accessibility, and inclusive economic inclusion.
Moreover, the comparatively loose economic order in the developing states can support the accelerated implementation of new business patterns and digital solutions. Governments and policymakers are also realising the need to invest in digital infrastructure, enhance digital literacy, and establish enabling regulatory frameworks to

enhance sustainable development. Due to the ongoing digital transformation, the combination of it with sustainable development strategies will play a decisive role in helping the developing countries to experience sustainable, inclusive, and long-term growth. Figure 1 shows the conceptual relationship between the digital economy and sustainable development, major drivers of it, as well as mediating factors.

Figure 1. Conceptual framework of digital economy and sustainable development.

Although the major concepts employed in this paper can be briefly captured in Table 1 that gives a brief summary of the underlying concepts and definitions employed in the analysis, they are the theoretical concepts used to explain the connexion between the digital economy and sustainable development. The table is also useful in explaining the scope and context of major constructs that were used during the study.

Table 1. Key concepts and definitions of digital economy and sustainable development.

Concept	Definition	Key Source
Digital Economy	Economic activities enabled by digital technologies, data, and ICT infrastructure	Bukht & Heeks (2017); Gokhberg et al. (2023)
Sustainable Development	Balanced integration of economic growth, social inclusion, and environmental protection	Guterres (2020); World Health Organization (2023)
Digital Entrepreneurship	Technology-driven business creation leveraging digital platforms and innovation ecosystems	Soluk et al. (2021)
SMEs	Small and medium enterprises contributing to employment and economic growth	Shahadat et al. (2023); Díaz-Arancibia et al. (2024)
Digital Platforms	Multi-sided digital systems facilitating interactions between users and businesses	Evans & Schmalensee (2016); Abubakar et al. (2019)

3. Digital Economy and Sustainable Development Nexus

3.1 Economic Dimension

Digital economy contributes to the process of improving the sustainability of the economy in terms of boosting productivity, enhancing innovation, and promoting markets. Digital solutions can be used to help companies streamline operations, lower transaction expenses, and enhance efficiency by automating operations and making decisions based on data. In developing countries where conventional inefficiencies tend to limit economic performance, the digitalization provides an avenue to drive the growth and

competitiveness (Nasser and Abdelkaoui, 2025). The combination of artificial intelligence, cloud computing, and digital platforms can enable businesses to automate their activities and react better to the needs of the market.

Additionally, the emergence of the digital markets has greatly redefined the working patterns and income generating opportunities. E-commerce, the gig economy, and marketplace platforms of digital services have opened new work opportunities, especially to young people and informal employees. Through these platforms, geographical boundaries are minimised, and individuals and businesses are allowed to compete in both local and international markets. Consequently, digitalization leads to the generation of employment and diversification of sources of income that are crucial in the economic growth that is sustainable. Also, the emergence of digital businesses and startups has been especially noticeable in developing economies, with less entry barriers and less capital requirements stimulating entrepreneurship (Trade, 2024). Not only do digital startups catalyse economic dynamism but also create innovation ecosystems that contribute to future growth that compliments broader economic policy objectives that aim at creating collective value (Mazzucato, 2024).

3.2 Social Dimension

The digital economy beyond the economic returns is also very important in terms of social sustainability because it brings about sensitization of inclusion, provision of more services, and power to the individual. Among the most prominent effects is in the financial inclusion segment where fintechs that include mobile banking, digital wallet, and peer to peer lending platforms have increased access to financial services. These digital solutions allow underserved groups in many developing nations to engage with the formal financial system, which in turn leads to the reduction of inequality and increasing resilience to financial shocks in such situations (Srinivasan, 2018).

Digital inclusion is also a key factor in reducing social inequalities by enhancing access to services in amenities that include healthcare services, education, and government services. With digital transformation, it has become possible to develop services in new ways, making them more accessible and efficient. Nonetheless, the positive outcomes of digitalization are not even and unequal access to technology still consolidates social inequalities. This digital gap means that there is a need to have inclusive digital policies that provide equal access to opportunities (Khan et al., 2025). Moreover, the digital economy enhances the human capital because it allows education and skill acquisition. The digital training programmes and availability of online learning platforms allow people to gain competencies required to engage in contemporary economies, which enhances the social aspect of sustainable development.

3.3 Environmental Dimension

There are opportunities and challenges of the digital economy in terms of environmental sustainability. On the one hand, the digital technologies are environmentally sustainable as they enhance the efficiency of resources and contribute to the green innovation. Internet of Things (IoT), smart systems, and data analytics allow to enhance the monitoring and control of energy consumption, emissions, and natural resources. Empirical analysis indicates that digitalization will be able to cut down carbon emissions by improving efficiency and environmental measures driven by innovation (Sun et al., 2024; Lin et al., 2024). Such improvements apply especially to the developing countries where the proper use of resources is essential to sustainable growth.

Digital technologies can also help in governing the environment and development in a sustainable city by offering means to track ecological systems and enforcing the adherence to environmental regulations. The ideas like Earth system boundaries should prove that economic processes, including digital expansion, should be coordinated with the ecological boundaries to have long-term sustainability (Bai et al., 2024). Inclusive and even green development outcomes have also been stressed by international organisations as a result of integrating digital transformation with environmental sustainability (Trade, 2024).

Nevertheless, the growth of the digital economy also implies some risks to the environment that should be considered. Growing data centre and communication network requirements are also adding to the energy usage and carbon emissions. Also, the high turnover rate of electronic devices has created a huge problem of electronic waste (e-waste) that has environmental and health hazards. The critical attitudes suppose that the unrestrained technological development can be incompatible with the sustainability initiatives, and more responsible and ethical technology evolution is necessary (Heikkurinen, 2018). These points highlight why there is a necessity of working towards having policies that will ensure a balance between technological development and environmental conservation. Table 2 is a summary of the multidimensional effects of the digital economy that are observed in economic, social, and environmental aspects.

Table 2. Impacts of digital economy on sustainability dimensions.

Dimension	Positive Impacts	Risks/Challenges	Key References
Economic	Productivity growth, innovation, job creation, global market access	Market concentration, inequality	Nasser & Abdelkaoui (2025); Trade (2024); Mazzucato (2024)
Social	Financial inclusion, access to healthcare, education, digital services	Digital divide, exclusion	Srinivasan (2018); Khan et al. (2025); Oloyede et al. (2023)
Environmental	Resource efficiency, green innovation, emission reduction	E-waste, energy consumption	Sun et al. (2024); Lin et al. (2024); Heikkurinen (2018)

The digital economy-sustainability nexus is a multidisciplinary interaction, which entails interactions in economic, social, and environmental sectors. Although digitalization has enormous opportunities to support sustainable development, it requires appropriate governance and policies, as well as responsible practises of innovation.

4. Role of Entrepreneurship and SMEs

4.1 Digital Entrepreneurship Ecosystems

With the advent of the digital economy, there have been a major contribution to the creation of vibrant digital entrepreneurship assemblage and especially in developing countries. These ecosystems are made up of interrelated actors, such as startups, investors, government agencies, technology-providing organisations, support organisations, among others, all of which work together to promote innovation and business development. The digital technologies have reduced entry barriers among entrepreneurs because it minimises the physical design required in the set-up of the business and allows the entrepreneur to explore international markets. Consequently, small-resource people can start and grow the business more effectively than in the economic context (Soluk et al., 2021). Government efforts, incubators, and innovation hubs are emerging as new sources of support to the digital entrepreneurship ecosystem in developing countries, to foster the culture of startups and technological adoption. These ecosystems are not only associated with economic activity but also with the level of knowledge exchange, cooperation and innovation and therefore sustainable development.

4.2 SMEs Adoption of Digital Technologies

SMEs are a major economic activity in the developing countries, and in many cases, they take a considerable portion of the workforce and the economy. Digitization of SMEs has turned out to be a major source of competitiveness, effectiveness, and progress. Cloud computing, online shopping platforms, online marketing solutions, and enterprise resource planning systems help SMEs be more organised, less expensive, and more efficient in communication with customers (Shahadat et al., 2023). Moreover, the digital financial service offers SMEs better access to finance which is usually a significant limitation in developing economies.

The digitization of the world enables SMEs to break the age-old communication barriers like accessibility to the market and information asymmetry. Through the digital platforms, SMEs have expanded their customer base, managed to trade internationally, and are also able to react better to fluctuating market conditions. Digital adoption among SMEs is however pegged on various technological, organisational and environmental pressures and conditions such as availability of infrastructure, digital capabilities and empowerment by the government (Díaz-Arancibia et al., 2024). In addition, systematic reviews point out that digital transformation has a great impact on improving the performance and resilience of SMEs, but the problem of resource limitations and deficiency in knowledge remains (Alfian et al., 2025). Figure 2 demonstrates the channel through which SMEs are incorporating digital technologies and making contributions in the sustainable development.

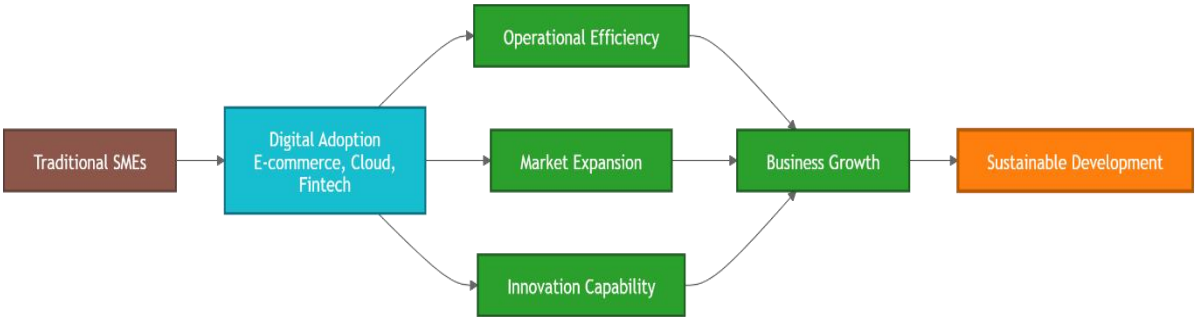

Figure 2. SME digital adoption pathway toward sustainable development.

4.3 Platform-Based Business Models

Due to the emergence of digital platforms, platform-based business models have become widespread and have altered the manner in which businesses are conducted and value-created. These models enable the interaction of various stakeholders such as producers, consumers and service providers in a common digital space. Platform-based ecosystems are built on the principles of network effects, where a value-add is gained by the more users are involved, hence forming scalable and efficient markets (Evans and Schmalensee, 2016).

Scalability, flexibility, and reach to a large number of users are all the benefits of platform-based business models to entrepreneurs and SMEs. Such models enable small businesses to run without a large physical infrastructure thus cutting on operational costs and also allowing them to expand very fast. Platform-based models have had a significant influence in retail, transportation, and financial services in the developing countries. They have helped informal businesses to formalise their business and engage more in the digital economy. Moreover, the utilisation of the digital platforms facilitates knowledge exchange and informed decision making, which further contributes to the improvement of the organisational performance (Abubakar et al., 2019).

4.4 Sustainable and Inclusive Enterprise Development

Entrepreneurship and SMEs play a key role in realising sustainable and inclusive economic development since they facilitate job creation, innovation, and inclusion of the society. Digital technologies also increase the ability of businesses to embrace sustainable practises through increased efficiency of resources, minimization of waste and provision of environmentally friendly business processes. As an illustration, energy management, supply chain optimization, and waste reduction can be assisted with the help of digital tools, thus, bringing environmental sustainability.

Digital entrepreneurship encourages social inclusion besides environmental advantages in which marginalised groups such as women, young people, and the rural community are offered opportunities. These groups can reach markets, financial services and jobs which were initially unreachable through digital platforms. This inclusiveness is especially significant in developing countries, where there is stronger social and economic inequality. Digital entrepreneurship helps to address the issue of inequality and promote a fair growth by enabling various groups to engage in economic activities.

4.5 Evidence from Developing and Asian Economies

The influence of SMEs and digital entrepreneurship is especially tangible in the developing and Asian economies, where the fast digital transformation has transformed the economic environment. India, China, Indonesia, Vietnam, and other countries have experienced a tremendous increase in digital start-ups and technology-based businesses. The growth of e-payment solutions, digital commerce and innovation platforms has allowed small enterprises to be incorporated into formal economic regimes and efficiently scale their activity.

These advancements indicate the opportunities of digital entrepreneurship to promote inclusive and sustainable development in developing areas. The effectiveness of these initiatives is, however, determined by the presence of favorable policy structures, digital infrastructure investments, and the establishment of digital competencies. In general, the experiences of developing and Asian economies indicate that entrepreneurship and SMEs are some of the major facilitators of the digital economy and that they are important in promoting sustainable economic development.

5. Key Drivers Enabling the Digital–Sustainability Link

5.1 Digital Infrastructure and Connectivity

The digital infrastructure and connectivity are the support base of the digital economy and is vital in facilitating sustainable economic growth. Stable internet connexion, high speed internet, mobile connexion, and data storage are needed to facilitate the interaction process digitally, support online businesses, and guarantee the smooth flow of information. In developing countries, the digital infrastructure has made markets, financial services and state services more accessible, so allowing inclusive growth. Increased connectivity enables the business, especially the SMEs, to become part of the global value chains and harness on digital platforms to expand. Additionally, the digital infrastructures underpin smart cities, telemedicine, and e-governance, which add to the economic performance and social welfare (Tan & Taeihagh, 2020). Nevertheless, the lack of infrastructure in rural regions as opposed to urban ones still restricts the potential of the digital transformation to its fullest, which means the necessity to make special investments to close the connectivity gap.

5.2 Government Policies and Regulatory Frameworks

Policies and regulatory systems by the government play a very important role in determining the path of the digital transformation and its role in ensuring sustainability. With proper policies in place, an

environment can be put in place to encourage innovations, entrepreneurship, and equitable access to digital technologies. Governments can significantly contribute to the creation of digital strategies, investments in infrastructure, and the creation of regulations that favour competition, data protection, and cybersecurity (Lesher et al., 2020). Digital technologies have gained relevance in many developing nations, and these digital technologies have gained relevance due to policy programmes like digital inclusion programmes, start-up incentives, and innovation funds.

Simultaneously, the regulatory frameworks should be able to balance between risk management and innovation. Problems like privacy of data, digital taxation and governance of the platform should be highly regulated to make sure that digital expansion does not cause exploitation and inequality. Other international bodies like OECD have stressed the significance of integrated policy frameworks in directing digital transformation and sustainable development (Canton, 2021). Open and dynamic regulatory frameworks will be necessary in establishing confidence among the users and companies, thus motivating more of them to join the digital economy.

5.3 Innovation and Technological Adoption

The connexion between the digital economy and sustainable development is mostly based on innovation and adoption of new technologies. The use of technologies, including artificial intelligence, big data analytics, blockchain, and the Internet of Things (IoT), allows utilising resources more efficiently, making decisions, and creating new business models. In the developing countries, the implementation of these technologies enables the businesses to bypass the traditional limits, increase productivity and provide new products and services that would address the changing consumer needs.

Technological innovation has also been important in solving the sustainability challenges. As an illustration, digital solutions will be able to optimise the use of energy, decrease waste, and enhance transparency of the supply chain. This is further increased by the spread of diffusion of innovation in sectors since digital technologies are being incorporated in other sectors like agriculture, manufacturing, and services. Furthermore, the recent events in the context of the global crisis, i. e. COVID-19 pandemic, have confirmed the ability of digital technologies and communication networks to maintain economic processes and provide resilience (Saeed et al., 2020). Innovation, in terms of research and development, public-or-private collaborations and knowledge-sharing programmes is thus necessary to ensure that the sustainability benefits of digital transformation are maximised.

5.4 Institutional Quality

Another important variable with an effect on the success of the digital economy in facilitating sustainable development is institutional quality. Good institutions with transparency, accountability, and effective governance generate a stable environment which facilitates investment, innovation and economic growth. Conversely, institutions with low strength may impede adoption of digital through the introduction of uncertainties, high transaction costs and resource unavailability.

In third world countries, the digital initiatives and policies tend to rely on the quality of the institution. Effective collaboration between the government and the private sector requires the effective administration of the state, a well-defined set of regulations, and anti-corruption strategies to make sure that the digital transformation is successful. Also, institutions are critical in mobilising stakeholders, such as governmental agencies, the players in the private sector, and the civil society organisations in a common development agenda. The increase in the institutional capacity may improve the capacity of countries to use digital technologies to promote sustainable development as well as prevent related risks (Lesher et al., 2020; Canton, 2021).

5.5 Human Capital and Digital Skills

The key to the effective incorporation of the digital economy in the strategies of sustainable development lies in human capital and digital skills. The presence of skilled labour force that can leverage on digital technologies is what defines how people and organisations can engage and access the digital economy. In less developed countries, it is necessary to invest in education and training, as well as in the development of skills that would enable the creation of digital capabilities and innovation.

Digital skills can help people to secure a job, start up a venture, and respond to the dynamic labour market needs. In addition, digitally literate citizens can also exploit online services, engage in digital governance, and take part in knowledge-based economies. Nevertheless, the educational and training systems usually have gaps making it difficult to cultivate digital skills, especially among the marginalised populations. Research on the topic of digital transformation emphasises the significance of social sustainability and inclusive skills building in the distribution of the benefits of digitalization (Nosratabadi et al., 2023). Eliminate these gaps it is necessary to implement specific interventions, such as vocational training, digital literacy, industry-educational institutions partnerships. Table 3 provides a comparative overview of the most important drivers and barriers that impact digital transformation.

Table 3. Drivers and barriers of digital transformation in developing nations.

Category	Key Factors	Implications	Key References
Drivers	Digital infrastructure, policy support, innovation, human capital	Enable digital transformation and sustainability	Lesher et al. (2020); Tan & Taeihagh (2020); Nosratabadi et al. (2023)
Barriers	Digital divide, financial constraints, cybersecurity risks	Limit inclusivity and SME growth	Triplett (2025); Awan et al. (2025); Benjamin et al. (2024)
Institutions	Governance, regulation, policy coordination	Ensure effective implementation of digital strategies	Canton (2021); Dahlman et al. (2016)
SMEs Role	Digital adoption, innovation, entrepreneurship	Bridge digital economy and sustainability outcomes	Shahadat et al. (2023); Alfian et al. (2025); Soluk et al. (2021)

These drivers, namely digital infrastructure, enabling policies, technological innovation, the quality of institutions, and human capital, react to each other to influence the effectiveness of the digital economy to support sustainable economic development. Their interaction will either result in inclusive growth and environmental sustainability or even increase the pre-existing inequalities due to digital transformation. This is why a unified and comprehensive strategy is needed to harness the potential of digitalization and ensure that it can deal with its issues.

6. Challenges and Barriers

6.1 Digital Divide

The ongoing digital divide is one of the greatest obstacles to the use of the digital economy to achieve sustainable development; it can be taken in various forms such as geographic, socioeconomic, and gender differences. The access to digital infrastructure, internet connectivity, and technological resources differs dramatically in terms of urban and rural territories in many developing countries. In rural areas, the problem is that there are not always enough broadband coverage and access to digital devices that would help people be involved in digital economic activities. Also, the digital divide between men and women continues to exist, and in most places, women experience a lower digital access rate, literacy, and engagement rates than men. These differences impair inclusive growth and restrict marginalised populations to being able to enjoy the advantages of digital transformation and thus compromise the social sustainability of the digital economy. Figure 3 shows the relationship between the key enabling drivers and significant obstacles to digital transformation in developing countries.

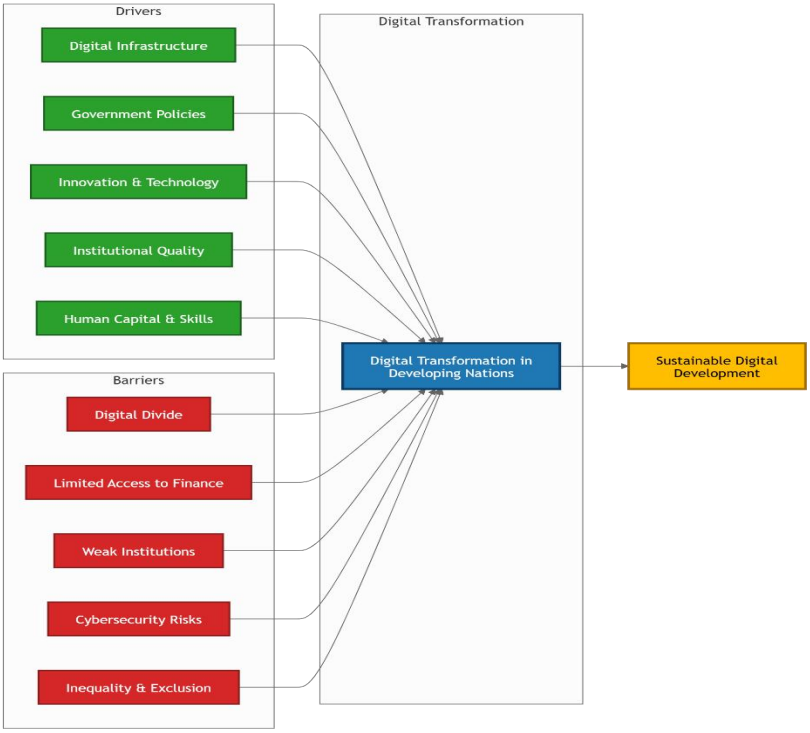

Figure 3. Drivers and barriers influencing digital transformation in developing nations.

6.2 Limited Access to Finance for Digital SMEs

The problem of access to finance has been a burning issue among the small and medium-sized enterprises (SMEs) willing to embrace and implement digital technologies. Even though digitalization has the potential to improve the performance and competitiveness of business, in the developing countries, a large number of SMEs lack funds to invest in digital tools, infrastructure, and innovation. The conventional financial institutions tend to view SMEs as high-risk borrowers as they lack collateral, formal credit records and unpredictable business environments. Although financial accessibility has enhanced with the fintech solutions, there are still considerable gaps, especially in early-stage startups and informal businesses. Such financial exclusion limits the development of digital entrepreneurship and the overall effect of the digital economy on sustainable development.

6.3 Weak Institutional Frameworks

Another severe obstacle to the successful implementation of digital technologies in the strategy of sustainable development is the weak institutional structures. Governance issues in most developing nations including regulatory uncertainty, bureaucratic inefficiency, and corruption make the innovation and investment in digital a poor environment. The lack of clear and consistent digital policies may result in inconsistent implementation of digital initiatives and decrease their effectiveness and scalability. Moreover, a lack of institutional capacity frequently discourages the accessibility of stakeholders, such as government organisations, the privates, and the civil societies. The institutional quality should thus be enhanced so as to have the digital transformation efforts being aligned with the sustainability goals and to be implemented in a transparent and efficient way.

6.4 Cybersecurity and Data Privacy Concerns

The issue of cybersecurity and data privacy has gained more and more significance because of the spread of digitalization. The increased dependence on digital environments, online transactions, and systems that are based on data exposes people and organisations to a range of cyber threats like data breaches, identity theft, or cyberattacks. These risks are especially severe in the developing countries, where the cybersecurity infrastructure and regulatory models are not fully developed. It is also made vulnerable by poor data protection laws and lack of awareness in regards to cybersecurity practises. Such problems can reduce confidence in digital systems, which will deter people and businesses to participate fully in the digital economy. It is thus important that there are strong cybersecurity deployments made and proper data-governance systems with an aim of establishing secure and trusted online space.

6.5 Risk of Inequality and Exclusion

The digital economy can be used to foster inclusive economic growth, but it equally poses the risk of increasing the existing inequalities in case it is not

handled carefully. The disparity in access to digital technologies and skills and opportunities has the potential to extend the distance between various social and economic groups. As an example, we can view the digital opportunities that are more likely to favour those who are more highly educated and digitally literate and leave behind that incompetent. Equally, because large companies have higher resources, they can easily embrace the advanced technologies than the smaller companies, which is increasing market concentration and decreasing competition.

Besides, the trend of automation and digitalization can leave some forms of work, especially in labour-intensive fields, without employment, and these people will need to adapt to the workforce. These changes may contribute to the growth of unemployment and social inequality unless proper policy changes, including reskilling programmes and social protection are in place. To combat these risks, it is necessary to specifically pay attention to inclusive digital policy, fair access to resources, the creation of new skills that allow the wide access of individuals to the digital economy.

The issues and obstacles which are related to the digital economy indicate how intricate the realisation of a sustainable economic development in developing countries is. Although digitalization presents major opportunities, the benefits of the change are not always achieved and can be disproportionate. The digital divide, financial constraints, institutional weaknesses, cybersecurity risks, and inequality are issues that should be addressed to make the digital economy a contributor to inclusive and sustainable growth. Addressing these obstacles and leveraging the potentials of digital transformation fully needs a holistic and coordinated response by governments, actors in the private sector, and international organisations.

7. Conclusion

This study reviews the relationship between the digital economy and sustainable economic development in developing nations, highlighting its transformative potential across economic, social, and environmental dimensions. The findings indicate that digital technologies enhance productivity, foster innovation, and expand market access, thereby contributing to economic growth. Simultaneously, they promote social inclusion by improving access to financial services, education, and public services, while also supporting environmental sustainability through efficient resource management and green innovations. However, the benefits of the digital economy are not automatic and depend on key enabling factors such as digital infrastructure, supportive policies, institutional quality, and human capital development. The study further emphasizes the critical role of entrepreneurship and SMEs in translating digital advancements into sustainable outcomes, particularly through digital platforms and innovative business models. Despite these opportunities, several challenges persist, including the digital divide, limited access to finance, weak institutional frameworks, cybersecurity risks, and the potential for increasing inequality. These barriers highlight the need for inclusive and coordinated strategies to ensure equitable participation in the digital economy. Moving forward, policymakers should prioritize investments in infrastructure, digital skills, and regulatory frameworks while promoting responsible and sustainable innovation. Future research should focus on region-specific dynamics and emerging technologies to deepen understanding of this nexus. Overall, the digital economy offers significant opportunities for sustainable development, but its success depends on a balanced approach that integrates technological progress with inclusive and sustainable policies.

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