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Digital Transformation and its Role in Advancing the Sustainable Development Goals (SDGs)

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Abstract

The term "digital transformation" describes how digital technologies are incorporated into every aspect of governance, business, and society, radically altering how companies function and provide value. The United Nations Sustainable Development Goals (SDGs) list several global difficulties that the world must overcome, and digital transformation is a key factor in advancing these goals. This study examines how digital technologies, including cloud computing, big data, artificial intelligence (AI), and the Internet of Things (IoT), can help achieve the SDGs. Several SDG targets are being directly addressed by the growing use of digital tools to increase accessibility, efficiency, and sustainability in important industries like infrastructure, healthcare, education, and energy. The study emphasizes how digital solutions improve healthcare delivery (SDG 3) through telemedicine and AI-based diagnostics, provide access to high-quality education (SDG 4) through e-learning platforms, and reduce poverty (SDG 1) through financial inclusion. Additionally, it looks at how breakthroughs like smart grids and renewable energy technologies encourage the use of clean energy (SDG 7) and how digital solutions in infrastructure and industries (SDG 9) support innovation and sustainable growth. The study also addresses the difficulties associated with digital transformation, including the need for supportive legislative frameworks, the digital divide, infrastructure constraints, and cybersecurity issues. In the end, the report makes the case that, even while digital transformation has enormous potential to hasten the SDGs' achievement, it is imperative to remove obstacles to its broad acceptance. To make sure that digital transformation promotes fair and sustainable growth for everybody, it urges international cooperation, investments in digital skills, and the creation of inclusive, progressive policies.

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1. Introduction

From business and healthcare to education and governance, digital transformation has become a major force behind innovation, efficiency, and competitiveness in a number of industries (Ahmed *et al.*, 2022; Kaputa *et al.*, 2022) ^[1, 39]. It describes how digital technologies are being incorporated into every facet of business operations, radically altering how companies generate revenue, provide services, and engage with stakeholders.

Organizations can become more agile, data-driven, and customer-centric by rethinking existing processes in addition to using new technologies. At the core of this change are important technologies like blockchain, cloud computing, artificial intelligence (AI), the Internet of Things (IoT), and big data analytics, which present previously unheard-of chances for expansion, effectiveness, and societal impact (Gill *et al.*, 2019; Chattu, 2021) ^[28, 9].

Pursuing sustainable development, which seeks to strike a balance between social inclusion, economic progress, and environmental protection, is one of the biggest issues the world is currently facing (Sangwan and Bhatia, 2019; Han *et al.*, 2021) ^[64]. To address urgent global issues like poverty, inequality, climate change, environmental degradation, peace, and justice, the United Nations unveiled the 17 Sustainable Development Goals (SDGs) in 2015. Up to 2030, the SDGs provide a thorough framework for directing international investment, policy, and action. Every objective aims to make the world a better, fairer place with targets and metrics. While the SDGs span diverse sectors, they share a common objective: to promote long-term sustainability and improve the quality of life for all people, irrespective of their background or geography (Fei *et al.*, 2021; Messerli *et al.*, 2019) ^[19, 48].

A key component of achieving these SDGs is digital transformation. Digital technologies have the potential to revolutionize a variety of industries, from healthcare and education to agriculture and energy, by increasing efficiency, expanding accessibility, and promoting sustainability (Zaki, 2019; Dayioğlu and Turker, 2021) ^[74, 11]. In a similar vein, advancements in energy-efficient technology, smart grids, and renewable energy can help achieve SDG 7, which aims to guarantee that everyone has access to modern, cheap, dependable, and sustainable energy. Additionally, digital technologies are directly addressing SDG 1 (No Poverty) and SDG 9 (Industry, Innovation, and Infrastructure) by promoting innovation and economic growth in disadvantaged places, enhancing financial inclusion, and reducing the digital gap.

It is impossible to exaggerate how crucial digital innovation is to achieving the SDGs. Digital technologies help organizations, governments, and communities make better decisions, maximize resources, and develop solutions that are both economically and environmentally sustainable by improving operational efficiency. Additionally, by increasing accessibility to services, allowing underrepresented groups to engage in the digital economy, and enhancing access to financial, healthcare, and educational resources, digital transformation promotes inclusivity (Kalkanci *et al.*, 2019; Ye and Yang, 2020) ^[38, 71]. Therefore, digital transformation is more than just a technology change; it is a potent force for building societies that are more inclusive, equal, and sustainable.

The SDGs can only be achieved through digital evolution, which improves sustainability, accessibility, and efficiency in several industries. Societies may address difficult global issues, encourage innovation, and hasten the transition to a more sustainable and inclusive future by integrating cutting-edge digital technology (Flyverbom *et al.*, 2019; Pokrajac *et al.*, 2021) ^[22, 56]. To ensure that no one is left behind in this digital revolution, it is crucial to address obstacles like the digital gap, poor infrastructure, and insufficient legislative frameworks to fully exploit the promise of digital transformation in accomplishing the SDGs.

2. Methodology

The PRISMA methodology (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) is typically used for conducting systematic reviews and meta-analyses, focusing on transparency and reproducibility in reviewing literature. When applying this methodology to the topic of Digital Transformation and its role in advancing the Sustainable Development Goals (SDGs), the following approach was employed:

A comprehensive literature search was conducted across multiple databases, including academic journals, government reports, and reputable online sources, to gather relevant research on the intersection of digital transformation and the SDGs. The search was performed using key terms such as "digital transformation," "Sustainable Development Goals," "SDG," "technology for sustainable development," "AI and SDGs," "ICT and sustainability," and other related terms to identify a broad range of studies and publications. The search was limited to peer-reviewed articles published in English, focusing on studies conducted within the past two decades to capture the most current insights.

Inclusion and exclusion criteria were established to ensure the relevance and quality of the selected studies. Studies were included if they focused on the role of digital technologies such as AI, big data, IoT, cloud computing, and blockchain in advancing specific SDGs. Only articles with clear analysis, case studies, or empirical evidence were considered, while opinion pieces, non-peer-reviewed sources, or publications outside the scope of the SDGs were excluded.

After applying the inclusion and exclusion criteria, the selected studies were assessed for quality using a set of predefined indicators, including the robustness of methodology, sample size, and the relevance of findings to digital transformation and sustainable development. Data from the studies were then extracted, focusing on the ways in which digital technologies contribute to specific SDGs, such as poverty reduction, quality education, clean energy, and climate action.

The findings were synthesized, and a thematic analysis was conducted to identify key trends, challenges, and opportunities within the literature. The role of digital transformation in accelerating progress towards the SDGs was explored, with particular attention to the benefits and potential risks associated with technology adoption. This synthesis aimed to provide a comprehensive understanding of how digital transformation can drive sustainable development while addressing issues such as the digital divide, regulatory frameworks, and ethical concerns.

By following the PRISMA methodology, this study ensures a rigorous, transparent, and reproducible approach to evaluating the literature on digital transformation and its impact on the SDGs, providing valuable insights for policymakers, researchers, and practitioners working to align technology adoption with sustainable development goals.

2.1 Background Context

The process of integrating digital technologies into all facets of a society or business is known as "digital transformation." It is distinguished by a fundamental change in the way services, business operations, and societal tasks are performed, in addition to the deployment of new technology (Frank *et al.*, 2019; Oztemel and Gursev, 2020) ^[25, 53]. To increase productivity, accessibility, and sustainability, this transition usually involves several industries, including

business, healthcare, education, government, and agriculture. Advanced technologies, including artificial intelligence (AI), the internet of things (IoT), big data, and cloud computing, are essential elements of digital transformation.

Artificial intelligence (AI) is a key component of technology-driven change because it makes automation, machine learning, and predictive analytics possible, which can improve decision-making, streamline procedures, and offer individualized services. By connecting physical objects to the internet, the Internet of Things (IoT) makes it possible to collect and monitor data in real time, offering insights that increase operational efficiency. Conversely, big data refers to the enormous volumes of data produced by people and organizations, which may be examined to produce useful information that helps in decision-making. Large datasets can be processed and stored in a distributed setting thanks to cloud computing, which facilitates the scaling, sharing, and accessibility of digital services (Mazumdar *et al.*, 2019; Sandhu, 2021) ^[46, 63]. Together, these technologies enable organizations to operate more effectively, create innovative solutions, and drive sustainable growth.

As part of the 2030 Agenda for Sustainable Development, the United Nations established the 17 Sustainable Development Goals (SDGs) in 2015. From poverty and inequality to climate change and peace, these global goals are meant to tackle the most important problems that humanity is now experiencing. The SDGs serve as a blueprint for a better future by acknowledging that development must be sustainable and inclusive. From guaranteeing access to high-quality education (SDG 4), to supporting innovation and infrastructure (SDG 9), and to encouraging climate action (SDG 13), each goal has targets that center on quantifiable activities (Franco and Tracey, 2019; Ferguson and Roofe, 2020) ^[20, 23]. These goals also emphasize the importance of leaving no one behind, calling for the empowerment of marginalized groups and communities in all areas of development.

The SDGs could advance much more quickly thanks to digital transformation, particularly as the globe struggles with increasingly difficult issues. A rare chance to leverage innovation and make major progress toward attaining sustainable development is presented by the convergence of digital technologies and the SDGs (Kim *et al.*, 2020; Hujo and Carter, 2019) ^[42, 34]. By making learning more accessible to those in underprivileged and distant places, digital learning platforms and online resources can increase access to high-quality education and contribute to the achievement of SDG 4 (Quality Education).

Furthermore, digital technologies are revolutionizing the energy industry, especially in the development of more energy-efficient systems and the promotion of renewable energy (Borowski, 2021; Shabalov *et al.*, 2021) ^[6, 65]. SDG 7 (Affordable and Clean Energy) is aided by the deployment of smart grids, which are made possible by IoT and AI and allow for more effective energy distribution and consumption. Data analytics and Internet of Things apps promote SDG 13 (climatic Action) by monitoring environmental conditions, forecasting climatic patterns, and tracking pollutant levels.

Digital tools also play a part in societal issues. By providing access to banking services in areas with limited traditional banking infrastructure, digital platforms promote financial inclusion (Pazarbasioglu *et al.*, 2020; Siano *et al.*, 2020) ^[55, 66]. This promotes business, improves livelihoods, and gives financial resources to marginalized communities to achieve

SDG 1 (No Poverty). Additionally, by encouraging better decision-making and public engagement, the use of digital technology in governance can increase accountability and transparency, which will aid in achieving SDG 16 (Peace, Justice, and Strong Institutions).

Although digital transformation offers many potential benefits, there remain obstacles to its complete integration in furthering the SDGs. Particularly in poorer nations, where inadequate access to infrastructure and technology can impede the successful adoption of digital solutions, the digital divide continues to be a major obstacle. Furthermore, to guarantee that digital transformation serves the greater good, ethical issues about cybersecurity, data privacy, and possible technological misuse must be addressed (Michael *et al.*, 2019; Karale, 2021) ^[49, 40].

To achieve the SDGs, digital transformation—powered by AI, IoT, Big Data, and cloud computing—is expected to be crucial. Digital tools offer the ability to accelerate progress toward the global goals by enabling more sustainable, inclusive, and efficient solutions across several sectors (Gidigbi, 2021; Yigitcanlar *et al.*, 2021) ^[27, 73]. To fully benefit from digital transformation in promoting sustainable development, however, it is imperative to provide fair access, address ethical issues, and cultivate the required infrastructure and policy frameworks.

2.2 Digital Transformation's Impact on Key SDGs

With the help of technologies like artificial intelligence (AI), the internet of things (IoT), big data, and cloud computing, digital transformation has the potential to significantly advance the Sustainable Development Goals (SDGs) of the UN. These technologies make it possible for people, governments, and organizations to more successfully and efficiently address difficult global issues (Saber *et al.*, 2019; Chatfield and Reddick, 2019) ^[61, 8]. SDG 1 (No Poverty), SDG 3 (Good Health and Well-Being), SDG 4 (Quality Education), SDG 7 (Affordable and Clean Energy), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 13 (Climate Action) are among the important SDGs that we examine in this assessment in relation to digital transformation as shown in figure 1.

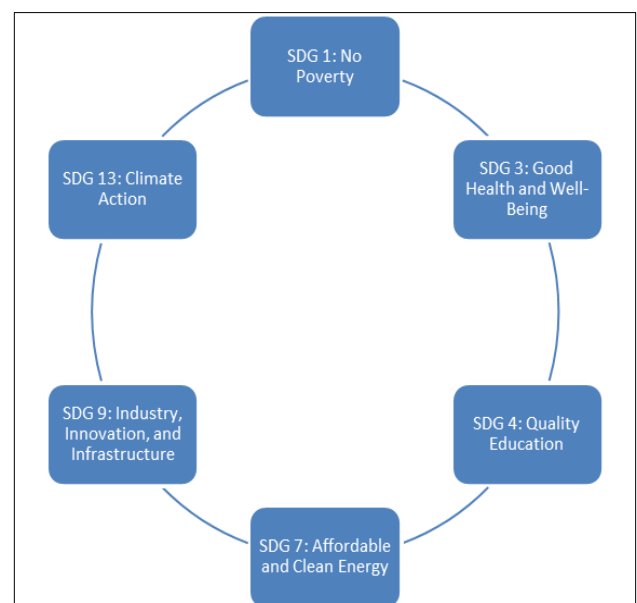


Fig 1: Digital Transformation's Impact on Key SDGs

The rise in financial inclusion is one of the most obvious effects of the digital revolution on reducing poverty. Digital payment methods and mobile banking have emerged as vital resources for giving unbanked people access to financial services. The way people use financial services has been completely transformed by platforms like M-Pesa in Kenya, which allow users to move money, pay bills, and obtain loans using their mobile devices. Especially in underserved and rural areas where traditional banking infrastructure is weak, digital solutions like these provide up potential for financial inclusion (Friedline *et al.*, 2020; Wang and He, 2020) ^[26, 70]. Further reducing poverty is made possible by digital transformation, which also makes remote work and digital entrepreneurial options accessible. Online marketplaces like Upwork and Fiverr, which link independent contractors with customers throughout the world, give people in underdeveloped nations the chance to make money (Kenney *et al.*, 2019; Odey, 2021) ^[41, 52]. These technologies lower economic obstacles and aid in the liberation of individuals from poverty by enabling them to engage in the global economy through digital methods. SDG 3 is being significantly advanced by digital transformation, which is transforming healthcare delivery and enhancing public health outcomes. Telemedicine, for instance, has expanded access to healthcare services, especially in rural areas or regions with limited medical infrastructure. Platforms that enable virtual consultations with healthcare professionals reduce the need for patients to travel long distances to seek care, making healthcare more accessible and affordable (Yang *et al.*, 2019; Jnr, 2020) ^[71].

Apart from telemedicine, the efficiency and precision of healthcare delivery are improved by the integration of health data systems, such as electronic health records (EHR) and patient monitoring devices (Alverson, 2020; Jin *et al.*, 2020) ^[2, 36]. In order to improve patient outcomes, AI-driven technologies are being employed for individualized treatment regimens, illness diagnostics, and predictive analytics. By expanding educational possibilities worldwide and improving access to high-quality learning resources, digital transformation is changing education. Numerous subjects are covered in easily accessible and reasonably priced courses offered by online learning platforms like Coursera, edX, and Khan Academy. These platforms bridge the education gap, allowing people from all socio-economic backgrounds to acquire new skills and knowledge, regardless of geographical location.

Additionally, ensuring that students are ready for the digital age is facilitated by the integration of educational resources into both formal and informal learning contexts as well as the development of digital literacy. SDG 4 is further promoted by tools that offer individualized learning experiences, such as AI-based tutoring systems, learning management systems, and interactive digital whiteboards (Rerhaye *et al.*, 2021; Niemi, 2021) ^[57, 51].

A key factor in the advancement of inexpensive and clean energy is digital transformation. IoT and AI-powered smart grids provide for effective energy distribution and real-time monitoring. These systems help meet SDG 7 by increasing energy supply reliability, lowering energy waste, and ensuring a more sustainable use of resources (Franco *et al.*, 2020; Elavarasan *et al.*, 2021) ^[14, 24]. Smart meters allow consumers to monitor their energy usage and optimize consumption, thereby promoting energy efficiency and

lowering costs.

Furthermore, thanks in part to developments in digital technology, renewable energy technologies like wind turbines and solar panels are becoming more and more affordable. To ensure that energy is produced and distributed as effectively as possible, renewable energy systems can be optimized through the use of AI and data analytics. These innovations support a sustainable energy future and lessen reliance on fossil fuels. Digital technologies are driving Industry 4.0, which is changing infrastructure, innovation, and production. By increasing production speed, decreasing waste, and enhancing efficiency, automation, robots, and artificial intelligence are transforming manufacturing processes (Goel and Gupta, 2020; Haleem *et al.*, 2021) ^[29, 31]. The use of IoT in manufacturing allows for real-time monitoring of equipment, helping to predict failures and minimize downtime, thus boosting productivity.

Additionally, the development of smarter infrastructure is made possible by digital technologies. Critical infrastructure, like highways, bridges, and water systems, can be monitored and managed by IoT devices to keep them in good condition and more resistant to the effects of climate change. By promoting the sustainable growth of infrastructure and industry, these technologies help achieve SDG 9 (Denoncourt, 2020; Koria and Prendeville, 2021) ^[13, 43]. Because technology makes data-driven environmental monitoring, climate modeling, and sustainable agricultural practices possible, digital transformation is essential to combating climate change. To track greenhouse gas emissions, deforestation, and forecast climate patterns, big data and artificial intelligence are being employed. This provides important information for climate action (Taylor *et al.*, 2020; Hsu *et al.*, 2020) ^[67, 33].

Another field where digital solutions are having a big influence is sustainable agriculture. Farmers can monitor soil conditions, optimize irrigation, and use fewer pesticides and fertilizers thanks to precision agriculture, which is fueled by IoT and AI. In line with SDG 13, this results in more environmentally friendly farming methods that also increase food security.

By offering creative answers to some of the most important problems facing the globe, digital transformation significantly contributes to the advancement of the SDGs. Digital technologies can greatly speed up progress toward accomplishing the SDGs set forth by the UN, from lowering poverty and enhancing healthcare to promoting renewable energy and halting climate change. However, to maximize the benefits of digital transformation, it is essential to address challenges such as the digital divide and ensure that all people have equitable access to these technologies (Chang *et al.*, 2021; Jamil, 2021) ^[35].

2.3 Barriers to Digital Transformation in Achieving SDGs

Although digital transformation has enormous potential to speed up the SDGs' progress, major obstacles are preventing its widespread adoption, especially in developing nations (Walker *et al.*, 2019; Ziadlou, 2021) ^[69, 75]. The digital divide, infrastructure constraints, cybersecurity and data privacy issues, and regulatory and legislative obstacles are some of these obstacles, as shown in Figure 2. For digital transformation to effectively contribute to the global achievement of the SDGs, several challenges must be addressed.

One of the most pressing barriers to digital transformation is

the digital divide the gap between those who have access to digital technologies and those who do not. In many low-income and rural areas, particularly in developing countries, access to the internet, smartphones, and computers remains limited. According to the International Telecommunication Union (ITU), nearly half of the world's population still lacks access to the internet, with the most significant gaps in Africa, Asia, and Latin America.

Because people without access to digital tools cannot benefit from the educational, economic, and healthcare opportunities brought forth by digital revolution, the digital divide makes inequality worse. Because people in digitally excluded areas continue to be cut off from essential services and opportunities, this lack of access makes it more difficult to achieve SDGs pertaining to health (SDG 3), poverty (SDG 1), and education (SDG 4). To guarantee that the advantages of digital technology may be fairly distributed throughout all populations, the digital divide must be closed (Deganis *et al.*, 2021; Pawluczuk *et al.*, 2021)^[12, 54]. Scaling digital solutions is significantly hampered by infrastructural constraints, even in areas with a moderate degree of internet connectivity. The efficient use of digital technology is hampered by poor infrastructure in many low-income nations, such as insufficient electricity, erratic internet connectivity, and restricted access to digital gadgets. Particularly in rural locations, issues with network coverage and power availability pose serious obstacles to the uptake of digital solutions like e-commerce, telemedicine, and online learning platforms.

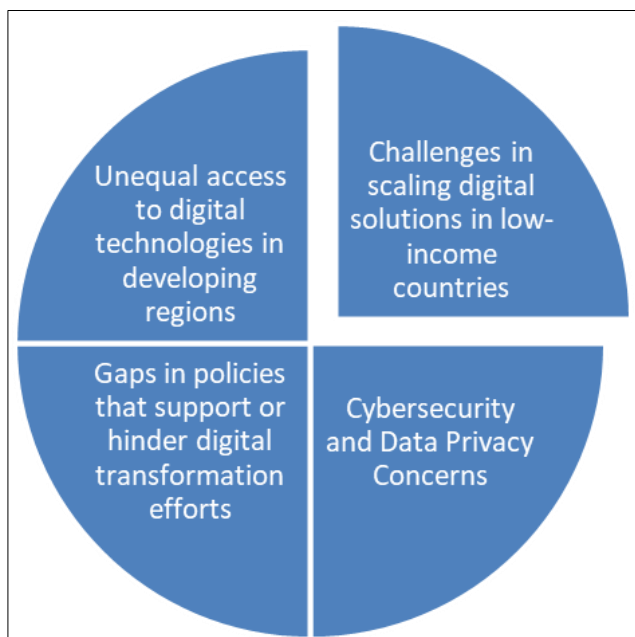


Fig 2: Barriers to Digital Transformation in Achieving SDGs

Furthermore, many nations, especially those with little financial resources, may find the expense of developing and maintaining digital infrastructure to be prohibitive. Low-income nations' governments and corporations might find it difficult to make the infrastructure investments required to facilitate broad digital adoption, depriving vast people of the chance to profit from the digital transformation of vital industries like healthcare, education, and energy. Digital transformation's ability to support SDGs like affordable and sustainable energy (SDG 7) and high-quality education (SDG

4) is constrained in the absence of strong infrastructure (Sachs *et al.*, 2019; Ziadlou, 2021)^[62, 75].

As digital technologies become more integrated into everyday life, the risks associated with cybersecurity and data privacy become more pronounced. The increasing reliance on digital solutions raises concerns about the security of personal data and the potential for cyberattacks. If these systems are not adequately protected, they are vulnerable to hacking, data breaches, and misuse.

Another important issue is data privacy, particularly in areas with lax data protection laws. Trust in digital platforms can be undermined by inadequate controls that allow personal information to be exploited (Balkin, 2020; Rockwern *et al.*, 2021)^[3]. In industries like healthcare (SDG 3) and education (SDG 4), where sensitive data must be safeguarded to preserve privacy and guarantee service integrity, this is especially troubling. The ability to accomplish SDGs of innovation (SDG 9), healthcare (SDG 3), and education (SDG 4) may be hampered by people and organizations' reluctance to fully embrace digital solutions due to concerns about cyber dangers.

Another major obstacle to digital transformation in the context of the SDGs is regulatory and policy issues. Regulations and policies that facilitate digital transformation are either nonexistent or out of date in many nations. Coherent digital regulations that encourage innovation and guarantee the responsible and inclusive use of digital technologies may be lacking in underdeveloped nations. Furthermore, it may be challenging to create international standards for digital technology due to regional regulatory fragmentation. To guarantee that efforts at digital transformation advance the global SDGs rather than exacerbate already-existing disparities, international collaboration on digital governance is required.

Furthermore, marginalized people's capacity to gain from digital transformation is restricted by the absence of appropriate policies that promote digital inclusion, such as reasonably priced internet service access and digital literacy initiatives. To make sure that the digital revolution doesn't leave behind vulnerable populations and exacerbate already-existing socioeconomic gaps, policies that address these problems and encourage inclusivity are crucial (Lyons *et al.*, 2019; Bello *et al.*, 2021)^[45, 4].

Although digital transformation has the potential to hasten the SDGs' progress, ensuring that its advantages are widely distributed would require removing the obstacles mentioned above. To facilitate the efficient and inclusive use of digital technologies, it is imperative to solve cybersecurity and data privacy issues, overcome infrastructural constraints, close the digital divide, and create thorough regulatory and legislative frameworks. By addressing these issues, nations and institutions can use digital transformation to further the SDGs and build a more just and sustainable future for everybody.

2.4 Strategies for Overcoming Challenges

Digital transformation has enormous potential to speed progress toward the Sustainable Development Goals (SDGs), but its effective implementation is hampered by some issues, including the digital divide, infrastructure constraints, and cybersecurity threats. Multifaceted approaches involving international cooperation, capacity training, strong policy frameworks, and public-private partnerships (PPPs) are needed to overcome these obstacles as shown in figure 3 (Esposito and Dicorato, 2020; Fanzo *et al.*, 2021)^[17, 18].

Countries and organizations may foster an atmosphere that allows digital technology to promote equitable and sustainable development by tackling these obstacles together. Overcoming the obstacles to digital transformation requires international cooperation. The modern world is so interwoven that no one organization can remove the obstacles on its own. To develop inclusive and scalable solutions, governments, businesses, and international organizations must collaborate. These collaborations may concentrate on closing the digital divide, exchanging best practices, and creating cooperative initiatives meant to give marginalized populations access to digital solutions. Governments can get financial and technical resources to expand digital initiatives by involving international stakeholders. Meanwhile, private-sector businesses, particularly those in the technology sector, can contribute their knowledge of innovation, research, and development to address urgent global problems (Meissner, 2019; Halaskova *et al.*, 2020) ^[47, 30]. International organizations such as the World Bank, the International Telecommunication Union (ITU), and other UN agencies can play pivotal roles in fostering cross-border cooperation, ensuring that digital solutions are inclusive and aligned with global sustainability goals.

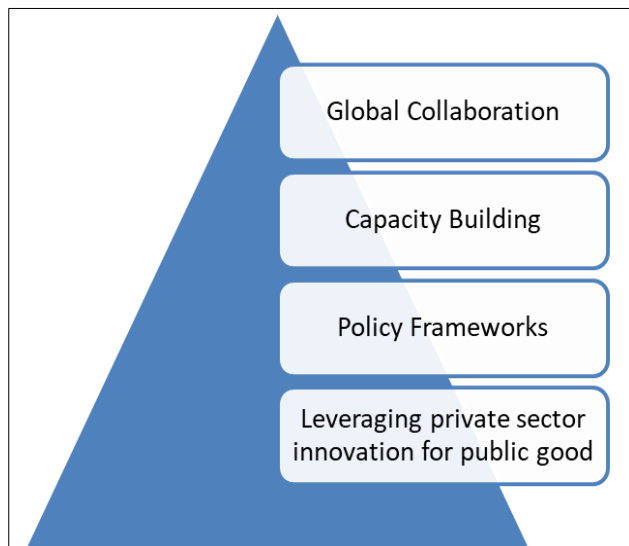


Fig 3: Strategies for Overcoming Challenges

Overcoming the obstacles presented by the digital divide and infrastructure constraints requires investments in digital education and skill development. The need for technical skills and digital literacy is growing as digital transformation picks up speed. However, especially in developing nations, a sizable section of the global workforce lacks digital technology skills. Governments and organizations must fund educational and career training initiatives that provide people the skills they need to succeed in the digital economy to address this.

Capacity building initiatives should focus on a wide range of skills, from basic digital literacy to advanced competencies in areas like artificial intelligence (AI), big data, cybersecurity, and software development. Providing access to online education platforms and affordable training resources can help bridge the skills gap and ensure that people are prepared for the future job market (Enders *et al.*, 2019; Collins, 2021) ^[15, 10]. Moreover, efforts should be made to ensure that these programs are inclusive, targeting

underserved populations, including women, rural communities, and marginalized groups. Capacity building not only empowers individuals but also contributes to the overall development of economies, driving innovation and fostering a more inclusive society in line with SDGs such as quality education (SDG 4) and decent work and economic growth (SDG 8).

The creation of supportive regulatory frameworks is a critical component in overcoming the obstacles to digital transformation. Governments must create all-encompassing regulations that handle issues with data privacy, cybersecurity, and moral AI while fostering digital inclusivity. These frameworks must be progressive, adaptable, and able to keep up with the rapid pace at which technology is developing.

Policies should contain explicit instructions on data protection, cybersecurity, and ethical concerns in cutting-edge technologies like blockchain and artificial intelligence (AI) to guarantee the responsible use of digital technologies (Rustad and Koenig, 2019; Voss and Houser, 2019) ^[60, 68]. Likewise, developing nations might use these models as a guide to enact their own data privacy laws.

Furthermore, by providing incentives for the development of digital infrastructure in underserved areas, especially rural ones, supportive policies could encourage digital inclusion. To close the digital divide, policies that promote investment in digital infrastructure and reduce the cost of internet access are essential. These regulations can also encourage businesses to develop new approaches that improve the price and accessibility of digital services, particularly in fields like healthcare (SDG 3) and education (SDG 4).

Scaling up digital transformation requires public-private partnerships (PPPs), particularly in developing nations where public sector resources may be scarce. PPPs can propel extensive digital projects that benefit the public by utilizing the private sector's innovation, technological, and investment capacities (Robles *et al.*, 2021; Li *et al.*, 2021) ^[58]. In this regard, the private sector plays a critical role in both delivering digital infrastructure and coming up with creative solutions to societal problems. In the field of education, governments and private organizations can collaborate to offer digital learning platforms that increase access to high-quality instruction in rural areas. PPPs can also facilitate the implementation of AI-driven diagnostics and telemedicine services, which can enhance healthcare outcomes and delivery, particularly in underprivileged areas.

Healthcare innovations that use AI to improve public health outcomes (SDG 3) and mobile banking initiatives that boost financial inclusion (SDG 1) are successful instances of PPPs (Berrone *et al.*, 2019; Ericsson and Mealy, 2019) ^[5, 16]. PPPs can generate scalable solutions that tackle difficult problems, enhance public services, and advance sustainable development by fusing the strengths of both sectors. A concerted and planned strategy is needed to remove the obstacles to digital transformation and take advantage of its potential to help achieve the SDGs. The creation of supportive policy frameworks, public-private partnerships, international cooperation, and capacity building is essential for maximizing the potential of digital technology in tackling global issues. By fostering an inclusive and collaborative environment, countries and organizations can ensure that digital transformation contributes to a sustainable, equitable, and prosperous future for all (Mukherjee, 2020; Fischer *et al.*, 2020) ^[50, 21].

3. Conclusion

By improving productivity, accessibility, and sustainability in a variety of industries, digital transformation is essential to reaching the Sustainable Development Goals (SDGs) of the UN. As digital technologies develop further, they present creative answers to global problems, including poverty, inequality, access to healthcare, and climate change. A more sustainable, just, and inclusive future is fostered by digital transformation, which helps nations and organizations accelerate progress toward attaining the SDGs by integrating technologies like artificial intelligence, the Internet of Things, and big data into important sectors.

Digital technologies have enormous potential to promote sustainable development. Digital solutions are changing sectors and giving people access to vital resources, including financial, healthcare, and educational resources, especially in underprivileged areas. However, major obstacles like the digital divide, infrastructure constraints, and data protection issues must be addressed for these technologies to be successfully integrated. Therefore, resolving these issues is essential to guaranteeing that the digital transition helps every sphere of society.

All parties involved, governments, corporations, international organizations, and communities, need to be urged to work together and make investments in digital transformation. Businesses should innovate in ways that support the SDGs, and governments should develop enabling policies that promote digital inclusion. International collaboration is also essential for scaling cross-border digital solutions. We can open new possibilities, get closer to the SDGs, and create a more sustainable and just future for everybody if we band together and embrace the digital revolution.

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