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DIGITAL TRANSFORMATION: DRIVING THE ROAD TO SUSTAINABILITY

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ABSTRACT

Terms such as eco-friendly, sustainability, sustainable development, climate change, and threshold are not only dominating global discussions but also shaping policymaking worldwide. The crossing of the 1.5°C global annual average threshold has become a critical concern for scientists and researchers. Governments and policymakers are actively working toward achieving the Sustainable Development Goals (SDGs) to create a more sustainable future. Digitalisation has emerged as a key driver of sustainability and inclusiveness by integrating systems and fostering synergies. Advancements in digital technology are accelerating both transformation and transition toward low-carbon pathways, resource efficiency, and inclusive growth.

Its applications extend far beyond individual industries. Promoting electric vehicles, renewable energy, waste management solutions, and eco-friendly products and processes are some prominent initiatives being widely adopted. The role of digital technologies in improving efficiency, enabling cross-sector collaboration, and supporting sustainable development forms the core of this study. This work seeks to highlight the significant contributions of digitalisation across sectors to sustainability and to propose strategies for harnessing its full potential in building a sustainable planet.

Keywords: Sustainability, SDGs, Digitalisation, Inclusiveness and Growth.

Introduction

The resources of our planet are finite and depleting at a rate far greater than anticipated a few decades ago. This rapid decline stems mainly from the relentless exploitation of scarce resources to satisfy ever-growing human wants. Over time, economists and policymakers have proposed various models of development to address the fundamental economic dilemma of balancing limited resources with unlimited needs. Traditionally, urbanisation and industrialisation have been central to growth, but this progress has often come at the cost of disturbing the planet's natural balance. Resource depletion, environmental degradation, and rising pollution levels have triggered severe climatic disturbances, broken previous records and defied established patterns. Increasing global temperatures are disrupting seasonal cycles and causing environmental instability. However, attributing these adverse conditions solely to industrialisation is simplistic and misleading, as multiple identified and unexplored factors contribute to these challenges.

In response, scientists and researchers worldwide are working toward sustainable and eco-friendly technologies and practices. Sustainability, at its core, refers to maintaining processes over the long term and is grounded in three dimensions: economic, environmental, and social. Innovations must align with the essence of sustainable development—meeting present needs without jeopardising the ability of future generations to meet theirs. Digitalisation represents a significant step in this direction, reducing reliance on resources such as paper while fostering environmental protection.

India, a nation marked by vast cultural, traditional, and socio-economic diversity, stands out as one of the fastest-growing economies, with a large market base and relatively lower-cost resources, attracting global investors. However, this economic revolution has widened the gap between the rich and the poor, leaving large portions of the population jobless or underemployed. Bursting at the seams with its vast population, more than half of whom are people under 30, India is confronting the simmering issue of joblessness. Job creation is still insufficient despite the government's implementation of several employment schemes. For India to capitalise on the promise of a knowledge-based society, it needs a combination of innovation, high-tech deployment, visionary governments, and an empowered workforce. After all, knowledge is power, as Francis Bacon said, and the use of new technologies, more efficient processes, and original ideas helps give companies a competitive edge and drive inclusive growth.

The word is one of sustainable development, and what it needs is inclusive sustainability—sustainable practices and resources available to everyone on fair terms. Sustainability will deepen social divisions and crises if it remains reserved for an elite few. Digitalisation plays a transformative role in advancing inclusive sustainability in today's era of big data and artificial intelligence. Initiatives such as Digital India, the Unified Payments Interface (UPI), and direct benefit transfers have significantly reduced inefficiencies and strengthened the integration of marginalised sections into the mainstream economy. Nevertheless, inadequate infrastructure in many regions continues to limit the full benefits of digitalisation.

The present study aims to identify the key drivers of digitalisation reshaping sustainability pathways, highlight the sectoral contributions of digital technologies, and suggest measures to harness their potential to achieve long-term sustainable development.

A Push for Inclusive and Sustainable Development

Economic growth and development are often reflected in rising incomes; however, this progress is not always evenly distributed across society. Higher incomes frequently widen the gap between the rich and the poor, intensifying inequality. Therefore, development models must be inclusive, ensuring that all sections of society are integrated into the mainstream. Inclusive growth emphasises broad-based, shared, and pro-poor development. Digitalisation, in particular, is increasingly used worldwide to reduce social inequality. One of the most outstanding applications has been in financial inclusion, where digital banking and payment systems have expanded services to untapped sectors of the population, unlocking growth opportunities in the process. Nevertheless, the consideration of these technologies needs to be careful: issues like access barriers and costs might worsen the digital divide. These realisations have led governments to directly promote digitalisation through flagship programmes aimed at extending and expanding their ambit.

The notion and application of sustainability also differ in developed (recipient) and developing (donor) countries. In countries such as India, sustainable measures also come at a price that makes them far from economically viable for people on low incomes. Even where sustainability investments create jobs and new business models, transitions to cleaner energy sources, for example, can also place an additional burden on the poor at a given moment, questioning inclusion. The path to both decarbonisation and resource efficiency rests heavily on sound, timely decisions that encourage the

necessary behavioural change and spur development.

"So inclusive and sustainable growth, then, means more than just economic advancement. It aims to improve quality of life and overall well-being by reducing poverty, reducing disparities, and promoting social cohesion and participation. The document also demands the prevention of environmental and habitat harm, the sustainable use of natural resources, and the protection of the planet's ecosystems for future generations.

Digital Transformation for Inclusive and Sustainable Development

Digitalisation has moved much faster than anyone expected; it has transformed economies and people's lives. It's changing the way we interact with ecosystems and stakeholders – from market monitoring and understanding consumer habits to conserving resources, building virtual communities, using big data analytics to anticipate trends, and increasing demand.

Within the ambit of sustainability, digitalisation means we develop proactive tools and use them to ensure we meet our environmental targets in ways that benefit everyone. A similar perspective, labelled sustainable digitalisation, has pressed for "sustainability by design," thus underlining the salience of integrating environmental and ethical considerations in all phases of the life cycle of digital technologies.

Bijpai and Biberman (2021) observed that the significant contributions of digital transformation to inclusive growth, environmental protection, social mobility, and equity were not explicitly recognised in the SDGs. They emphasised that the digital revolution represents a unifying societal transformation that integrates other technological shifts such as AI, IoT, VR, and machine learning. Similarly, MIT Sloan Management Review identified three critical areas where digital technologies can reshape enterprises: customer experience, operational processes, and business models—by integrating digital tools with physical offerings.

Digital technologies are modernising daily life and business operations—from real-time automated services to virtual education, e-payments, online bookings, and grievance redressal systems. Industries are increasingly embracing automation, as seen in insurance companies offering policies and processing claims entirely online. Business models are now built around digitalised operations, automated production, digitised marketing and virtual hirings – not just for big corporations but also small businesses. Powerful new technologies, like blockchain, have transformed data security and networking, leading to the development of cryptocurrencies, blockchain-based accounting systems, encrypted cloud computing, and neural networks.

Although this change has increased productivity and economic efficiency, it has also widened inequality and exacerbated the digital divide between those who use ICT and those who do not. In India, lack of infrastructure, including poor connectivity and limited digital literacy, combined with fear of cyber fraud, brings exclusion in the rural areas.

However, digitalisation can help accelerate sustainable development and the low-carbon transition through efficiency gains, cross-sector coordination, and a circular economy. The COVID-19 pandemic has made even more evident the potential in this regard, when online commerce, digital platforms, and remote rendering of services can cater to essential needs such as access to goods (food), health care (access to doctors through telemedicine), or education (see e-learning). These are compatible with many of the SDG targets, such as those related to energy conservation, water use, and even good health and education. But without significant investments in infrastructure and internet access, poorer nations may struggle to tap into these gains.

AI could be a key driver in advancing sustainability by analysing, for example, satellite images to monitor forest cover, estimate carbon sequestration, and align climate-related data. In the energy domain, digital applications and platforms support network management, consumer engagement and demand-supply optimisation with a view to more sustainable production and consumption of clean energy.

Across agriculture, energy, construction, transportation, and industry, digital transformation provides significant opportunities. The digital and green transitions intertwine: their synergies open the way for innovation, economic growth, and jobs. This could involve scaling sustainable food and land systems or enabling well-being with low-energy demand through digital solutions across different sectors.

Conclusion

Sustainable development is becoming an increasingly pressing concern worldwide. However, this vision is still a far-fetched and even an overambitious dream in practice. To become sustainable, we need not only systemic change but also a shift in the perspective and attitude of billions of people around the world. Concrete jungles where green is an exception rather than the norm only reinforce the widespread apathy of people as much as the government. Simultaneously, technological advancement is now synonymous with contemporary progress. New digital technologies- including the Internet of Things, artificial intelligence, and big data, enabled by faster processing power, cheaper storage and breakthroughs such as

quantum computing, are enabling new business models. Concepts of the sharing economy and the circular economy have quickly become fashionable in response to this shift, pointing to the potential to reduce energy use in end-consumer sectors compared with supply-intensive ones. Significant, cost-effective emissions reductions are needed to achieve several of the SDGs, and digital technologies will underpin the transition to low emissions.

Yet inclusive innovation is about more than job creation. It is about including outcast communities within production systems so that they can create the products for themselves, as highlighted by Stewart and Hyde in a recent edition of Constraints. While growing economies generate jobs and income, the wealth they generate is unequally shared, and in many countries, people are left behind altogether as profits soar.

Digital tools can help address some of these problems by tackling the root causes of conflict, including injustice, discrimination, and social exclusion. Data becomes readily available worldwide in real time, and via remote links to resources may be made accessible globally; this allows knowledge sharing across global coverage areas that cross political boundaries. Big data analytics, for example, can support policy-making, business model changes, and problem-solving across social and political issues and the economy. Incorporated into daily life and government, these technologies can represent giant leaps toward sustainability for countries – if they also address the digital divide.

However, inclusive and sustainable growth is highly complicated. It demands a comprehensive, cross-sectoral response that takes into account geopolitical, economic, social and environmental imperatives and resolves the play of governance, institutions, policies, markets, technologies, culture and human behaviour. Crucially, growth should be pursued without depleting natural Capital (which underpins human well-being), while making good trade-offs and seeking synergies between objectives, including equity, efficiency, innovation and security. Success will ultimately hinge on mobilising resources, building capacity and shaping partnerships to ensure the implementation and monitoring of policies that genuinely underpin inclusive and sustainable growth.

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