# Twin Transitions - Digital and Green Transitions

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# TWIN TRANSITIONS – DIGITAL AND GREEN TRANSITION

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**Abstract:** *The "twin transitions" have become more current than the "twin deficits." The number one theme of sustainable development today is the double transition – green and digital transition. Discussions and debates about their contribution to the economy, sustainable development, circular economy, the environment, and the social community are already well known. Discussions now dominate about when the results and outcomes of the digital and green transition will be real. Figures in many countries that have seriously addressed these issues show significant economic, societal, and environmental progress. The goal is to analyse how long it takes to put the dice together - to achieve economic benefit and community adaptation with acceptable environmental costs. The experiences of countries that have already begun to realize the values of sustainable development and promote the circular economy have shown that the economic environment must be accompanied by social support - changes in awareness, habits, and approaches of*

*individuals, then education, culture, as well as social networks, and even politics. Also, the legislation should support the economic and social sphere with timely, adequate, and concrete provisions. The transformation of society and sustainable development implies the contribution of all partners - government, companies, finance, and civil society. The faster the pace of adoption of digitization, the stronger the transformation of society. Although the "twin transitions" generally reinforce each other, they also conflict. These conclusions should help to examine the opportunities and pitfalls of the twin transitions - green and digital transitions, to facilitate policymakers to make adequate decisions regarding a sustainable economy.*

**Keywords:** *digitalization, green finance, green-digital solutions.*

## INTRODUCTION

During the 1980s and 1990s, there was an intense debate among economists about "twin deficits," the problem of simultaneous current account deficits and budget deficits. Discussions about causes and consequences are waning, although they still occur even in developed countries, such as Italy and Spain. Today, attention is focused on the "twin transitions" - green and digital transition. They manifest together, simultaneously supporting and hindering each other.

The twin transitions refer to a comprehensive economic and social transformation that combines environmental sustainability (the "green" aspect) and the adoption of digital technologies (the "digital" aspect). It is a dual process of addressing environmental sustainability and embracing digital technology for economic and social progress. The synergistic effect refers to driving economic growth, improving the quality of life, and responding to global environmental challenges. The concept has gained prominence in recent years as countries and organizations seek ways to address environmental issues while harnessing the potential of digital technologies for innovation and economic development.

The success of the twin transition implies the joint action of the government, private, non-governmental, and civil sectors. Their activities must be aligned with the United Nations Sustainable Development Goals and the Paris

Agreement, which are committed to environmental issues and promoting sustainable development through innovation and technology. All this entails significant investments in clean energy, digital infrastructure, research and development, and strategies and policies to ensure a sustainable and prosperous future. That is why these two transitions require proactive integrated management. While the green transition aims to achieve sustainability in the fight against climate change and environmental degradation, the digital transition aims to use digital technologies for the sustainability and progress of business, society, and citizens.

There are many good practice examples of green and digital transition. They are the result of green digital solutions. Digital technologies can play a crucial role in monitoring and optimizing the use of resources, enabling more efficient and sustainable practices. Green economies include smart grid systems that improve the management of renewable energy sources. The development of precision agriculture uses artificial intelligence for sustainable agriculture for irrigation, animal feed, pesticides, and fertilizer. In transport, these are smart transport solutions to reduce emissions and congestion. In the construction sector, digital technology helps spatial planning. The energy sector uses technological solutions for better maintenance of the energy system, recycling, and use of renewable sources. Policies, such as incentives for the adoption of clean technology and the development of green financing mechanisms, support these transitions by encouraging investments in the green and digital sectors. Such an approach can guarantee the construction of a more sustainable and technologically advanced future that balances economic growth and environmental responsibility.

The analysis of this paper is based on a simple concept, which we consider through two hypotheses: H1 - The faster the pace of adoption of digital technologies, the faster the transformation of the economy and society, and H2 - The broader the application of green technology, it is easier to achieve environmental sustainability.

The structure of the work is as follows. After the introduction, the chronology of the incorporation of green and digital values into the system was presented. The next part presents the green-digital context. Then we

point to the drivers of the green and digital transition. Before the conclusion, the elements of the transformation are presented.

## INTEGRATION INTO THE SYSTEM

Creating a system involves three fundamental prerequisites. The first relates to the willingness to accept the transition. Another prerequisite is the preparation and introduction of regulations. The third, perhaps the most important, are finances and resources. The constant for all three prerequisites is time. It is a long-term process of accepting faster digital transformation and broader application of green technologies.

The transition twins are a central part of the EU's political agenda, intending to strengthen the EU's resilience and open strategic autonomy. According to Muench et al. (2022), the EU aims to be sustainable, fair, and competitive. It achieves this by successfully managing the green and digital transition. In this way, it engages in a rapid and inclusive transition towards ecologically sustainable lifestyles and economies. These two "twins" can reinforce each other in many areas, but they are not automatically aligned.

Digital technologies give strong support to the spread of the green transition. Collecting and monitoring real-time information enables clearer system simulation and forecasting. This significantly improves the efficiency of the system. The use of digital technologies enables the optimization of the number of system operations (green cities, green regions), as well as the exchange of economic activities via the Internet. Thus, new levels of interaction within the system arise, and their management becomes a complex process.

In particular, the digital contribution to the environment is already visible today and with a lot of space for improvement in the future. Several key contributions can be singled out: digital passport (data for business models, competitiveness, and resilience), low-power digital technologies, smart cities, digital networking, and high-performance computing.

IGreen and digital manufacturing will likely represent a competitive advantage for businesses in the future. Companies in global supply chains

will rely on green suppliers whose production methods are tracked and verified using digital technologies. On the other hand, these suppliers will introduce green and digital standards to appear in the global market. We can rightly set the premise that the green and digital transition goes beyond the concept of constant returns within the economy. The twin transitions are factors of increasing returns to scale in the economy because the medium and long-term potentials are much higher. They are already taking place and creating new economic opportunities - creating new jobs, creating new professions, encouraging innovation through human capital. The technologically advanced manufacturing function (with human capital and technology) is based, increasingly on artificial intelligence, IoT, block-chain, and supercomputing. It enables companies to achieve greater returns to scale and the economy to achieve economies of scale. However, inevitably the consequences of such a transformation will also have negative effects through numerous economic, social, and environmental challenges aimed at climate change, and as such imply the loss of jobs, people's livelihoods, public expenditures, limiting food and water, etc. Transformations of society and economy with sustainable ecology imply expensive processes which will dramatically affect less developed and poor economies, and whose future generations will suffer the most from climate change (Tavares, 2022). Setting up an adequate environment requires a radically new way of thinking and requires new business models. One of the biggest challenges is getting innovative technological green solutions out of the laboratory and onto the market. Finally, increasing technological innovation implies financial support, which is often lacking in the early and growth stages of innovative start-ups.

The process of green transition began during the 1990s initially through the initiatives of individuals to introduce regulations to protect jobs in new environmental regulations. It was only in the 2000s that the concept of green transition was introduced into the international public debate (COP15). Since then, awareness ("True Transition") of the importance of transition has been continuously raised, gradually followed by regulation. Where regulation exists, the problem arises of delays in its implementation (problems of greater pollution, loss of jobs, financing). The first concrete step towards the

green transition was made at the UN conference in 2009 when it was decided at the meeting to prepare a study in which all the challenges and risks associated with the transition to a green economy would be assessed and used. At the UN conference in Rio de Janeiro (UN, 2012), with the theme of Green economy in the context of sustainable development and poverty eradication, a concept based on a new paradigm of economic growth through ecosystems and poverty reduction was developed. Although compatible with the earlier UN concept of sustainable development, it carried some risks and challenges. Mostly it referred to less developed countries because it is increasingly demanding, and there was also a fear that it would lead to the strengthening of protectionism from developed countries, problematic financial cooperation, and international inequality. From today's perspective, the fear was justified.

The Just Transition, known from before, is also an important concept. It became part of the Paris Agreement (UN, 2015), the ILO document for a just transition to environmentally sustainable economies and societies for all (ILO, 2016), as well as the 2030 Agenda for Sustainable Development (UNGA, 2015). Just Transition took a special place at COP26, held in Glasgow in 2021. Several developed countries signed the Declaration. The idea was to accelerate the development, application, and dissemination of technologies, as well as the adoption of policies, for the transition to sustainable and green energy systems (low-emission, energy-efficient, with subsidies), while harmonizing financial flows towards sustainable development. Also, it was agreed to provide support to developing countries. This entails three key elements that developed economies implemented a decade ago: 1) investment in the development and implementation of green digital solutions, 2) development of methods and tools for measuring the net impact of green digital technologies on the environment, and 3) recommendations and advice within sectoral policies.

The last organized meeting of the UN (United Nations Environment Program - UNEP) and the European Commission (EC), in June 2023 in Brussels, aimed to further strengthen partnership relations in environmental multilateralism, which will solve the planetary environmental crisis. The focus was on the future of the European and global green transition in the

degraded environment of the planet and the crisis of climate change, loss of biodiversity, and pollution. The causes are apostrophized through current economic, social, political, and geopolitical realities. The central topic during the UN General Assembly, held from September 18 to 26, 2023, was the SDG summit. The UN initiative focused on digital public infrastructure with affirmations of continued commitment to the SDGs.

## GREEN-DIGITAL CONTEXT

"Green digital solutions" mean combining digital technology with the aim of achieving ecological sustainability and reducing the negative impact on the environment. These solutions use digital tools, data and technologies to support environmentally friendly practices and initiatives. The experiences of developed countries show that these solutions make a strong contribution to sustainable development. The solution *smart cities* use digital tools (sensors, data analytics and IoT), data and devices, the combined use of which leads to waste reduction and optimization of consumption in the city. They achieve energy efficiency by using digital technologies for monitoring and managing *renewable* energy *sources* (solar panels, wind farms). *Smart agriculture* uses IoT devices and data to optimize agricultural production, enabling precise irrigation, monitoring crop conditions, and reducing the need for pesticides and fertilizers. *The eco-mobility* solution has proven to be very practical for numerous urban problems through the development of electric and autonomous vehicles, as well as vehicle-sharing platforms and ride-sharing applications, with the aim of reducing greenhouse gas emissions and traffic congestion. The efficiency of public administration is the result of *the digital administration* solution, which has accelerated the processes and procedures of administration. *The smart device* solution for home or business use enables the use of smart devices and applications for better energy consumption management, as well as for monitoring and controlling heating, cooling and lighting systems. The increasingly significant solution of *block chain technology* enables widespread use for supply chain tracking, networking of end users, manufacturers and distributors, payment system, certification of ecological products, etc. *A waste management system* is a solution that uses digital tools for better waste management, including

monitoring and optimizing the collection and recycling process. All of these solutions represent a fusion of technology and environmental responsibility, and are used to create a more sustainable future that simultaneously promotes innovation and reduces the negative impact on the environment.

*Green transition.* This aspect focuses on achieving sustainability by reducing the ecological and environmental impact of economic and social flows. It includes strategies and policies aimed at reducing the negative impact of human activities on the environment, mitigating climate change and conserving natural resources. Key elements of the green transition include switching to renewable and clean energy sources, improving energy efficiency, reducing greenhouse gas emissions, promoting sustainable agriculture, and protecting ecosystems and biodiversity. In this sense, governments, businesses and individuals are encouraged to adopt sustainable practices and technologies, such as electric vehicles, renewable energy systems and sustainable urban planning. Specifically, the green transition is based on four key elements: mitigation of climate change (renewable energy sources, reduction of carbon emissions and the adoption of more sustainable transport and production practices), conservation and biodiversity (ecosystem protection and promotion of sustainable land use), resource efficiency (waste reduction, improving the use of resources and promoting circular economy practices) and the environment (enforcing policies and regulations to ensure compliance with environmental standards).

*Digital transition.* This aspect involves the digital technologies use and the information economy to drive economic growth, innovation, and efficiency. At its core is the digital technologies used to drive economic growth, improve efficiency, and improve social well-being. A prerequisite is the adoption of digital tools, platforms, and data-driven solutions in various sectors. Key components of the digital transition include the development of digital infrastructure (e. g. high-speed Internet access), the use of analytics, artificial intelligence, and automation to increase productivity, and the digitization of various industries, such as health, education, and manufacturing. The digital transition can also include the creation of "smart" cities, where data and technology are used to improve quality of life, improve resource management, and optimize transportation and

infrastructure. Specifically, at the core of the digital transition are four key elements: digitization (the adoption of digital tools, technologies, and processes in different sectors), data management (using data analytics, artificial intelligence, and machine learning, and improving operations), connectivity (broadband infrastructure, digital inclusion) and smart cities (creating an urban environment with integrated technology to improve infrastructure and services).

*Green and digital transition.* The number of elements, tools, and data, along with the optimization of processes, improvements in productivity and sustainability, as well as the setting of regulations, and the adoption of strategies and policies indicates a complex transition process. The potential synergy of the two transitions gives the following outcomes: innovation (solutions to environmental challenges, data analysis for process optimization, development of smart networks), efficiency (digitalization of processes leads to resource efficiency, reduction of waste and energy consumption), new business models (development of technologies clean energy and green technology start-ups), and monitoring and reporting (digital tools can monitor and report on the environment in real-time, under environmental regulations).

## DRIVERS OF GREEN TRANSITION

From the experience of developed countries, we can conclude that numerous elements and influences drive the green and digital transition. These experiences are different among developed countries and constantly stimulate debate among scientists and researchers.

Amoroso et al. (2022) analysed the acceptance of two transitions and showed that traditional factors still play a crucial role. These are financial resources, which are used for the acquisition of technology, and the absorptive capacity of the company, which shows integration into current production processes. Market factors, such as demand factors, competition, modern and operational infrastructure, and networks, also have a great influence. They also point out that the regulatory framework remains the leading factor at the institutional level, which includes incentives and tax (dis)incentives.

However, an important aspect is the speed of (non)adoption of new technology. This is often a problem, as it comes from the absence and/or lack of awareness of the costs and benefits of adopting new technology. Often insufficient attention is paid to finding financial and technical support, as well as available government incentives. Also, managers of most companies do not have a risk willing, and it is difficult for them to decide to take on new technological and digitally sustainable solutions. Time also plays a crucial role in a world of rapid change. Therefore, a positive attitude towards innovation is important. Early application of new digital and green technology gives a positive outcome toward sustainable economies, new technologies become more accessible, and benefits and relevant management practices grow.

Developed countries have recognized that the green and digital transition greatly contributes to increasing global employment (ILO, 2022). Labour, as a factor of production, became dominant in the production function. But not labour as physical capital, but as human capital (innovations, inventions, technology). Thus, the following were singled out as priority elements of the green and digital transition: (1) people at the centre of innovation, (2) connecting innovation systems, and (3) rapid exchange of information.

The problem partly faced by developed countries is undervalued investments in green tech SMEs and start-ups, due to high investment risk and profit, capital intensity, absence of collateral, and long-term financing. Recommendations that can be cited as crucial, not only for developed countries, are improving access to finance and increasing innovation funding, investment platforms (improving co-investment), and advisory services for the innovative companies' participation in projects.

At the global level, cooperation has been developed with international actors, such as international institutions and organizations such as the European Commission, the United Nations Conference on Climate Change (COP), meetings and initiatives of the Ministerial Forum on Clean Energy (CEM), the International Labour Organization (ILO), International Energy Agency (IEA) They promote both transitions in the context of sustainable development goals. Also, the governments of the countries, through bilateral and multilateral agreements, are jointly committed to the improvement and

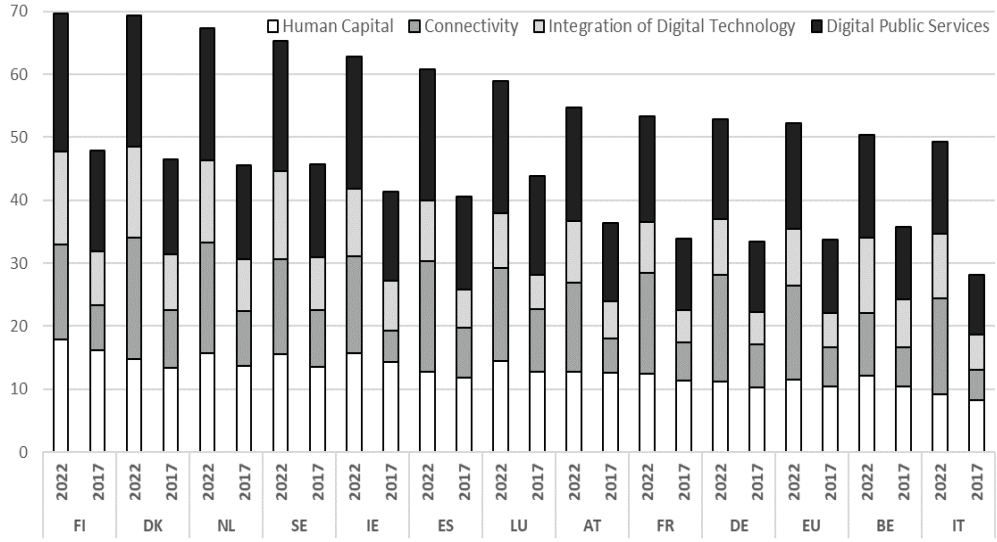
preservation of the environment, through the broad application of digitization. At the national level, there is growing awareness of joint action by the Government, civil society, the business world, and citizens to change habits, knowledge, and skills in line with sustainable development based on new technological solutions.

The EU implements programs in the direction of sustainable development and circular economy, through support for digitization (Digital Europe Programme), green energy (The Green Deal), and SDGs (Agenda 2030). The goal is to ensure the supply of clean, affordable, and safe energy, implement the mobilization of the industry for a clean and circular economy, support construction and renovation in energy and resource-efficient way, accelerate the transition to sustainable and smart mobility, and implement the "farm to villa" strategy. In March 2021, 26 EU member states and Norway and Iceland signed a declaration on accelerating the use of green digital technologies for environment benefit. The idea was to apply and invest more in green digital technologies to achieve climate neutrality and accelerate the green and digital transition in priority sectors in Europe (EC, 2021). Companies have also shown social responsibility in this direction. Thus was born the European Green Digital Coalition (EGDC), which consists of 26 companies dedicated to supporting the EU's green and digital transformation, taking action in the following areas (CEU, 2020): 1) investing in the development and application of green digital solutions, 2) developing methods and tools for measuring the net impact of green digital technologies on the environment and climate and 3) joint creation of recommendations and guidelines for the green digital transformation of these sectors that benefits the environment, society and economy.

The European Commission monitors the digital progress of member countries through the Digital Economy and Society Index (DESI). It summarizes the relevant indicators of Europe's digital performance and consists of four elements – human capital, connectivity, integration of digital technology, and digital public services. Figure 1 shows the DESI ranking list (by structure) for developed EU member states in 2017-2022. In the observed period, all EU member states became more digitized. Finland, Denmark, the Netherlands, and Sweden dominate as the most advanced

digital economies in the EU, followed by Ireland and Spain. Germany is slightly above the EU average, while Italy is below. At the back are Romania, Bulgaria and Greece. Developed countries achieve a higher level of digitization than other countries, as well as the EU average, thanks to a high base. Methodologically, the greater the degree of digitization, the greater the adoption of digital technologies by citizens and the economy.

**Figure 1.** DESI for developed EU member states, 2017-2022




*Source*: Authors’ calculation according European commission database

During the meeting of the World Economic Forum in Davos in 2022, the Digital Riser Report (ECDC, 2021) was presented, which included an analysis of the digital competitiveness of 140 countries. Within the G7, Canada has the greatest digital success (progress in relative digital competitiveness). Japan and Germany achieved an unfavourable trend in the initial ranking, while Italy achieved a positive trend (from last to second place in 2021). Within the G20, China is the global digital superpower, followed by Saudi Arabia and Brazil. In the last place are India, Japan and Germany. The US has had an unfavourable trend in recent years.

The ranking of green progress by country varies from approach to approach and depends on the coverage of the considered categories. The focus is on how much a country cares about preserving and restoring the natural environment and its resources, as well as the health of its citizens. This is demonstrated through policymaking and the effectiveness of existing measures. Four indicators that can be measured for several countries are shown in Table 1. As a rule, developed countries are ranked best (Costa Rica is an intruder) because they have worked for decades on the quality of their environment and the health of their citizens. Scandinavian countries and Great Britain dominate. At the back are Qatar, Iran, Turkey, China, and Saudi Arabia.

**Table 1.** Most green countries in the world, ranking in 2023

| Rank | Countries | The Most Green |
|---|---|---|
| 1 | Sweden | EPI: 5th; GFI: 9th; JRC: 28th; IQAir: 4th |
| 2 | Denmark | EPI: 1st; GFI: 2nd; JRC: 31th; IQAir: 16th |
| 3 | United Kingdom | EPI: 2nd; GFI: 4th; JRC: 34th; IQAir: 13th |
| 4 | Finland | EPI: 3rd; GFI: 6th; JRC: 45th; IQAir: 1st |
| 5 | Switzerland | EPI: 9th; GFI: 14th; JRC: 27th; IQAir: 20th |
| 6 | France | EPI: 12th; GFI: 7th; JRC: 29th; IQAir: 23th |
| 7 | Costa Rica | EPI: 68th; GFI: 20th; JRC: 12th; IQAir: 8th |
| 8 | Iceland | EPI: 10th; GFI: 1st; JRC: 56th; IQAir: 3rd |
| 9 | Norway | EPI: 20th; GFI: 5th; JRC: 49th; IQAir: 7th |
| 10 | Ireland | EPI: 2nd; GFI: 4th; JRC: 34th; IQAir: 13th |

*Source*: GreenMatch (https://www.greenmatch.co.uk/)

*Note*: EPI – the Environmental Performance Index; GFI – Green Future Index; JRC – European Union's Joint Research Centre; IQAir – Air Quality

However, the success of twin transitions depends on some factors. Economic factors include the costs of adopting both transitions mobility of workers between sectors, skills, and expertise of workers, financing of necessary investments, limited resources, and (mis)alignment between short-term economic assessments and long-term sustainable development goals. Social factors include acceptance/resistance to change, fairness, and changing

behavior and cultural norms, but environmental protection. Technological factors include the digital divide, technological challenges, and cyber security and data privacy. Political factors include regulatory frameworks, standards, and geopolitical aspects. Addressing these factors in developed economies has involved a combination of government policies, public-private partnerships, education and skills development, public awareness campaigns, and innovation. Overcoming these challenges is essential to realizing the full potential of the green and digital transition and achieving a more sustainable and technologically advanced future.

## TRANSFORMATIONS WITHIN TWIN TRANSITIONS

The Paris Agreement unequivocally emphasizes the importance of climate technologies for a sustainable future (UN, 2015, Article 10). According to this agreement, innovation is a crucial factor for an effective response to climate change, economic growth, sustainable development, and environmental protection. However, the question arises, as to how to direct investments while simultaneously aiming at both goals - green and digital transition. Digital innovations can reflect the transformation of conventional production and technological processes (smart cities, green energy, sustainable transport, smart houses) so that they are aimed at the goals of green transformation. The reverse rule also applies that green digital technologies encourage digital transformation. In addition, developed countries face the problem of the investment gap in green technology. Why? Investors are not ready to invest in innovative green technologies or start-ups (insufficient level of investment) due to limited commercial profitability. What are the reasons? The reasons are higher investment risk, intensive investment, absence of collateral, and high short-term investment costc. The rule is that investors prefer to invest in safe and mature technologies which are recognizable in the market. Tax policy must be stimulating during the transformation to remove critical restrictions on economic activity.

Herein lies another limitation to rapid transformation. It is not enough to quickly launch innovations from the laboratory to the market. There is also a time lag in the market itself, from the moment of appearance to the moment

of recognition of the innovation. The longer that period is extended, the higher the investment costs. Incentives, through new technological solutions and advice, must be directed towards SMEs and start-ups to improve their business. They are incubators and exploiters of innovations, and they successfully remove bottlenecks in the market. They contribute to the general public good. This is mainly reflected in the opportunity cost of investing in climate technology.

Digital innovations are suitable for blockchain technology applications because such networked systems can provide more successful monitoring, analysis, and control of information, as well as database creation, better calculation, and presentation of results. Collective and business advantages are hidden here (BOX 1), and it's not just having information but sharing, creating, and owning it.

Box 1: *Zero defects VS Poka-yoke*

The term zero defect became part of the quality system in the American manufacturing industry during the 1960s. As a performance goal rather than a program, it also took root in the automotive industry in the 1990s. In recent decades, it is only part of the broader and more complex concept of Poka-yoka. The development centre of Toyota, the auto industry from Japan, has developed a method of protecting against errors or minimizing them for easier elimination. The Poka-yoke method (operator-error) in literal translation is protection against errors. In a manufacturing system, the aspiration is to keep error rates low, improve worker safety, and increase company efficiency. Digital instructions, and detailed procedures are widely used as a tool to avoid errors and the need for subsequent corrections. It is similar to other digital networks and tools. The advantages of the new approach are reduction of waste, reduction of time for employee training, greater security of the entire business system, and greater productivity of workers and the company. Such an approach hides the company's mission that errors are better prevented than detected.

## CONCLUSION

The era of digitization is leading the world away from traditional linear solutions. It dominates rapid adaptation in green transition, energy transformation, nature conservation, soil, and reforestation, as well as building community resilience. The world is moving towards transparent carbon markets, an efficient circular economy, smart energy grids, climate-resilient urbanization, and green finance. The trend of these flows is in the hands of developed countries. The pace of implementation shows that there are differences even among developed countries, but all have achieved significant positive results of the green and digital transition.

The experiences of developed countries have shown that the more the economic, social, and environmental benefits of green and digital transition are understood, the more interested parties are willing to actively participate in this process. Only then can achieving twin transitions lead to a sustainable economy.

The green and digital transition faces several limiting factors and challenges that can hinder its progress. The main limiting factors are financing, short-term return on investment, scientific research, and geostrategic turmoil. Financing is a limiting factor as it often requires significant barriers to investment for governments, businesses, and individuals, especially in less developed countries. A modern and fast life requires an equally quick return on investment, which is not an option with green and digital technology. Science also takes time to turn an idea into an innovation. Finally, inconsistent policies and political instability slow the pace of investment ventures and technological change, adversely affect regulation, and slow down transformation.

Based on the above, several recommendations can be singled out for less developed and underdeveloped countries to achieve maximum benefits from the twin transition, namely: (1) close interweaving of green and digital transition, (2) reduction of the innovation gap in green technology, (3) ) rapid commercialization of innovation solutions, (4) use of innovation in environmental actions, (5) evaluation of public contribution, (6) financing of

innovation and tax policy, (7) adaptation of innovation to socio-economic and cultural context and (8) international cooperation.

Ultimately, the green and digital transition is a response to the complex challenges of the 21st century, aiming to build a more sustainable and technologically advanced future that balances economic growth with environmental responsibility.

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