

Digital Transformation as A Driver of Sustainable Economic Growth Through Changes in Employment Structure

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ABSTRACT

Digital transformation has become a crucial factor in driving economic growth through increased productivity, investment efficiency, innovation, and expanded market access. However, technological developments are also changing the labor structure by reducing the need for routine work and increasing the demand for digitally skilled, analytical, creative, and adaptive workers. This article aims to analyze the role of digital transformation in driving sustainable economic growth through changes in the labor structure and identify opportunities and challenges for Indonesia. The research uses a qualitative approach with a descriptive literature study method. Secondary data were obtained from scientific journal articles published at least since 2025 and official publications from the Central Statistics Agency (BPS), Bank Indonesia, and the World Bank. The data were analyzed using content analysis and thematic analysis covering economic productivity, changes in skills demand, shifts in job types, the risk of structural unemployment, informality, and environmental sustainability. The analysis shows that digital transformation contributes to economic growth through strengthening digital infrastructure, digitizing MSMEs, expanding electronic transactions, and creating new jobs in the technology and service sectors. However, these benefits have not been fully distributed due to persistent skills gaps, unequal access to technology between regions, the risk of reduced routine jobs, and weak protection for platform workers. Digital transformation can only generate inclusive and sustainable economic growth if supported by equitable infrastructure, strengthening vocational education, improving digital skills, protecting the workforce, developing MSMEs, and implementing environmentally friendly technologies.

INTRODUCTION

Digital transformation has become a major force transforming production, distribution, consumption, and employment systems in the global economy. The use of technologies such as artificial intelligence, cloud computing, big data, automation, e-commerce, and digital payment systems enables economic activities to proceed more quickly, efficiently, and integratedly. This transformation is not only oriented towards increasing economic growth but also aimed at creating inclusive and sustainable development. Xholo et al. (2025) explain that digitalization can support economic development by improving the quality of human development, economic complexity, and gross national income. Similarly, Cigu (2025) emphasizes that the digital economy contributes to productivity, entrepreneurial activity, energy efficiency, and sustainable economic development.

Digital transformation contributes to economic growth through various mechanisms, including increased productivity, investment efficiency, reduced transaction costs, market expansion, and accelerated information dissemination. Mohammed and Laib (2025) found that digitalization influences economic growth in countries in the Middle East and North Africa region by strengthening connectivity and the efficiency of economic activity. Meanwhile, Wang et al. (2025) showed that digital infrastructure development can support economic growth by increasing the efficiency of corporate investment. These findings demonstrate that the success of digital transformation is determined not only by the use of technology, but also by infrastructure availability, institutional quality, investment capabilities, and human resource readiness.

While digital transformation offers growth opportunities, it also fundamentally changes the labor structure. Automation and the use of artificial intelligence can reduce the need for routine and administrative work, while simultaneously creating demand for workers with digital, analytical, creative, and managerial skills. Qiao and Chen (2025) found that digital transformation increases labor demand in the high-tech and service sectors and drives an increase in the proportion of highly skilled workers. However, the World Bank (2025) cautions that the benefits of digital technology have not been shared equally, with skilled workers enjoying greater returns, while low-skilled workers in routine and manual jobs face the risk of displacement into the informal sector. Therefore, changes in the labor structure are a crucial dimension in assessing the sustainability of digital-driven economic growth.

In the Indonesian context, digital transformation is growing rapidly through the expansion of e-commerce, digital financial services, online transportation, the creative industry, and the use of digital platforms by micro, small, and medium enterprises. Suhendra et al. (2025), based on an analysis of 34 provinces in Indonesia, found that the digital economy has a positive and significant impact on regional economic growth. This development is also evident in Bank Indonesia data (2025), which shows that the volume of digital payment transactions in the third quarter of 2025 reached 12.99 billion transactions, a 38.08% increase compared to the same period the previous year. This data indicates that digitalization has become an important part of people's

economic activities while opening up opportunities for the creation of new jobs in the information technology, logistics, financial services, digital marketing, and platform-based industries.

The rapid development of the digital economy must be linked to Indonesia's employment situation. The Central Statistics Agency (2025) recorded that the Indonesian workforce in August 2025 will reach 154.00 million people, while the employed population will total 146.54 million. The open unemployment rate is recorded at 4.85%, while the average wage is IDR 3.33 million per month. This large workforce demonstrates that digital transformation must be able to create productive jobs on a large scale. Digital economic growth is not only demonstrated by increased transactions and technology use, but must also be reflected in increased job opportunities, job quality, labor productivity, and income levels.

Indonesia's main challenge lies in the imbalance between the pace of technological development and workforce readiness. Some workers lack the digital competencies needed by industry, while access to digital infrastructure, education, and training varies across regions. Statistics Indonesia (BPS) (2025) explains that digitalization plays a role in improving the quality of education, health, economic growth, and human development, but inequality in access to technology across regions remains a challenge. This situation has the potential to widen the gap between urban and rural workers, educated and less educated workers, and large companies and MSMEs. Without policies to improve skills and ensure equitable infrastructure, digitalization may increase productivity for certain groups, but may not necessarily result in inclusive changes in the labor structure.

Digital transformation also needs to be directed to support the balance between economic growth, job creation, and environmental sustainability. Chen and Xing (2025) explain that the digital economy can encourage green innovation, which in turn improves the quality of economic development. Meanwhile, Yang and Lin (2025) show that the growth of the regional digital economy drives corporate transformation and generates digital benefits in the form of increased efficiency and business performance. In the Indonesian context, MSME digitalization holds a strategic position because Bank Indonesia (2025) noted that by the first semester of 2025, QRIS had been used by 39.3 million merchants, 93.16% of whom were MSMEs. MSME digitalization can expand markets and create jobs, but it needs to be accompanied by worker protection, skills development, data security, and the implementation of environmentally friendly business practices.

Based on these conditions, a study of digital transformation as a driver of sustainable economic growth through changes in the labor structure is crucial in Indonesia. Several previous studies have discussed the impact of digitalization on economic growth, investment efficiency, green innovation, and labor demand, but the relationship between digital transformation, changes in job composition, labor quality, and economic sustainability still requires a more integrated discussion. This study is needed to explain how digitalization shifts the workforce from routine jobs to knowledge- and technology-based jobs, while also

identifying the risks of structural unemployment, skills gaps, and the expansion of platform-based informal employment. The study's results are expected to form the basis for formulating policies on digital infrastructure development, vocational education, labor retraining, digital worker protection, and MSME development so that digital transformation truly produces inclusive, productive, and sustainable economic growth in Indonesia.

LITERATURE REVIEW

Digital transformation is a process of comprehensive change in economic and organizational activities through the use of digital technologies, such as artificial intelligence, big data, cloud computing, the Internet of Things, automation, and electronic platforms. Digital transformation goes beyond simply converting manual activities to electronic ones, but also creates new business models, production processes, transaction patterns, and work relationships. Vial (2019) explains that digital transformation is a process of organizational change triggered by the use of digital technology to increase value creation. In the economic sphere, Mohammed and Laib (2025) view digitalization as a factor that can increase the efficiency of economic activities, strengthen connectivity, and expand access to information and markets. Thus, digital transformation can be understood as a systemic change that affects the structure of production, consumption, investment, and employment.

The relationship between digital transformation and economic growth can be explained through the endogenous growth theory developed by Romer (1990). This theory positions knowledge, innovation, technology, and human resource quality as internal factors that determine long-term economic growth. Investment in digital technology can increase productivity because companies are able to process data more accurately, reduce operational costs, accelerate decision-making, and produce new products or services. Wang et al. (2025) show that digital infrastructure development contributes to economic growth by increasing the efficiency of corporate investments. Based on endogenous growth theory, digitalization not only functions as a supporting tool but also becomes knowledge capital that generates innovation and sustainable productivity increases.

Digital transformation can also be analyzed using Schumpeter's (1942) theory of innovation and creative destruction. According to this theory, economic development occurs through innovation that replaces old technologies, production methods, business models, and types of work with more productive forms. In the process of digital transformation, routine and easily automated jobs tend to decrease, while new jobs emerge in the fields of data analysis, software development, cybersecurity, digital marketing, e-logistics, and platform management. Yang and Lin (2025) explain that the development of a regional digital economy can drive corporate transformation and create digital benefits in the form of increased efficiency and business performance. This process demonstrates that digitalization generates economic growth through the creation of new activities, but also creates adjustment pressures for companies and workers still dependent on conventional systems.

The changes in the labor structure resulting from digital transformation can be explained through the theory of skill-biased technological change. This theory states that technological developments tend to increase the demand for highly skilled workers because modern technology is more complementary to analytical, technical, communication, and problem-solving skills. Conversely, the demand for workers performing routine work has the potential to decrease because some tasks can be replaced by digital devices and automation. Autor, Levy, and Murnane (2003) explain that computer technology more easily replaces jobs with routine procedures, but tends to complement non-routine jobs that require cognitive abilities and social interaction. The findings of Qiao and Chen (2025) also show that digital transformation increases the demand for labor in the high-tech and service sectors and drives an increase in the need for highly skilled labor.

Becker's (1964) human capital theory provides a basis for explaining the importance of education and skills in addressing changes in the labor structure. Human capital encompasses the knowledge, skills, experience, health, and productive capabilities of the workforce. In the digital era, the ability to use technology, process information, communicate through digital platforms, and adapt to change has become a crucial component of human capital. Workers with digital skills have a greater opportunity to move from low-productivity jobs to jobs that offer higher productivity and income. Conversely, limited access to digital education and training can widen the employment gap. Therefore, vocational education, retraining, and digital skills development are crucial instruments to prevent the digital transformation from causing structural unemployment.

Changes in the labor structure indicate a shift in the composition of jobs by economic sector, skill level, employment status, and technology use. Digital transformation can encourage the shift of labor from traditional sectors to modern industrial and technology-based services. However, the development of digital platforms can also increase flexible and informal jobs, such as those for ride-hailing drivers, digital freelancers, e-commerce merchants, and app-based service providers. The World Bank (2025) explains that new technologies have increased productivity and employment opportunities in the East Asia and Pacific region, but the benefits are mostly felt by skilled workers, while some low-skilled workers face the risk of shifting to the informal sector. Therefore, changes in the number of jobs need to be analyzed alongside changes in job quality, income levels, social protection, and employment security.

The concept of sustainable economic growth emphasizes that increased economic output must be accompanied by equitable distribution of social benefits and environmental protection. The World Commission on Environment and Development (1987) defined sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Elkington's (1997) triple bottom line approach also positions the economic, social, and environmental dimensions as three elements that must operate in balance. In the context of digitalization, sustainable growth is achieved when technology increases productivity and

employment opportunities while reducing inequality and promoting efficient use of resources. Chen and Xing (2025) demonstrate that the digital economy can encourage green innovation, which in turn strengthens high-quality economic development.

Based on this overall theory, digital transformation can be positioned as a driving factor influencing sustainable economic growth directly and through changes in the employment structure. Direct influences occur through increased productivity, investment efficiency, innovation, and market expansion, while indirect influences occur through the creation of new types of jobs, increased demand for skilled labor, and labor shifts between business sectors. Suhendra et al. (2025) demonstrated that the digital economy has a positive impact on regional economic growth in Indonesia. However, the sustainability of this influence depends on the equitable distribution of digital infrastructure, the quality of human resources, labor protection, institutional support, and the ability of public policies to address the digital divide. This theoretical framework emphasizes that changes in the employment structure are a crucial mechanism linking digital transformation to productive, inclusive, and sustainable economic growth.

METHODOLOGY

This study uses a qualitative approach with a descriptive literature review method to analyze the relationship between digital transformation, changes in the labor structure, and sustainable economic growth. The qualitative approach is used because the research is oriented towards understanding and interpreting concepts, theories, empirical findings, and policy implications contained in various publications. Creswell and Creswell (2018) explain that qualitative research is used to understand a phenomenon in depth through the interpretation of non-numerical data and the surrounding context. Meanwhile, Snyder (2019) states that literature review is a research method used to identify, evaluate, and synthesize existing knowledge to discover patterns, relationships, and research gaps. The units of analysis for this study are journal articles and official publications that discuss economic digitalization, economic growth, job changes, workforce skills, productivity, and sustainable development.

The research data uses secondary data sourced from scientific journal articles published at least in 2025 as well as official publications of national and international institutions. Article searches were conducted through Google Scholar, Crossref, ScienceDirect, Taylor & Francis, SpringerLink, and MDPI with the keywords " *digital transformation and economic growth* ", " *digital economy and employment structure* ", " *digitalization and sustainable economic development* ", and "digital transformation and Indonesian employment". The main articles used include research by Mohammed and Laib (2025), Suhendra et al. (2025), Wang et al. (2025), Chen and Xing (2025), Cigu (2025), and Qiao and Chen (2025). Supporting data regarding the condition of the Indonesian economy and employment were obtained from publications by the Central Bureau of Statistics (2025), Bank Indonesia (2025), and the World Bank (2025). According to Bowen (2009), the use of documents as a data source allows researchers to obtain stable,

traceable, and relevant information to understand the development of a phenomenon.

Source selection was conducted through the stages of identification, screening, feasibility assessment, and determination of articles to be analyzed. This procedure refers to Tranfield, Denyer, and Smart (2003), who explain that a systematic literature review must be conducted through a transparent source search and selection process to ensure the synthesis of the results is accountable. Articles were included if they were published at least in 2025, originated from scientific journals with a clear publishing identity, and discussed at least one relationship between digital transformation, economic growth, changes in employment structure, productivity, workforce skills, or sustainable development. Articles that were irrelevant, lacked adequate methodological information, or were merely opinions without theoretical or data support were excluded from the analysis. Selected sources were then documented based on the author's name, year of publication, research objectives, research object, analysis method, main findings, and relevance to Indonesian conditions.

Data analysis was conducted using content analysis and thematic analysis techniques through the process of reading, coding, grouping, comparing, and synthesizing information from each source. Krippendorff (2018) explains that content analysis is used to generate accountable conclusions through a systematic review of document content, while Braun and Clarke (2006) state that thematic analysis is used to identify and interpret key patterns in the data. The research themes are grouped into the contribution of digitalization to productivity and economic growth, changes in skill demand, shifts in job types, the risk of structural unemployment and informality, and the contribution of digitalization to sustainable development. The validity of the results is maintained through source triangulation by comparing findings from journal articles with official data from BPS, Bank Indonesia, and the World Bank. Patton (2015) explains that source triangulation can increase the credibility of research because a finding is checked through several different sources of information.

RESEARCH RESULT AND DISCUSSION

The results of the literature analysis indicate that digital transformation has become a key driver of economic growth due to its ability to increase productivity, efficiency, innovation, and market connectivity. Digital technology enables companies to reduce transaction costs, accelerate information processing, improve supply chain coordination, and reach consumers without geographic limitations. Mohammed and Laib (2025) found that digitalization contributes to economic growth by strengthening connectivity and increasing the efficiency of economic activities. These findings align with David et al. (2025), who stated that internet penetration and mobile technology influence economic growth and human development in developing countries. Based on these findings, digital transformation can be viewed as a new factor of production that complements capital, labor, and knowledge resources in creating long-term economic growth.

Digital infrastructure is a crucial prerequisite for digital transformation to deliver optimal economic impact. The availability of internet networks, data

centers, digital payment systems, technological devices, and computing services determines the ability of companies and communities to participate in the digital economy. Wang et al. (2025) found that digital infrastructure development increases the efficiency of corporate investments by improving access to information, reducing uncertainty, and accelerating decision-making processes. Meanwhile, Okorie, Adediji, and Ifionu (2025) demonstrated that digitalization can have a positive impact on the broader economy if supported by appropriate infrastructure investment and policies. In the Indonesian context, digital infrastructure development needs to be carried out equitably because the imbalance in connectivity between urban, rural, western, and eastern regions can cause the benefits of digital transformation to be concentrated in certain areas.

The development of digital transactions demonstrates that digital transformation has become a vital part of Indonesia's economic activity. Bank Indonesia (2025) noted that the volume of digital payment transactions in the third quarter of 2025 reached 12.99 billion transactions, representing a 38.08% increase compared to the same period the previous year. This increase reflects the widespread use of digital banking services, e-wallets, e-commerce, and quick response code-based payments. The findings of Suhendra et al. (2025) also demonstrate that the digital economy has a positive and significant impact on economic growth in 34 provinces in Indonesia. However, increasing digital transaction volume cannot be the sole measure of the success of digital transformation. This success must also be assessed based on the digital economy's ability to increase productivity, expand employment opportunities, raise incomes, and reduce economic disparities between regions.

Digital transformation further leads to changes in the employment structure through a shift in workforce needs from routine jobs to jobs that emphasize cognitive, technical, creative, and social skills. The use of automation, software, and artificial intelligence reduces the need for a number of administrative and operational tasks that involve repetitive procedures. Instead, demand increases for workers in data analytics, software development, cybersecurity, digital marketing, platform management, and product design. Qiao and Chen (2025) found that digital transformation increases labor demand in the high-tech and service sectors and drives an increase in the proportion of highly skilled workers. This change supports the theory of *skill-biased technological change*, which explains that technological developments tend to complement skilled workers but can displace workers performing routine jobs.

Changes in Indonesia's employment structure are also evident in the emergence of various new jobs related to digital platforms, e-commerce, the creative economy, delivery services, financial technology, and content production. Bank Indonesia (2025) noted that by the first semester of 2025, QRIS had been used by 39.3 million merchants, 93.16% of whom were MSMEs. This data indicates that digital transformation has expanded the participation of small businesses in the formal economic system and created demand for supporting services, such as logistics, digital marketing, online store management, and payment services. Yang and Lin (2025) explain that the growth of the regional digital economy can drive corporate transformation and generate digital benefits

in the form of increased efficiency and business performance. Thus, the digitalization of MSMEs has the potential to expand employment opportunities, but the benefits depend on the ability of businesses to develop skills, access financing, and maintain competitiveness.

On the other hand, digital transformation also poses risks in the form of reduced routine jobs, uncertainty in employment relationships, and an increase in informal, platform-based employment. Digital work models often offer flexibility in time and income opportunities, but some workers lack income security, occupational accident protection, health insurance, and adequate old-age security. The World Bank (2025) explains that technological developments have increased productivity and employment opportunities in the East Asia and Pacific region, but the benefits are not shared equally, as they are enjoyed more by skilled workers. Some educated and low-skilled workers are at risk of shifting to informal employment. This situation indicates that the growth in the number of digital jobs has not always been accompanied by an increase in job quality, so social protection for platform workers needs to be part of digital transformation policies.

Indonesia's labor market situation reinforces the importance of carefully managing changes in the employment structure. The Central Statistics Agency (2025) noted that the workforce in August 2025 will reach 154.00 million people, while the working population will reach 146.54 million. The open unemployment rate is 4.85%, and the average wage is IDR 3.33 million per month. This large workforce presents both an opportunity and a challenge, as digital transformation must provide productive employment for new workers and workers affected by automation. If digital job creation is slower than the reduction of routine jobs, Indonesia could face structural unemployment, a mismatch between the skills of job seekers and the skills required by the labor market.

The skills gap and technology access gap are factors that can hinder inclusive digital transformation. Statistics Indonesia (BPS) (2025) explains that digitalization is linked to improvements in the quality of education, health, economic growth, and human development, but inequality in access to technology between regions remains a major challenge. Workers in areas with limited internet access, educational institutions, and training facilities have fewer opportunities to obtain quality digital jobs. This situation can widen the income gap between skilled and unskilled workers, as well as between urban and rural areas. Therefore, investment in digital infrastructure must be accompanied by digital literacy programs, vocational education, retraining, and skills upgrading to enable workers to move from low-productivity jobs to more productive ones.

From a sustainability perspective, digital transformation can support more environmentally friendly economic growth through energy efficiency, reduced raw material use, transportation optimization, and the development of green innovation. Chen and Xing (2025) found that the digital economy encourages green innovation, which in turn improves the quality of economic development. Cigu (2025) also explained that the digital economy can increase productivity, entrepreneurial activity, energy efficiency, and environmental

performance. However, digitalization also results in high energy demands for data centers, electronic devices, and telecommunications networks and increases the potential for e-waste. Therefore, the growth of the digital economy in Indonesia needs to be supported by the use of renewable energy, e-waste management, data center efficiency, and the implementation of circular economy principles so that economic benefits are not accompanied by increased environmental burdens.

Overall, digital transformation can drive sustainable economic growth if changes in the labor structure are managed inclusively. Digitalization increases productivity, investment efficiency, innovation, and market expansion, but it also changes the types of jobs, the required skill levels, and employment patterns. In Indonesia, digital transformation policies need to integrate infrastructure development, workforce skills development, strengthening vocational education, protecting platform workers, digitizing MSMEs, and developing environmentally friendly technologies. The government, universities, businesses, and training institutions need to build systems that match industry needs with workforce competencies. With this approach, digital transformation will not only generate growth in transactions and economic output but also create productive, decent, and equitable jobs, supporting Indonesia's economic sustainability.

CONCLUSIONS AND RECOMMENDATIONS

Digital transformation has proven to be a crucial driver of sustainable economic growth through increased productivity, investment efficiency, innovation, market expansion, and strengthening technology-based economic activities. The development of digital payment systems, e-commerce, digital financial services, and the digitization of MSMEs demonstrates that technology has become a vital part of the Indonesian economy. However, the success of digital transformation is measured not only by transaction growth and technology use, but also by its ability to create job opportunities, increase incomes, improve job quality, reduce inequality, and support environmental sustainability.

Digital transformation is also changing the structure of the workforce by reducing the need for routine work and increasing demand for workers with digital, analytical, creative, and adaptive skills. This change opens up opportunities for new jobs in the technology, digital services, creative economy, logistics, and platform-based industries, but also raises the risk of structural unemployment, skills gaps, and the expansion of informal employment. Therefore, digital transformation can only drive inclusive and sustainable economic growth in Indonesia if supported by equitable infrastructure, improved human resource quality, worker protection, strengthening MSMEs, and the implementation of environmentally friendly technologies.

The government needs to integrate digital transformation policies with employment, education, and regional development policies. Equitable internet infrastructure must be accompanied by digital literacy programs, vocational education, competency certification, retraining, and skills enhancement tailored to industry needs. Universities and training institutions need to strengthen

collaboration with the business sector in designing curricula based on technology, data analytics, artificial intelligence, digital entrepreneurship, and the green economy. Furthermore, employment regulations need to provide adequate protection for platform workers, including employment security, decent income standards, health insurance, occupational safety, and social security.

Business actors, especially MSMEs, are advised to utilize digital technology not only as a means of payment and marketing, but also to improve production efficiency, financial management, service quality, and innovation capabilities.

Business digitalization needs to be directed at efficient energy use, waste reduction, and the implementation of circular economy principles to ensure economic growth does not increase environmental burdens. Future research is recommended to use quantitative data at the provincial, business sector, or company level to measure the impact of digital transformation on changes in employment composition, productivity, wage levels, and job quality. This approach can generate stronger empirical evidence to inform digital transformation and employment policies in Indonesia.

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