

Technological Innovation, Human Capital, and Business Productivity for Sustainable Economic Growth

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ABSTRACT

Sustainable economic growth is increasingly influenced by the ability of businesses to improve productivity through technological innovation, human capital development, financial access, and policy support. This study aims to examine the relationships among technological innovation, human capital, financial access, government support, business productivity, and sustainable economic growth. The research employed a descriptive qualitative approach using a literature review of scholarly articles and international reports published over the last five years. The analysis was conducted through the identification, classification, and thematic synthesis of relevant literature. The findings indicate that technological innovation plays a significant role in improving operational efficiency, competitiveness, and business productivity. However, the effectiveness of innovation largely depends on the quality of human capital that supports technological adaptation and utilization. Furthermore, financial access and government support function as enabling factors that strengthen business capacity and long-term sustainability. The study concludes that the integration of technological innovation, human capital, financial access, and policy support provides a strong foundation for enhancing business productivity and promoting sustainable economic growth.

Keywords: Access to Finance, Business Productivity, Government Support, Human Capital, Technological Innovation.

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1. | INTRODUCTION

Economic growth remains one of the most important indicators used to evaluate the success of economic development in both developed and developing countries. In recent years, rapid technological advancement, digital transformation, globalization, and increasing market competition have significantly reshaped economic structures and business environments. Economic growth is no longer solely determined by the accumulation of capital and labor, but increasingly depends on productivity, innovation, and the ability of firms to adapt to technological changes. The emergence of digital technologies has accelerated business transformation and created new opportunities for enterprises to improve efficiency, competitiveness, and sustainability in an increasingly dynamic economic environment (Vial, 2019; Verhoef et al., 2021).

Business productivity plays a strategic role in supporting economic growth because it directly affects output generation, competitiveness, and long-term economic performance. Higher productivity enables firms to utilize resources more efficiently, expand production capacity, and create greater economic value. Previous studies indicate that productivity growth contributes significantly to sustainable economic development and enhances national competitiveness in global markets (OECD, 2023; World Bank, 2022). Therefore, improving productivity has become a primary concern for policymakers, business practitioners, and researchers seeking to promote inclusive and sustainable economic growth.

Small and medium-sized enterprises (SMEs) represent a critical component of economic development due to their substantial contribution to employment generation, income creation, and economic resilience (Varga, 2021). SMEs constitute the majority of business entities worldwide and serve as important drivers of innovation and entrepreneurship. The Asian Development Bank (ADB, 2022) reports that SMEs contribute significantly to gross domestic product and labor absorption across many economies. Similarly, OECD (2021) emphasizes that SMEs play a vital role in strengthening economic stability and supporting local economic development. Despite their importance, many SMEs continue to face challenges related to limited financial resources, inadequate technological capabilities, insufficient managerial skills, and restricted market access.

The increasing adoption of digital technologies has created opportunities for SMEs to enhance business performance and productivity. Digital transformation enables firms to improve operational efficiency, strengthen customer engagement, optimize resource utilization, and expand market reach. Technological innovation has been identified as a major determinant of organizational competitiveness and sustainable business performance (Clauss et al., 2021; Soto-Acosta, 2020). Furthermore, Surya et al. (2021) argue that technological innovation contributes significantly to the productivity and sustainability of SMEs by improving production processes, strengthening market competitiveness, and supporting economic growth. However, technology adoption

alone may not guarantee productivity improvement unless supported by other organizational and institutional factors.

Human capital is another critical factor influencing business productivity and economic performance. Firms with skilled and competent human resources are generally more capable of adopting innovations, managing technological changes, and responding to market dynamics (Ryketeng & Syachbrani, 2023). Entrepreneurial competencies, knowledge-sharing practices, and workforce capabilities have been found to positively influence innovation performance and organizational competitiveness (Marvel et al., 2016; Zulkifli et al., 2023). In addition, access to finance and government support policies are essential elements that facilitate business development and encourage innovation-driven growth, particularly among SMEs that often experience financial constraints and institutional barriers (Ratnawati 2020).

Although previous studies have extensively examined the relationships between innovation, business performance, and SME development, several research gaps remain. First, most studies investigate technological innovation, human capital, financial access, and government support separately rather than integrating these factors within a single conceptual framework. Second, prior research primarily focuses on firm performance outcomes, while the implications for sustainable economic growth receive relatively limited attention. Third, many studies are conducted within specific sectors or geographical contexts, limiting the generalizability of their findings. Consequently, there is a need for a more comprehensive framework that explains how technological innovation, human capital, financial access, and government support collectively influence business productivity and contribute to sustainable economic growth.

Based on these considerations, this study aims to develop an integrative perspective on the relationship between technological innovation, human capital, financial access, government support, and business productivity. Furthermore, the study seeks to explain how productivity enhancement can contribute to sustainable economic growth in an increasingly digital and competitive economic environment.

2. | LITERATURE REVIEW

Technological Innovation and Business Productivity

Technological innovation has become a fundamental driver of organizational competitiveness and economic development in the digital era. Innovation refers to the introduction and implementation of new technologies, products, processes, or business models that improve organizational performance and create value for stakeholders. The increasing integration of digital technologies into business activities has transformed traditional production systems, enabling firms to operate more efficiently and respond more effectively to changing market demands. According to Vial (2019), digital transformation represents a process through which organizations improve their operations, structures, and value creation mechanisms through the adoption of digital technologies. Similarly, Verhoef et al. (2021) argue that technological innovation

facilitates organizational adaptation to rapidly changing business environments and enhances competitive advantage.

From a productivity perspective, technological innovation contributes to the optimization of production processes, the reduction of operational costs, and the improvement of product quality. Firms that successfully adopt innovative technologies are generally able to achieve higher levels of efficiency and market responsiveness. Clauss et al. (2021) emphasize that digitalization supports business model innovation, which subsequently improves organizational performance and productivity. Furthermore, Surya et al. (2021) found that technological innovation positively influences SME productivity by strengthening production capabilities, improving marketing effectiveness, and enhancing business sustainability. Therefore, technological innovation can be viewed as a strategic resource that enables firms to achieve superior productivity and maintain competitiveness in increasingly dynamic economic environments.

Human Capital and Business Competitiveness

Human capital theory emphasizes the importance of knowledge, skills, competencies, and experience as strategic assets that contribute to organizational success. In contemporary business environments, technological advancement alone is insufficient to ensure productivity growth without adequate human resource capabilities. The effectiveness of innovation adoption largely depends on the ability of employees and entrepreneurs to understand, utilize, and manage technological resources (Ahn et al., 2022). Human capital therefore serves as a critical factor influencing productivity, competitiveness, and organizational adaptability.

Marvel et al. (2016) highlight that human capital significantly contributes to entrepreneurial performance through knowledge acquisition, opportunity recognition, and innovation development. Likewise, Zulkifli et al. (2023) demonstrate that knowledge sharing and employee competencies positively affect innovation performance and organizational effectiveness. The ability of firms to develop and retain skilled workers enables them to respond more effectively to environmental changes and emerging market opportunities. Entrepreneurial competencies, including strategic thinking, problem-solving skills, leadership capabilities, and innovation orientation, have also been found to improve SME performance and long-term competitiveness (Khan et al., 2021).

Human capital further supports the successful implementation of technological innovation by facilitating learning processes and organizational transformation. Organizations possessing highly competent human resources are generally more capable of utilizing technological opportunities to improve productivity and business performance. Consequently, investments in education, training, and skill development are considered essential strategies for strengthening competitiveness and supporting

sustainable economic growth in knowledge-based economies (Marvel et al., 2016; Zulkifli et al., 2023).

Financial Access, Government Support, and Sustainable Economic Growth

Access to financial resources and government support policies are widely recognized as important determinants of business development and economic sustainability. Financial access enables firms to acquire capital for investment, technology adoption, business expansion, and innovation activities. However, many SMEs continue to face financing constraints that limit their growth potential and productivity improvement. According to Ratnawati (2020), financial inclusion and effective financial intermediation contribute significantly to SME growth by providing access to credit and investment opportunities that facilitate business development.

Government support also plays a crucial role in creating favorable conditions for business sustainability. Public policies related to entrepreneurship, innovation incentives, training programs, and financial assistance can strengthen SME competitiveness and improve productivity. OECD (2021) emphasizes that effective policy interventions are necessary to address structural barriers that hinder SME growth and innovation. Furthermore, OECD (2023) notes that coordinated support mechanisms involving government institutions, financial sectors, and business communities contribute to more resilient and productive economic systems.

The relationship between financial access, policy support, and sustainable economic growth has become increasingly important in the context of digital transformation and global economic uncertainty. Surya et al. (2021) found that government support, venture capital availability, and human resource capacity collectively influence SME development and productivity. Therefore, sustainable economic growth can be achieved when businesses have adequate financial resources, supportive institutional environments, and sufficient capabilities to adopt innovation and improve productivity. Such integration strengthens business resilience while contributing to broader economic development objectives.

3. | RESEARCH METHOD

This study employed a descriptive qualitative approach to explore the relationships among technological innovation, human capital, financial access, government support, business productivity, and sustainable economic growth. A qualitative approach was selected because it enables researchers to obtain a comprehensive understanding of economic phenomena, organizational behavior, and business development processes within a rapidly changing economic environment. The descriptive qualitative method is particularly suitable for examining how various factors interact and contribute to productivity improvement and sustainable economic development from both theoretical and practical perspectives. Rather than focusing on statistical measurement, this approach emphasizes interpretation, contextual understanding, and the identification of patterns emerging from existing literature and empirical findings.

The research utilized a literature-based qualitative design by collecting and analyzing secondary data from academic journal articles, international reports, and scholarly publications published between 2019 and 2023. The selected literature focused on themes related to technological innovation, digital transformation, human capital development, financial inclusion, government support, business productivity, and economic growth. Data sources included peer-reviewed journal articles indexed in reputable academic databases, reports published by international organizations such as the OECD, World Bank, and Asian Development Bank, as well as previous studies investigating SME development and innovation-driven economic growth. The use of recent literature was intended to ensure that the analysis reflected contemporary economic conditions and current theoretical developments.

Data collection was conducted through systematic literature review procedures, including identification, selection, classification, and evaluation of relevant references. The collected literature was subsequently categorized according to major themes, namely technological innovation, human capital, financial access, government support, business productivity, and sustainable economic growth. The analysis process involved data reduction, thematic coding, data interpretation, and synthesis of findings to identify relationships among the studied variables. This procedure allowed the researcher to compare different perspectives, identify recurring patterns, and formulate a comprehensive conceptual understanding of the determinants of business productivity and economic sustainability. According to Surya et al. (2021), qualitative analysis provides valuable insights into the interactions between innovation, productivity, and business development, particularly when examining complex socio-economic phenomena. Similarly, Verhoef et al. (2021) emphasize that understanding digital transformation and organizational adaptation requires interpretative approaches capable of capturing multidimensional relationships among technological, organizational, and environmental factors.

The findings derived from the qualitative analysis were then integrated into a conceptual framework explaining how technological innovation, human capital, financial access, and government support collectively contribute to business productivity and sustainable economic growth. This framework serves as the basis for discussing the implications of innovation-driven development strategies in contemporary economic systems.

4. | RESULTS

The Role of Technological Innovation and Human Capital in Enhancing Business Productivity

The findings indicate that technological innovation has become one of the most influential factors affecting business productivity in contemporary economic systems. The increasing adoption of digital technologies has transformed traditional business

operations into more efficient, flexible, and data-driven processes. Organizations that actively integrate technological innovation into their production, marketing, and managerial activities tend to demonstrate higher levels of productivity compared to those relying on conventional business models. Digital transformation facilitates automation, reduces transaction costs, improves communication efficiency, and enables firms to respond more rapidly to changing consumer preferences and market conditions (Vial, 2019; Verhoef et al., 2021).

The literature further suggests that technological innovation contributes to productivity improvement through multiple mechanisms. First, innovation enhances operational efficiency by optimizing resource allocation and reducing production waste. Second, digital technologies improve information accessibility and support strategic decision-making processes. Third, innovation enables firms to diversify products and services, thereby strengthening their competitive position in increasingly dynamic markets. Clauss et al. (2021) emphasize that business model innovation driven by digitalization significantly improves organizational performance and competitiveness. Similarly, Soto-Acosta (2020) argues that digital transformation has become a strategic necessity for firms seeking resilience and long-term sustainability in rapidly changing business environments.

Despite these advantages, the findings reveal that technology adoption alone is insufficient to ensure productivity improvement. Human capital emerges as a complementary factor that determines the effectiveness of innovation implementation. The successful utilization of technological resources depends largely on the competencies, knowledge, and adaptability of employees and entrepreneurs. Organizations possessing highly skilled human resources are generally more capable of understanding technological opportunities, managing innovation processes, and adapting to environmental changes. This finding supports the argument of Marvel et al. (2016), who identify human capital as a strategic resource that enhances entrepreneurial performance and organizational competitiveness.

The analysis also indicates that knowledge-sharing practices and continuous learning contribute significantly to productivity enhancement. Employees who possess relevant skills and participate in organizational learning processes are more capable of applying innovative solutions to operational challenges. Zulkifli et al. (2023) demonstrate that human capital development positively influences innovation performance by facilitating knowledge creation and dissemination within organizations. Consequently, firms that invest in employee training and competency development tend to achieve higher productivity and stronger innovation capabilities.

Another important finding concerns entrepreneurial competencies. Strategic leadership, opportunity recognition, problem-solving skills, and innovation orientation appear to strengthen organizational adaptability and competitiveness. Khan et al. (2021) argue that entrepreneurial competencies play a critical role in improving SME performance because they support effective decision-making and resource

management. In highly competitive business environments, entrepreneurial competence becomes increasingly important for identifying emerging opportunities and responding to technological disruptions.

The findings further suggest that technological innovation and human capital should not be viewed as separate determinants of productivity. Instead, both factors operate in an integrated manner. Technological investments generate greater productivity gains when accompanied by adequate human resource capabilities. Conversely, highly skilled employees may experience limited productivity improvements if organizations lack sufficient technological infrastructure. This interdependence highlights the importance of adopting a holistic approach to business development that simultaneously strengthens technological and human resource capacities.

The observations obtained from the reviewed literature are consistent with the findings of Surya et al. (2021), who emphasize that innovation contributes to productivity growth when supported by human resource competence, business management capabilities, and organizational adaptability. The study demonstrates that innovation-driven productivity growth is not solely a technological phenomenon but also a human-centered process involving knowledge, learning, and organizational transformation. Therefore, sustainable productivity improvement requires continuous investment in both technological innovation and human capital development.

Overall, the results indicate that technological innovation and human capital jointly create a foundation for enhanced productivity, competitiveness, and long-term business sustainability. Organizations capable of integrating these elements effectively are more likely to achieve superior performance and contribute positively to broader economic development objectives.

Financial Access, Government Support, and Sustainable Economic Growth

The findings reveal that financial access and government support constitute critical institutional factors influencing business productivity and sustainable economic growth. Although technological innovation and human capital are essential drivers of organizational performance, their effectiveness is often constrained by limited access to financial resources and inadequate policy support. Businesses require sufficient capital to invest in technology, develop human resources, expand operations, and implement innovation strategies. Consequently, financial accessibility becomes an important prerequisite for productivity enhancement and long-term business sustainability.

The reviewed literature indicates that access to finance directly affects the ability of firms to adopt innovation and pursue growth opportunities. Organizations with adequate financial resources are generally more capable of investing in technological infrastructure, research and development activities, and workforce training programs. Conversely, financial constraints often limit business expansion and reduce innovation

capacity. Ratnawati (2020) highlight that financial inclusion facilitates SME growth by improving access to credit and investment opportunities necessary for business development. This finding suggests that financial institutions play a strategic role in supporting innovation-driven productivity growth.

The results also demonstrate that financial access contributes to organizational resilience during periods of economic uncertainty. Firms with stronger financial capabilities are better equipped to respond to market fluctuations, technological disruptions, and changing consumer demands. Such resilience enables organizations to maintain productivity levels and pursue sustainable growth despite external challenges. This observation aligns with the perspective presented in OECD (2021), which emphasizes the importance of inclusive financial systems in supporting entrepreneurship and SME development.

Government support emerges as another influential determinant of business productivity and economic sustainability. Effective policy interventions can reduce structural barriers, facilitate innovation adoption, and improve access to essential resources. Various forms of government support identified in the literature include financial assistance programs, entrepreneurship development initiatives, digital transformation incentives, training programs, regulatory reforms, and innovation support mechanisms. These initiatives create enabling environments that encourage business growth and productivity enhancement.

OECD (2023) argues that coordinated policy frameworks strengthen business ecosystems by promoting collaboration among governments, financial institutions, and private-sector actors. Such coordination enhances resource accessibility and supports innovation-oriented development strategies. Furthermore, government policies aimed at strengthening digital infrastructure and technological capabilities can accelerate productivity improvements across different sectors of the economy.

The findings also indicate that government support contributes to reducing inequalities in access to opportunities among business actors. Smaller firms often face greater challenges in obtaining capital, technology, and market access compared to larger organizations. Public policy interventions therefore play an important role in creating more equitable conditions that enable businesses of various sizes to participate in economic development processes. This observation supports the findings of ADB (2022), which highlight the importance of policy support in strengthening SME competitiveness and economic resilience.

Another important result concerns the relationship between productivity and sustainable economic growth. The analysis suggests that productivity improvement serves as an intermediary mechanism through which innovation, human capital, financial access, and government support contribute to broader economic development outcomes. Higher productivity enables businesses to generate greater output, create employment opportunities, improve income levels, and strengthen economic competitiveness. As productivity increases across sectors, the cumulative effect

contributes to sustainable economic growth and improved societal welfare (World Bank, 2022).

The findings further demonstrate that sustainable economic growth requires an integrated development approach. Economic sustainability cannot be achieved solely through technological advancement or financial investment. Instead, it depends on the interaction among innovation capabilities, human resource development, financial inclusion, and supportive institutional frameworks. Chaudhuri et al. (2023) argue that knowledge-based economic growth increasingly relies on the effectiveness of innovation systems that facilitate knowledge creation, dissemination, and utilization. Therefore, sustainable growth emerges when economic actors possess adequate capabilities, resources, and institutional support to innovate and improve productivity continuously.

The results synthesized from the literature strongly support the conclusions of Surya et al. (2021), who found that government support, financial resources, innovation, and human capital collectively influence business productivity and economic sustainability. However, unlike many previous studies that examine these factors separately, the present analysis demonstrates their interconnected nature and highlights the importance of adopting an integrative framework for understanding productivity-driven economic growth.

The findings suggest that sustainable economic growth is most effectively achieved when technological innovation, human capital, financial access, and government support operate simultaneously within a supportive economic ecosystem. Such integration enhances productivity, strengthens competitiveness, and contributes to long-term economic resilience in increasingly complex and dynamic business environments.

5. | DISCUSSION

The findings of this study demonstrate that business productivity is influenced by a combination of technological, human, financial, and institutional factors rather than by a single determinant. This result reinforces contemporary economic perspectives emphasizing that sustainable economic growth increasingly depends on the interaction between innovation capabilities, human capital development, financial accessibility, and supportive policy environments. The results support the argument that technological innovation has become a critical driver of productivity enhancement because it enables organizations to improve efficiency, reduce operational costs, and strengthen competitiveness in increasingly dynamic markets (Vial, 2019). However, the findings also indicate that the effectiveness of technological innovation depends significantly on the quality of human resources responsible for adopting and utilizing new technologies.

The relationship between innovation and human capital observed in this study confirms that organizational competitiveness is strongly influenced by the capacity of

employees and entrepreneurs to learn, adapt, and implement innovative solutions. Human capital contributes not only to knowledge acquisition but also to the development of organizational capabilities that facilitate innovation and strategic decision-making. This finding is consistent with the perspective proposed by Marvel et al. (2016), which highlights the strategic role of human capital in enhancing entrepreneurial performance and organizational adaptability. Similarly, Zulkifli et al. (2023) emphasize that knowledge-sharing mechanisms and employee competencies significantly improve innovation outcomes and organizational effectiveness.

Another important contribution of this study is the identification of financial access and government support as enabling factors that strengthen the productivity-enhancing effects of innovation and human capital. Previous studies often examined technological innovation or organizational capabilities independently, whereas the present findings suggest that productivity improvement requires sufficient financial resources and supportive institutional frameworks. Businesses with better access to financing are more capable of investing in technology, workforce development, and innovation initiatives. This observation supports the findings of Ratnawati (2020), who argue that financial inclusion plays a crucial role in facilitating business growth and innovation-oriented development.

The findings further reveal that government support contributes to the creation of an enabling environment for productivity growth by reducing structural barriers and promoting access to resources. Effective policy interventions, including training programs, digital transformation incentives, and financial assistance schemes, help firms strengthen competitiveness and improve resilience. This observation is consistent with OECD (2023), which emphasizes the importance of coordinated policy frameworks in supporting entrepreneurship, innovation, and sustainable business development.

The study also addresses several gaps identified in previous literature. While earlier studies commonly focused on isolated relationships between innovation and performance or human capital and competitiveness, this research demonstrates the interconnected nature of technological innovation, human capital, financial access, and government support. The findings therefore extend the framework proposed by Surya et al. (2021), which highlighted the importance of innovation and institutional support for SME productivity, by incorporating a broader perspective on sustainable economic growth. Furthermore, the results support the knowledge-based growth perspective advanced by Chaudhuri et al. (2023), which suggests that long-term economic development increasingly depends on the effectiveness of innovation ecosystems and knowledge utilization processes.

Overall, the findings indicate that sustainable economic growth can be achieved more effectively when innovation, human capital, financial inclusion, and government support are integrated within a comprehensive development strategy. Such integration

not only improves business productivity but also strengthens economic resilience and competitiveness in the face of ongoing technological and market transformations.

6. | CONCLUSION

This study examined the relationships among technological innovation, human capital, financial access, government support, business productivity, and sustainable economic growth through a descriptive qualitative approach. The findings indicate that business productivity is not determined by a single factor but rather by the interaction of technological, organizational, financial, and institutional dimensions. Technological innovation contributes significantly to productivity improvement by enhancing operational efficiency, facilitating business transformation, and strengthening competitiveness. However, the effectiveness of innovation largely depends on the availability of competent human resources capable of adapting to technological change and utilizing knowledge effectively.

The study further reveals that financial access and government support play essential roles in creating favorable conditions for productivity growth. Adequate financial resources enable firms to invest in technology, workforce development, and innovation activities, while supportive government policies facilitate access to opportunities, reduce structural barriers, and encourage sustainable business development. The integration of these factors strengthens organizational resilience and enhances the ability of firms to respond to changing economic environments.

The results also demonstrate that productivity serves as a key mechanism linking innovation, human capital, financial inclusion, and policy support to sustainable economic growth. Therefore, achieving long-term economic sustainability requires a comprehensive strategy that simultaneously promotes technological advancement, human resource development, financial accessibility, and institutional effectiveness. Such an integrated approach can strengthen business competitiveness, improve economic resilience, and contribute to inclusive and sustainable economic development. The study provides a conceptual foundation for future research and offers practical insights for policymakers and business stakeholders seeking to foster productivity-driven economic growth in an increasingly digital and competitive global economy.

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The authors declare that there is no conflict of interest.

Ethical Approval and Originality Statement

Ethical approval was obtained for this study. The manuscript represents original work and has not been previously published, nor is it under consideration by another journal.

Data Disclosure Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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