Innovation of Business Models in the Digital Economy: A Case Study of Start-up Companies

Rita Ningsih[1], Wahyu Murti[2]
Universitas Borobudur, Jakarta, Indonesia[1,2,4,5,6]
Email: ritaningsih.unindra@gmail.com[1], wahyu_murti@borobudur.ac.id[2]

Abstract

This research aims to analyze the impact of digital technology adoption on the business performance of startup companies in Indonesia. Using a random sampling method, five startups were selected as respondents, and data were collected through a questionnaire that has been tested for validity and reliability. The validity test results show that all questionnaire items are valid, with the calculated r value greater than the r table value. The reliability test using Cronbach's Alpha coefficient produces a value of 0.78, indicating that the research instrument is consistent and can be reused. Descriptive analysis reveals that the majority of startups operate in the fintech, edutech, and healthcare sectors, with most having utilized technologies such as artificial intelligence (AI) and data analytics. The findings indicate that digital technology adoption positively impacts business performance, especially in enhancing operational efficiency and expanding market reach. Startups that maximize the integration of digital platforms experience significant growth in terms of user numbers and revenue. However, challenges such as cyber security, the digital divide, and marketing competition remain major obstacles. This research also emphasizes the importance of government policies in supporting a conducive digital ecosystem so that startups can overcome these hurdles and continue to innovate. With the right strategies and optimal utilization of technology, startups in Indonesia have great potential to grow and contribute significantly to the national digital economy.

Keyword: business model innovation, digital economy, start-up companies

INTRODUCTION

According to data from the Indonesian Internet Service Providers Association (APJII), the number of internet users is projected to reach 221 million in 2024. This number is indeed substantial (Ariqah, 2024). Meanwhile, according to Worldometer, the population of Indonesia is around 284 million people (Lestari & Santoso, 2024). From this comparison, it can be deduced that the number of internet users in Indonesia reaches 77.82%. This indicates that nearly a majority of the population has utilized the internet, which is one form of technological advancement.

The rapid technological development has significantly transformed the landscape of human life (Pakarti et al., 2023). Starting from the education sector which has transformed with the advent of e-learning, to the healthcare field that has advanced with sophisticated medical technology, technology has become an inseparable part of our lives. Social media platforms have changed the way we interact and access information, but on the other hand have also raised challenges such as the dissemination of hoaxes and polarization (Mantiri & Reskin, 2024). In the economic sector, digital technology has given rise to new business models and

accelerated economic growth. However, digital divide and cyber security remain crucial issues that need to be addressed. The government plays a critical role in formulating policies that support sustainable and inclusive technological development. Current technology trends such as artificial intelligence and the Internet of Things offer great potential to solve various global problems but also present complex ethical challenges (Cholik, 2021).

The rapid technological development has sparked a revolution in the global economy sector. The use of technology to support economic activities is becoming increasingly massive, as articulated by Harahap (2019). The emergence of e-commerce platforms like Shopee and Tokopedia has transformed consumer behavior and opened opportunities for entrepreneurs. Financial technology has also facilitated transactions and promoted financial inclusion. However, digital transformation also brings challenges such as the digital divide and cyber security. The government plays a vital role in creating a conducive digital ecosystem to foster sustainable economic growth.

The rapid increase in the digital economy has driven massive transformation in the business world. Technology has become a primary enabler for companies to create new innovations, reach wider markets, and improve operational efficiency. Data, as a highly valuable asset, has become the center of many business strategies. By leveraging technologies such as artificial intelligence (AI), companies can analyze data in-depth to gain valuable insights and make smarter business decisions (Muzakir et al., 2023). However, digital transformation is not without challenges. Companies need to address resistance to change, build an innovation culture, and ensure data security to remain competitive in this digital era. The rapid growth of the digital economy has given rise to a dynamic startup ecosystem (Fachrurazi et al., 2023). Startups, as relatively new ventures, have become the forefront of innovation in various sectors (Bakhar et al., 2023). With advanced technological support, startups can create innovative solutions for various issues, ranging from health, education, to environmental concerns. The health sector, for instance, has undergone transformation with the emergence of startups offering telemedicine and application-based health services. Startups also play a crucial role in promoting financial inclusion and access to public services. The presence of startups not only creates new job opportunities but also drives the creation of a stronger innovation ecosystem. Other examples include the education sector where some companies offer tutoring or consultation services related to education, and there are still many diverse aspects that are the focus of startup companies. Startups typically have unique characteristics such as flat organizational structures, a flexible work culture, and dynamic work environments (Loho et al., 2023).

RESEARCH METHOD

1. **Population and Sampling Method**

    The population is the research area with specific characteristics studied, from which conclusions can be drawn. The sample, on the other hand, is a part of that population (Sugiyono, 2017). In this study, the population consists of all startup companies sharing similar characteristics. This research does not restrict the sector in which the company operates, but the focus is on startups that have been running for less than five years. The sampling method used in this study is random sampling, where five startup companies are randomly selected to be the samples for this research.

2. **Research Instruments**

    The instrument used in this study employs a questionnaire using a 4-point Likert scale. Additionally, the types of questions in this questionnaire are closed-ended, where each question point has been prepared by the researchers, and this questionnaire will be given to respondents who are employees of the company. These employees will answer

each question provided using the 4-point Likert scale, which includes: Point 1 "Strongly Disagree", Point 2 "Disagree", Point 3 "Agree", Point 4 "Strongly Agree".

The questionnaire used in this study is designed to elicit in-depth information regarding the influence of the digital economy on companies, particularly in business model innovation. This questionnaire will consist of 10 questions structured around two main themes. The first theme will focus on the extent to which the digital economy has shaped and changed the business landscape of the companies. Questions in this theme will explore how the companies adapt to the rapid changes in the digital business environment, as well as the challenges and opportunities they face. The second theme will more specifically discuss about the business model innovations triggered by technology development. Questions in this theme will measure the level of innovation undertaken by the companies, the factors driving innovation, and the impact of such innovations on company performance.

3. **Research Procedure and Duration**

The research procedure will begin with a preparatory stage, which includes preparing the research instruments, determining the population and samples, and obtaining research permissions. Following that, an execution stage will involve data collection through questionnaires, data analysis using statistical software, and interpretation of the research results. The final stage will be the preparation of a comprehensive research report, ranging from the introduction to conclusions. This research is estimated to take 4-6 months. This duration may vary depending on the complexity of the research, the number of samples, and availability of resources. The preparation stage, which includes instrument preparation and obtaining permissions, is estimated to take about 1-2 months. The execution stage, which includes data collection and analysis, is expected to take 2-3 months. Finally, the report preparation will take about 1 month.

4. **Analysis Plan**

The initial phase of data analysis involves processing raw data. The data collected from the questionnaire will be cleaned of any incomplete or inconsistent entries. Subsequently, the data will be tabulated and coded, especially for qualitative data, to facilitate further analysis. Descriptive analysis will be performed to obtain a general overview of the collected data. Descriptive statistics such as frequencies, percentages, means, medians, and modes will be calculated for each variable. Additionally, bivariate descriptive analysis will be conducted to observe relationships between two variables. Data visualization will also be performed to present the data in a more engaging and comprehensible manner. After obtaining a general overview, inferential analysis will be conducted to test the research hypotheses. The choice of statistical tests will be adjusted according to the type and distribution of the data. For instance, to test for differences in means between two groups, a t-test may be used. For more than two groups, ANOVA may be used. Furthermore, regression analysis may be conducted to determine the influence of independent variables on dependent variables. If qualitative data are present in the study, a thorough qualitative analysis will be performed. This process involves identifying themes, categorizing data, and drawing conclusions based on patterns that emerge from the data. The results of qualitative analysis will then be integrated with the results of quantitative analysis to gain a more comprehensive understanding. The final phase of data analysis is the interpretation of results. Statistical analysis results will be interpreted in the context of relevant theories and the research questions posed. Conclusions will be drawn based on findings obtained. Analysis results will also be compared with previous research to see the new contributions made by this study. Additionally, limitations of the study will be identified, and implications of the research findings for the development of knowledge and business practices will be discussed. In this phase, it is important to be cautious when

making generalizations, considering the sample limitations and the design of the study. The analysis results will be presented in the form of a research report that is clear and easy to understand. This research report will include an introduction, literature review, research methodology, research results, discussion, and conclusions.

5. **Validity and Reliability Testing**

As this study utilizes a questionnaire, it is necessary to conduct Validity Testing after data from the respondents have been collected. Validity testing is used to determine whether the questionnaire truly measures what it is supposed to measure, thus it can be declared valid (Ghozali, 2016). The validity test is performed by comparing the calculated r value and the r table value at a degree of freedom (df) = n-2, where n is the sample size, and the significance level (alpha) used is 0.05. If the calculated r value is greater than the r table value and is positive, then the questionnaire item or indicator is stated as valid (Ghozali, 2018).

After passing the validity test, and each item in the questionnaire is declared valid, the next step is to conduct reliability testing on each validated questionnaire. Reliability testing is useful for assessing whether each point in the questionnaire is consistent for use over time so that if the questionnaire is deemed reliable, it can be reused in the future (Ghozali, 2018). In this Reliability Test, Cronbach's Alpha method will be used, which serves to measure the internal consistency of each item in the instrument. A Cronbach's Alpha value greater than 0.6 is considered to indicate that the instrument is reliable.

6. **Statistical Testing and Comparisons**

Data analysis in this research will be conducted using a descriptive and inferential statistical approach. Descriptive statistics will be used to provide an overview of the characteristics of the collected data. Univariate analysis will be applied to calculate various statistical measures such as frequencies, percentages, means, medians, and modes for each variable. Thus, we can understand the data distribution, central value, and data spread for each research variable. In addition, bivariate analysis will be used to test the relationship between two variables. The correlation coefficient will be used to measure the strength and direction of the relationship between two continuous variables, while the t-test will be used to compare means between two groups. Through bivariate analysis, we can identify whether there is a significant relationship between research variables and how strong that relationship is.

In addition to descriptive and bivariate analysis, comparisons among groups will also be conducted. For example, if we wish to compare the performance of companies that have adopted digital technology with those that have not, we may use an independent t-test. Or, if we want to compare company performance across various size levels, ANOVA may be employed. This comparison among groups will allow us to draw conclusions regarding the influence of independent variables on dependent variables. Thus, we can identify significant factors influencing company performance in the context of the digital economy. Moreover, comparisons of the results of this study with previous studies will be conducted to examine the new contributions this study offers to the existing literature.

7. **Scope and Limitations of the Study**

The scope of research defines the boundaries set to focus the study. It determines the areas we will explore in-depth. The scope includes various aspects, from topics to be studied, the population or samples involved, the variables to be measured, to the time and place of the study. The scope of this research focuses on companies categorized as startups. This study has several limitations that need to be considered. First, this research focuses only on startup companies, meaning the findings may not be generalizable to other companies under different conditions. Secondly, the variables used in this study may not encompass all factors that can be used to analyze how the digital economy and business

model innovations affect these companies. External factors such as macroeconomic conditions and changing government policies may also have significant impacts but are not discussed in depth in this study.

RESULT AND DISCUSSION

The advancement of technology in recent years has dramatically reshaped the landscape for startup companies worldwide, with Indonesia being no exception (Raharjo, 2021). As one of Southeast Asia's fastest-growing economies, Indonesia has seen a surge in entrepreneurial activity, particularly in technology-driven sectors. This study focuses on startup companies in Indonesia, examining the impact of digital technology adoption on their performance. The research employed a random sampling method, with data collected through validated and reliable questionnaires distributed to startup companies across various industries. The findings provide insight into the digital transformation journey of startups, the sectors that dominate this space, and the challenges faced in the rapidly evolving digital economy.

The study utilized a questionnaire instrument to gather data from startup companies operating in Indonesia. A random sampling method ensured a broad and unbiased representation of startups across multiple sectors. Of the total targeted respondents, five companies successfully returned completed questionnaires, contributing to the analysis.

A crucial component of the study involved testing the validity and reliability of the questionnaire to ensure the accuracy and consistency of the data collected. Validity testing was performed by comparing the calculated r value with the r table value at a degree of freedom (df) = n-2 and a significance level of 0.05. The results demonstrated that all 10 items on the questionnaire yielded r values greater than the r table value, confirming their validity. In terms of reliability, the Cronbach's Alpha coefficient for the questionnaire was measured at 0.78, indicating high internal consistency and suggesting that the instrument could be reused in future research without compromising reliability.

Descriptive Analysis – Sectoral Insights

Upon validating the data, descriptive analysis was conducted to identify patterns and trends among the participating startups. The analysis revealed that the majority of startups surveyed operate in the financial technology (fintech), education technology (edutech), and healthcare sectors. This finding aligns with Indonesia's broader economic trend, where digitalization is increasingly prominent in sectors that are essential to societal growth and development.

1. Fintech Startups

    The fintech sector has emerged as a key driver of innovation, addressing gaps in Indonesia's traditional banking system by providing digital solutions for payments, lending, and investment (Alfarizi et al., 2023). Startups in this space leverage artificial intelligence (AI) and big data to offer personalized financial services, thus enhancing user experience and financial inclusion.

2. Edutech Startups

    The edutech sector has gained momentum, particularly in light of the COVID-19 pandemic, which necessitated a shift towards online learning platforms. Indonesian edutech startups are utilizing AI and data analytics to develop adaptive learning models, catering to a diverse range of educational needs.

3. Healthcare Startups

    Healthcare startups have also embraced digitalization, developing telemedicine platforms and health management apps that facilitate remote consultations and digital record-keeping. This technological shift has improved access to healthcare services, especially in rural and underserved regions (Wibowo, 2022).

Technology Adoption and Startup Growth

The study highlights the significant role that technology adoption plays in enhancing startup performance. Startups that actively integrate digital platforms, such as e-commerce, IoT applications, and AI-driven tools, reported higher growth rates in terms of user acquisition and revenue generation. Digital technologies enable startups to streamline operations, reduce costs, and provide innovative solutions to consumers, fostering competitive advantages in their respective markets.

Several startups participating in the study have adopted AI and big data technologies to drive decision-making processes. By analyzing large volumes of data, startups can identify market trends, predict consumer behavior, and personalize product offerings. This data-driven approach not only boosts operational efficiency but also enhances customer satisfaction and loyalty.

Positive Impacts of Digital Transformation

The findings of this study corroborate earlier research (Harahap, 2019) that emphasizes the transformative power of digital technology for startup growth and economic development. Digital transformation enables startups to be more agile, innovative, and capable of scaling operations quickly. Furthermore, it facilitates market expansion, allowing startups to reach global audiences without incurring significant costs.

Startups leveraging digital platforms experience enhanced brand visibility, increased client engagement, and improved financial performance. E-commerce integration, for example, enables startups to conduct transactions seamlessly across borders, thus unlocking new revenue streams and expanding their customer base.

Challenges and Barriers to Technology Adoption

Despite the numerous benefits associated with digital technology adoption, startups in Indonesia face several challenges that impede their growth. The study identifies two primary challenges:

1. Cybersecurity Risks

   As startups increasingly rely on digital platforms, they become more susceptible to cyber threats. Data breaches, ransomware attacks, and hacking incidents can significantly disrupt business operations and erode consumer trust. Startups with limited financial resources may struggle to implement robust cybersecurity measures, making them vulnerable to attacks.

2. Change Management

   The process of adopting new technologies often necessitates organizational restructuring and cultural shifts. Resistance to change among employees and leadership can hinder the successful implementation of digital tools. Additionally, a lack of skilled personnel proficient in digital technologies poses a barrier to effective digital transformation.

3. The Digital Divide

   While some startups thrive in Indonesia's burgeoning digital economy, others face difficulties due to unequal access to technology and infrastructure. Startups located in remote areas may lack reliable internet connectivity and technological resources, limiting their capacity to innovate and compete. This digital divide exacerbates economic disparities, with urban-based startups having a distinct advantage over their rural counterparts.

The Role of Government and Policy Interventions

The study underscores the critical role of government in fostering a conducive digital ecosystem for startups. Policymakers must prioritize initiatives that promote digital literacy, provide financial incentives for technology adoption, and develop infrastructure that supports digital innovation. Collaborative efforts between the government, private sector, and academic institutions can bridge the digital divide, ensuring that all startups have equal opportunities to thrive.

Government-led initiatives aimed at enhancing cybersecurity awareness and providing startups with access to affordable cybersecurity solutions are also essential. By investing in cybersecurity frameworks and training programs, the government can mitigate the risks associated with digitalization.

Innovation as a Response to Challenges

The challenges highlighted in the study compel startups to adopt innovative strategies to remain competitive. Startups that embrace innovation can turn obstacles into opportunities, developing new business models that address existing market gaps. For instance, fintech startups facing cybersecurity challenges can differentiate themselves by prioritizing secure payment solutions and transparent data policies, attracting trust-conscious consumers.

Similarly, edutech startups can invest in mobile learning applications that cater to regions with limited internet access, bridging the educational gap. Healthcare startups, on the other hand, can explore partnerships with government health agencies to expand telemedicine services in underserved areas.

Future Directions and Recommendations

The study suggests that future research should focus on longitudinal analysis to track the long-term impact of digital transformation on startup performance. Additionally, exploring the role of emerging technologies such as blockchain and quantum computing could provide deeper insights into the future trajectory of Indonesia's startup ecosystem.

Startups are encouraged to foster a culture of continuous learning and adaptability, ensuring that their teams remain well-versed in technological advancements. Partnerships with technology firms and participation in incubator programs can further equip startups with the necessary tools to navigate the digital landscape successfully.
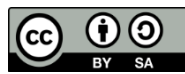
CONCLUSION

This study concludes that the utilization of digital technology significantly impacts the growth and performance of startup companies in Indonesia. The adoption of technologies such as artificial intelligence (AI), data analytics, and digital platforms helps startups enhance operational efficiency, expand markets, and achieve growth in both revenue and user numbers. Startups that can effectively leverage digitalization can also develop and innovate new business models, contributing to the development of the digital economy in Indonesia. This indicates that technology is not merely an assistive tool but is also a key factor for the success and sustainability of startup businesses in the modern era.

However, startups also face various challenges such as cybersecurity, the digital divide, and intense marketing competition. Adaptation to change and the development of innovative strategies are crucial in ensuring that companies can compete and grow. Furthermore, the government's role in creating supportive policies and a digital ecosystem is imperative for overcoming these constraints and enhancing company competitiveness. With appropriate business strategies and good policy support, startups in Indonesia have the potential to continue growing, innovating, and making significant contributions to the national economic growth.

BIBLIOGHRAPHY

Alfarizi, M., Hanum, R. K., Firmansyah, A. A., & Wusqo, U. (2023). Digital Banking in Accelerating Womenpreneur Indonesia's Economic Empowerment: Socio-Economic Exploration and the Role of LPS Based on PLS-SEM. *Journal of Master of Sharia Economics*, *2*(2), 1–32.

Ariqah, N. (2024). *Factors that affect the use of mobile e-wallet applications in Indonesia using the heuristic evaluation method.* Faculty of Science and Technology UIN Syarif HIdayatullah Jakarta.

Bakhar, M., Harto, B., Gugat, R. M. D., Hendrayani, E., Setiawan, Z., Surianto, D. F., Salam,

M. F., Suraji, A., Sukmariningsih, R. M., & Sopiana, Y. (2023). *Startup Development in Indonesia (Startup Development in Indonesia in various fields)*. PT. Sonpedia Publishing Indonesia.

Cholik, C. A. (2021). The development of information communication technology/ICT in various fields. *Journal of the Faculty of Engineering, UNISA Kuningan*, *2*(2), 39–46.

Fachrurazi, F., Rukmana, A. Y., Supriyanto, S., Syamsulbahri, S., & Iskandar, I. (2023). Business revolution in the digital era: Strategies and the impact of technological process transformation on competitive advantage and organizational growth. *West Science Journal of Business and Management*, *2*(03), 297–305.

Ghozali, I. (2016). *Multivariate analysis application with IBM SPSS 23 program*.

Ghozali, I. (2018). application of multivariate analysis with SPSS program,. *Semarang: UNDIP*, *1*(1), p.129.

Harahap, N. J. (2019). *Students and the Industrial Revolution 4.0. Ecobisma (Journal of Economics, Business and Management), 6 (1), 70–78*.

Lestari, A. D., & Santoso, I. B. (2024). The Problematic Of The Rise Of Brought In Private Company Workforce Recruitment And Its Legal Analysis. *Scientific Journal of Advocacy*, *12*(1), 145–165.

Loho, A. E., Rengkung, L. R., & Mandei, J. R. (2023). Engineering for the Development of Organic Strawberry Agribusiness in North Sulawesi in the Agribusiness 4.0 Era. *AGRI-SOSIO-ECONOMICS, 19*(1), 9–16.

Mantiri, A., & Reskin, M. (2024). The influence of social media on the national insight of the younger generation. *Critical Studies of Law and Society*, *1*(01).

Muzakir, U., Baharuddin, B., Manuhutu, A., & Widoyo, H. (2023). Application of Artificial Intelligence in Information Systems: A Literature Review on Applications, Ethics, and Social Impact. *Journal of Education and Teaching Review (JRPP), 6*(4), 1163–1169.

Pakarti, M. H. A., Farid, D., Saepullah, U., & Sucipto, I. (2023). The Influence of Technological Developments on Privacy Protection in Civil Law. *SULTAN ADAM: Journal of Law and Society*, *1*(2), 204–212.

Raharjo, B. (2021). Fintech, Financial Technology, Digital Banking. *Publisher of Yayasan Prima Agus Teknik*, 1–299.

Sugiyono. (2017). *Qualitative and R&D Quantitative Research Methods*. Alphabeta.

Wibowo, A. (2022). Digital Economy Transformation. *Publisher of Yayasan Prima Agus Teknik*, 1–179.