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Digital Technology Innovation in Improving Financial Access for Low-Income Communities

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A B S T R A C T

Access to finance is one of the key factors in building an inclusive and sustainable economy. Low-income communities often experience difficulties in accessing adequate financial services, such as savings, credit and insurance. This research aims to investigate how digital technology innovation has contributed to improving financial access for low-income people. This research is a literature analysis that utilises a qualitative approach. This approach involves analysing and interpreting data based on information and text taken from various sources. The study results show that digital technology innovation has opened up great opportunities in improving financial access for low-income people. Digital banking services, e-payments and alternative funding models have helped overcome traditional barriers, such as geographical distance and administrative costs, which often hinder access to financial services.

A B S T R A K

Akses keuangan merupakan salah satu faktor kunci dalam membangun ekonomi yang inklusif dan berkelanjutan. Masyarakat berpenghasilan rendah seringkali mengalami kesulitan dalam mengakses layanan keuangan yang memadai, seperti tabungan, kredit, dan asuransi. Penelitian ini bertujuan untuk menginvestigasi bagaimana inovasi teknologi digital telah berkontribusi dalam meningkatkan akses keuangan bagi masyarakat berpenghasilan rendah. Penelitian ini adalah analisis literatur yang memanfaatkan metode pendekatan kualitatif. Pendekatan ini melibatkan analisis dan interpretasi data berdasarkan informasi dan teks yang diambil dari berbagai sumber. Hasil studi menunjukkan bahwa inovasi teknologi digital telah membuka peluang besar dalam meningkatkan akses keuangan bagi masyarakat berpenghasilan rendah. Layanan perbankan digital, pembayaran elektronik, dan model pendanaan alternatif telah membantu mengatasi hambatan tradisional, seperti jarak geografis dan biaya administrasi, yang sering kali menghalangi akses ke layanan keuangan.

1. INTRODUCTION

One of the key factors that play an important role in building an inclusive and sustainable economy is access to finance (Sukenti, 2023). Especially in this context, people with low income levels often face complex challenges in accessing adequate financial services such as savings facilities, credit facilities, and insurance coverage. This can then result in them being trapped in a continuous cycle of poverty, with limited opportunities to significantly improve their well-being. However, amidst the dynamics of global change, especially as digital technology has advanced over the past few years, there are promising new opportunities to overcome these constraints and substantially expand access to finance for low-income people (Wahyoedi et al., 2023). This digital transformation has paved the way for innovation in the financial sector, enabling services that are more inclusive, accessible, and tailored to the specific needs of marginalised segments of society.

In line with the adoption of digital technology, various online-based financial platforms and services have emerged (Sutrisno, Ausat, et al., 2023), which not only provide low-income people with easier access to financial products, but also help to reduce traditional barriers that were once difficult to overcome. This means that the opportunity to open a savings account, obtain microcredit, and access insurance coverage can now become more feasible, changing the game for those previously limited by physical and institutional

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boundaries. It is therefore imperative to recognise that this digital transformation has created new momentum in the quest to improve financial inclusion. By harnessing the potential of technology and building a supportive ecosystem, the opportunity can be expanded and deepened, giving low-income communities new hope to overcome their financial limitations, end the cycle of poverty, and improve the path to sustainable prosperity (Prastyaningtyas et al., 2023).

Innovation in digital technology has undergone a significant evolution, particularly in the form of the development of inclusive digital banking services, sophisticated e-payment platforms and revolutionary smartphone-based financial applications (Salamah, 2023). This transformation has fundamentally changed the paradigm in the way people interact with the financial system. Through these solutions, people are given the extraordinary ability to access financial services without being bound by the need to visit a physical location, such as a conventional bank office. Today, the process of opening a bank account has become easier and more accessible to a wider range of people, thanks to these digital technology innovations. By simply utilising a smartphone device, individuals can conduct financial transactions with incredible ease, from fund transfers to bill payments, everything can be done quickly and efficiently. In fact, the trend of smartphone-based financial applications has embraced the convenience and ease for people to manage their financial aspects in the palm of their hands (Zhu & Wang, 2022).

Not only that, but the role of blockchain technology and artificial intelligence in the financial context cannot be ignored. Blockchain technology has provided a strong foundation in securing the integrity of financial transactions, removing potential risks and uncertainties in the process (Sudirjo et al., 2023). Meanwhile, artificial intelligence has provided a new impetus in providing smarter and more targeted financial recommendations, by analysing spending patterns and financial habits to provide better guidance in fund management. This means that innovative developments in the world of digital technology, particularly in the realm of digital banking services, cutting-edge e-payment platforms and paradigm-shifting smartphone-based financial applications, have ushered in a new era in the way people engage with the financial system. These technologies have opened the door to greater financial inclusion, higher efficiency, and stronger security in everyday financial transactions (Pu et al., 2021).

The great potential of these innovations is reflected in their ability to significantly increase access to finance for low-income segments of society. Not only that, these innovations are able to overcome challenges that often arise, such as geographical distance barriers that often hinder accessibility, and high administrative costs that burden individuals when seeking to utilise traditional financial services. By smartly applying digital technology, the financial sector can substantially reach out to low-income earners, minimising limitations that were once difficult to overcome (Tay et al., 2022). Amidst this dynamic, the role of technology is not just limited to providing access to more accessible financial services, but also goes beyond that, setting the stage for active learning on wise financial management. Through integrated educational solutions, digital technology plays an important role in providing low-income earners the opportunity to deepen their understanding of fundamental financial management concepts. Information on financial products and options can be accessed more easily and transparently. By doing so, individuals are able to make smarter and more informed financial decisions, opening the door to a sustainable improvement in their quality of life (Mondejar et al., 2021).

Despite its vast potential, it cannot be ignored that there are still a number of challenges that must be faced and overcome in order to actualise this potential. One of these challenges is the accessibility aspect related to adequate technological infrastructure, especially when looking at rural or remote areas that often face limitations in terms of connectivity and stable internet access (Velaga et al., 2012). Not only that, in the context of realising the potential of this innovation, it is also very important to consider the role of digital literacy and financial literacy. These two aspects of literacy are critical pillars in ensuring that communities are able to utilise these innovations effectively and efficiently. Therefore, strong collaborative efforts are needed from various parties to improve people's understanding of technology and fundamental financial concepts. In the face of these challenges, cross-sector collaboration is increasingly important to create an ecosystem that fully supports the development and adoption of these innovations (Mahardhani, 2023). Only by overcoming infrastructure barriers, improving digital and financial literacy, and promoting an inclusive approach, can the potential of technological innovations in the financial sector be truly felt by all levels of society, including those in previously hard-to-reach areas.

This research aims to investigate how digital technology innovations have contributed to improving financial access for low-income people. In this context, the research will identify the most influential types of

innovations, evaluate their impact on low-income people's financial access, and analyse the factors that influence the adoption of these technologies by the target group. This research is significant as it will provide in-depth insights into how digital technologies can help address the financial access challenges faced by low-income communities. The results of this study are expected to provide input for the government, financial institutions, and other stakeholders in designing policies and programmes that focus on broader and more sustainable financial inclusion.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

Innovation

Innovation refers to the process of creating, developing, and applying new ideas, concepts, products, services, or ways to solve problems, meet needs, or take advantage of opportunities (Muhamad et al., 2023). Innovation involves the introduction of something that has never existed before, or a significant alteration of something that already exists with the aim of increasing value or efficiency (Diawati et al., 2023). There are several types of innovation, including product innovation, process innovation, technological innovation, marketing innovation, and organisational innovation. Here is a brief explanation of each type of innovation:

1. Product Innovation: This involves the development of new products or significant changes to existing products. The aim is to fulfil new needs or wants from consumers or the market.
2. Process Innovation: Process innovation involves changing or creating new ways of carrying out business activities or processes. The aim is to improve efficiency, reduce production costs, or optimise operational performance.
3. Technological Innovation: This type of innovation is related to the use of new or existing technologies to create new solutions, new products, or improve existing processes. Technological innovation is often a key driver of change in various sectors.
4. Marketing Innovation: Marketing innovation relates to new ways to market products or services to consumers. This could include changes in promotion strategies, branding, distribution, or market segmentation.
5. Organisational Innovation: Organisational innovation involves changes in the structure, culture, or governance of the organisation. The goal is to create an environment that supports the ability to innovate and adapt to change.

Innovation can arise from a variety of sources, such as internal research and development, collaboration with external partners, response to market or technological developments, and inspiration from emerging needs or challenges. It is important to remember that innovation is not just about creating something entirely new, but it can also mean taking an existing concept and adapting it in a creative and useful way.

Digital Technology

Digital technology refers to technology that operates based on the representation of discrete numbers or digital signals, in contrast to analogue technology that operates based on continuous signals (Ausat et al., 2023). In a modern context, digital technology often refers to the use of computers and electronic devices to process, store and transmit information in the form of digits or bits (zeros and ones). It has brought about fundamental changes in various aspects of human life, including communication, business, education, entertainment and more (Sutrisno, Kuraesin, et al., 2023). Here are some examples of digital technology:

1. Computers and Software: Computers are one of the most fundamental forms of digital technology. They can process data in digital form and run different types of software for tasks such as word processing, calculations, design, and modelling.
2. Internet: Digital technology and the internet are closely related. The internet is a global network that enables communication and information exchange between various devices around the world. It has changed the way we communicate, learn, shop, and work.
3. Mobile Phones and Mobile Devices: Smartphones are devices that incorporate various digital technologies, including small computers, cameras, sensors, and internet connectivity. They allow users to communicate, surf the internet, and use various applications.
4. Sensor Technology: Digital sensors allow devices to detect changes in the physical environment, such as temperature, light, pressure, or motion. This is crucial in many applications, such as autonomous vehicles, healthcare, and more.

5. Internet of Things (IoT): The concept of IoT involves connecting various devices and physical objects to the internet, enabling data exchange and remote control. Examples include smart home devices, connected vehicles, and industrial sensors.
6. Cyber Security: Digital technology also brings new challenges related to cyber security. Data protection, privacy, and information security are crucial in the ever-evolving digital world.
7. Blockchain: Blockchain technology enables secure and transparent storage and exchange of data through a distributed network. It is best known for its use in cryptocurrencies such as Bitcoin, but also has wider potential applications.

Digital technology has fundamentally changed the way we live, work and interact. It has provided new opportunities for innovation in a variety of sectors and has changed the landscape of business, education, entertainment, and more.

Finance

Finance is a branch of science that deals with the management of funds, assets, liabilities, investments, and all activities related to money management (Hermansyah, 2023). More generally, finance involves all aspects related to the management of financial resources, be it at the level of an individual, business, government, or other institution. The main objective of finance is to optimise the use of funds and financial resources in order to achieve predetermined financial goals (Mihajlović et al., 2020). Some important concepts and components in finance include:

1. Financial Management: This involves making decisions relating to fund allocation, investment, and financing. Financial management aims to achieve a balance between risk and return and maximise firm value.
2. Investment: Investment involves the allocation of funds to assets that are expected to generate profits in the future. Investments can be in the form of stocks, bonds, property, currencies, and other financial instruments.
3. Financing: This relates to the way companies or individuals obtain the necessary funds to achieve their goals. Financing can come from internal sources (such as reinvested profits) or external sources (such as loans or issuing new shares).
4. Risk Management: Risk management involves the identification, analysis, and mitigation of risks associated with financial decisions. The goal is to reduce potential losses and ensure financial viability.
5. Financial Planning: This involves planning how financial resources will be managed to achieve short and long-term goals. Financial planning involves creating a budget, organising savings, and planning for retirement or children's education.
6. Financial Markets: Financial markets are places where various financial instruments are traded. This includes the stock market, bond market, currency market, and derivatives market.
7. Insurance: Insurance is a tool to protect oneself or assets from unexpected financial risks, such as accidents, illnesses, or natural disasters.

Finance plays a very important role in the economy and in the daily lives of individuals and business entities. Good financial management can help achieve financial stability, create investment opportunities, and manage risks effectively.

Society

Society refers to a group of individuals who live within a certain area or neighbourhood and interact with each other in various ways (Holland et al., 2011). The concept of society encompasses the social relationships, norms, values, customs, and interactions that form the pattern of collective life (Bhandari & Yasunobu, 2009). It covers various aspects of human life, including social, cultural, economic, and political. Some important elements in the concept of society are:

1. Social Interaction: Society involves interactions between individuals that form a social network. These interactions can be in the form of communication, co-operation, conflict, and other interpersonal relationships.
2. Norms and Values: Norms are rules that govern behaviour and interactions in society. Values are beliefs and principles that are valued by the society and form the collective worldview.
3. Identity and Personality: Society provides a framework for the formation of an individual's identity and personality. Individuals develop their identity through interactions with specific social groups.

4. Social Structure: Social structure includes hierarchies, classes, and layers in society. It includes the different roles and statuses held by individuals in the group.
5. Culture: Culture includes values, norms, language, customs, art, religion, and other elements that make up the cultural identity of a society.
6. Economy: The economic structure of a society includes how resources are managed, wealth distribution, employment, and the prevailing economic system.
7. Politics: The political system of a society involves how decisions are made, leadership is organised, and political participation occurs.
8. Institutionalisation: Institutions are the structures and systems that exist in society to fulfil various needs, such as education, health, law, and others.
9. Social Change: Societies continue to change and evolve over time. These changes can come from internal or external factors, such as technology, globalisation, or historical events.

Societies can be small groups like local communities or families, or they can include larger populations like countries or larger cultural groups. The concept of society helps us understand how individuals interact with each other, form norms and create social structures that provide the basis for living together.

Low Income

Low income refers to a relatively low or below-average level of income in a given community or region (Petrović et al., 2022). This income is usually insufficient to fulfil basic needs such as food, shelter, education, health care, and other needs essential for a decent life. The concept of low income is relative and can vary based on geographical, social and economic contexts (Reyes-García et al., 2016). A number of factors influence how income is measured as low or high including:

1. Geographic Location: Living standards and the cost of living can vary significantly between urban and rural areas, as well as between different countries.
2. Price Index: Inflation rates and prices of goods and services can affect the purchasing power of income. What is considered a low income in one place may be quite high in another if the cost of living is lower.
3. Family Expenditure: Family expenditure on basic needs such as food, shelter, education and healthcare also affect whether income is considered low or sufficient.
4. Social Perspective: The standard of living and economic expectations of the surrounding community can also influence the view of what is considered a low income.
5. Economic Inequality: Inequality in income distribution also plays an important role. Some individuals or groups may earn most of the income while others fall below the low income threshold.

Low income has a serious impact on individual and community wellbeing. People with low income may have difficulties in fulfilling basic needs, accessing education and health services, and participating in social and economic activities. Government initiatives and non-profit organisations often aim to reduce poverty and low income levels by providing social support, skills training, and economic opportunities to vulnerable groups.

3. RESEARCH METHOD

This research is a qualitative literature review focusing on digital technology innovation's impact on enhancing financial access for low-income communities. Data will be collected from various sources, including scientific journals, books, research reports, and articles, spanning from 2009 to 2023. The qualitative approach enables a deeper understanding of complex issues through meticulous analysis and diverse viewpoints. Its advantages include flexibility in understanding complex phenomena and gaining insights into the topic's evolution over time. However, source credibility and limitations should be scrutinized. The research aims to provide a comprehensive overview of the topic's development and may offer recommendations for further research.

4. DATA ANALYSIS AND DISCUSSION

In the midst of a modern era that is now dominated by advanced digital technology, the changing dynamics in the financial landscape have opened up exciting new opportunities to address the complex challenges of access to finance that have long been faced by low-income segments of society. This ongoing transformation, fuelled by the rapid development of digital technology, is giving rise to revolutionary innovations in conventional business mindsets (Touriano et al., 2023). As a result, it not only bridges the access gap, but also

opens the door to broader and more sustainable financial inclusion, especially for previously neglected groups. These innovations underpinned by digital technology not only facilitate the accessibility of financial services, but also change the paradigm of people's interaction with the financial system as a whole. With increasingly advanced platforms and evolving technology-based applications, individuals now have the means to not only experience the ease of making transactions, but also gain more active involvement in managing all aspects of their personal finances (Yang et al., 2021). As the digital technology ecosystem continues to evolve, it is important to recognise that these innovations do not only offer technical solutions, but also change the way people view and behave when dealing with money and finance. In essence, this new era brings deeper consequences than just changes in tools and methods; it creates the potential for greater social change and helps shape the path towards more equitable and sustainable financial inclusion for all.

One form of innovation that has had a very significant and paradigm-shifting impact is digital banking services that have shaken the traditional foundations of the financial sector (Fasnacht, 2018). In this environment, such services have opened up tremendous opportunities for low-income earners to achieve financial inclusion, even without the need to physically visit bank offices that are often far and difficult to reach, overcoming the geographical barriers that in many cases have been a formidable obstacle in the quest to access necessary financial services. The adoption of banking apps on smartphones has also brought about a transformation in the way people manage their financial affairs (Almaududi Ausat et al., 2021). With easy access via mobile phones, individuals now have the convenience and freedom to bank, check their balances, and transfer funds, all within the palm of their hands. The implication is a significant reduction in the cost and time previously required to access conventional financial services, resulting in a marked increase in accessibility for those in the lower economic strata (Konte & Tetteh, 2023). More than just bringing convenience, this innovation also marks the opening of a window of opportunity for greater change in the way individuals interact with finance. By embracing digital banking, they have access not only to services, but also to better financial knowledge and insights. As such, its impact goes beyond the mere ease of transactions; it creates the foundation for deeper and more sustainable financial inclusion for all sections of society, especially those who previously felt limited by physical and institutional constraints.

Moreover, technological developments in the digital payment space have brought about a fundamental change in the way financial transactions are conducted (Harahap et al., 2023). Especially low-income earners, who may have previously been limited in their access to formal payment systems, now have a golden opportunity to benefit from emerging digital payment platforms. Through these conveniences, they can seamlessly pay various bills, make purchases of goods and services, and transfer funds to family or friends without significant hindrance, all with greater speed and security. This development carries deeper ramifications than just a shift from cash to digital transactions. It is a concrete step in reducing dependence on physical money and developing a more sophisticated and structured transaction culture. By using digital payment platforms, low-income earners gain easier and faster access to various services, while creating higher efficiency in conducting each transaction (Ausat & Suherlan, 2021). Through this wider acceptance of digital payment technologies, not only is financial inclusion enhanced, but also greater economic empowerment for previously marginalised groups. By supporting the shift towards a more mainstream use of digital payment systems, low-income communities can now experience the positive impact of the efficiency, accessibility, and security offered by these technologies, forming a more solid foundation to improve their economic well-being.

It is important to note that the impact of digital technology is not only limited to the conventional aspects of financial transactions, but has also created a huge buzz in formulating new business models that promote the principle of financial inclusion (Iman, 2020). Within this framework, platforms such as peer-to-peer lending and crowdfunding have emerged as tools that promote broader financial inclusion. These platforms are able to bring more equitable access to credit and funding, not only for individuals but also for small businesses that were previously marginalised by traditional financial institutions that are more restrictive in their lending. In addition, blockchain technology has also played a major role in creating new opportunities for secure and transparent financial services (Ali et al., 2020). The software has paved the way for services such as cross-border money transfers that are more efficient and more secure. In addition, blockchain technology has also changed the paradigm of digital identity management. With its ability to secure and store data, the technology has helped in providing a more reliable platform to manage digital identities with a higher level of security. Thus, beyond focusing on daily transactions, digital technology has accelerated the movement towards deeper and more diverse financial inclusion. Innovations such as peer-to-peer lending

platforms, crowdfunding, and blockchain technology have established an ecosystem that supports more inclusive and sustainable access to finance, which in turn can contribute to economic development and broader societal well-being (Stefanelli et al., 2022).

While the innovative potential brought about by digital technology seems very promising, it must be recognised that there are still a series of challenges that require serious attention and collaborative efforts to overcome. Among them, the importance of equitable access to technological devices and reliable internet connectivity should not be overlooked. Ensuring that all levels of society have equal access to the necessary devices and connections is an important foundation to ensure that the benefits of this technology can be felt by everyone. Another significant barrier is the uneven level of digital and financial literacy, especially among low-income communities (Hidayat & Sari, 2022). Improving their understanding of digital technology and basic financial aspects is an important element in ensuring that these innovations are not only implemented well, but also provide maximum benefits. Through focused education programmes, people can gain the knowledge and skills necessary to effectively operate these technologies and implement wise financial strategies. By addressing these barriers, we can ensure that the positive impact of digital technology innovations can be felt more equitably and widely. Cross-sector collaboration and comprehensive efforts in building technological infrastructure, supporting digital literacy, and providing financial training will be important steps in addressing these challenges and creating a firmer foundation for sustainable financial inclusion.

Holistically and comprehensively, the proliferation of innovations in digital technology has played a pivotal role in unlocking greater opportunities to facilitate more equitable financial inclusion for people with lower income levels. Today, these innovations go beyond simply providing access to traditional banking services, but also integrate sophisticated digital payments and embrace alternative models of financing that were previously impossible for marginalised economic groups to access. By providing easier and more affordable access to these services, digital technology has changed the landscape of how low-income communities interact with the financial system as a whole. It has also led to greater control over aspects of their own finances, giving them the opportunity to take smart steps in managing their personal finances and planning for their future. However, in unravelling the full potential and benefits of these innovations, it is important to note that challenges remain and robust collaboration will be required to overcome these obstacles. In the future, synergies between the government, private sector, and financial institutions will become increasingly important to ensure that the positive impact of these innovations can better permeate all walks of life. These comprehensive measures will help to reduce the persistent financial gap and promote broader, sustainable and equitable financial inclusion for all individuals, strengthening the foundations of a more solid and sustainable economy.

5. CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

Digital technology innovations have opened up huge opportunities to improve access to finance for low-income people. Digital banking services, e-payments and alternative funding models have helped overcome traditional barriers, such as geographical distance and administrative costs, that often prevent access to financial services. Digital technologies have also given low-income people the ability to better manage their finances, improve transaction efficiency, and gain access to financial services that were previously hard to reach.

Digital technology innovation in financial access has significant positive implications. It can help reduce financial and economic disparities, as well as promote broader financial inclusion. By providing access to banking services, digital payments, and alternative funding options, low-income communities can have better access to financial resources that support economic growth and improve welfare.

At the same time, it needs to be recognised that there are still some challenges to overcome. For digital technology innovations in access to finance to be truly effective, governments, financial institutions and other stakeholders need to work together on: Firstly, infrastructure: Ensure adequate technology infrastructure across the region to ensure universal accessibility to digital services. Second, digital and financial literacy: Improve digital and financial literacy among low-income communities so that they can make good use of these technologies. Third, security and privacy: Develop and maintain high standards of security and privacy in the use of digital technologies to prevent security risks and data misuse. Lastly, partnerships: Encourage cooperation between the government, private sector, financial institutions, and non-profit organisations to create a comprehensive financial inclusion ecosystem.

While digital technology innovation has great potential, there are some limitations that need to be

considered. Not all low-income communities have access to digital devices or adequate internet connectivity. In addition, inequalities in technology access and literacy may limit the benefits that can be gained by some groups in society. Therefore, further efforts need to be made to ensure that these innovations can be implemented in an inclusive and sustainable manner. In the end, digital technology innovations in financial access have opened a window of opportunity for low-income communities to overcome traditional barriers in accessing financial services. With the right support, these technologies can help advance financial inclusion, strengthen economic resilience, and improve overall well-being.

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