

# Scientometric Analysis on Digital Banking Innovation Model

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This study examines the development of research trends in digital banking innovation-related articles published in reputable journals indexed by Scopus between 1996 and 2022. The analysis focuses on trends in keywords, journals and research paths for 350 publications on digital banking innovation. The results of the systematic review analysis mapping are then reviewed in considerable detail to examine digital banking development strategies that can be utilized by the banking industry in Indonesia. This study constructs bibliometric maps using descriptive statistical approaches and bibliometric analysis with the biblioshiny R program. The study presents nine research paths based on the results of MCA (Multiple Correspondence Analysis) keyword cluster mapping, which can be used as a conceptual structure map. In addition, to negotiate the changing competitive landscape, three strategies were provided in this research: 1) Omni-Channel; 2) Open Bank and 3) Smart Banking. This includes incumbents addressing customer retention, challengers pursuing a low-cost digital experience, niche companies providing banking as a service, and social media platforms developing payment platforms. Banks must be capable of adapting their business innovation model, organizational structure, work culture, and infrastructure in order to perform a digital transformation. Digital channels must be utilized to provide services and innovations within banks. The main thing is how to find the right balance between efforts to optimize opportunities and carry out various digital innovations in an effort to increase market share in the future.

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## INTRODUCTION

Digitalizing the financial sector is among the primary drivers of recent economic expansion (Galazova & Magomaeva, 2019). There is little doubt that financial technology (FinTech) has opened up a brand-new age of digital financial services, transforming businesses and benefiting consumers (Jugurnath et al., 2018). Digital banking emerged as internet usage, and mobile devices increased. Therefore, digitalization is no longer an option but a requirement for the financial business.

Digital banking is a breakthrough in mobile banking technology that enables customers to independently conduct financial transactions, such as balance inquiries, fund transfers, and bill payments, via mobile devices, smartphones, or other gadgets at any time and location they prefer (Alalwan et al., 2017). Digital banking applications can become the principal banking channel in Indonesia if the needs of customers and the danger of fraud in cyberspace transactions are taken into account. The tremendous acceleration of client growth from 2013 to the present reinforces this strategy.

However, some consumers are reluctant or concerned about using digital banking tools. In addition to a lack of experience and security, one of the major obstacles to digital banking in Indonesia is the bandwidth that the banking services require and the network coverage of service providers (Pousttchi & Schurig, 2004). As with any other industry, the banking industry utilizes the internet and mobile applications as one of the most efficient distribution methods for banking products. Consequently, there is a rise in banking rivalry to counteract the rise in client demand (Shaikh & Karjaluo, 2014). As a result, several banks undergo extensive changes/transformations, including digital transformation, to meet customer demands for the best possible service.

Banking digitization is currently a strategic objective for the global banking industry. Modern financial technology is the change agent in the banking industry (Rupeika-Apoga et al., 2018). The digital transformation process comprises the constant introduction of novel technology, resulting in the total digital transformation of the entire economy (Abyazov and Asaul, 2018). Moreover, digital technology enhances interactions between banks, governments, and prospective clients (Rabbani et al., 2020).

Digital technology continues to advance, especially with the more recent quick digital technology

inclusion processes, such as Big Data Analytics, Internet of Things (IoT), Artificial Intelligence (AI), and Machine Learning, as well as numerous other technological advancements, including Robotics. These innovations are associated with the enhancements that digital banking will provide, which can drive switching and comparison, resulting in improved consumer outcomes and product offerings (Omarini, 2018). In addition, digital transformation requires the management of all business activities and banking services to adapt to digitalization (Pirainen, 2016). Therefore, creative advancements are essential for the long-term sustainability of bank efficiency growth.

Indonesia is a nation with enormous potential to benefit from the digitalization boom with its large population of young people. However, Indonesia has a low level of financial inclusion. Bank Indonesia reports that just 49 percent of adults have a bank account. Furthermore, financing for MSMEs is still regarded as being quite constrained. This figure is still well below the median for Asia-Pacific nations (Bank Indonesia, 2021).

Digital change provides both opportunities and challenges. The banking industry is needed to be a solution by providing innovative services through digital channels. In the context of the digitalization of the banking industry, the most crucial consideration is how to strike a balance between efforts to maximize potential and implementing various digital innovations to reduce risks. The author proposes to observe the evolution of literature, correlations, and in-depth subjects on Digital Banking Innovation in light of the previous events.

Innovations in digital banking are anticipated to contribute to expanding the network of business owners to benefit the community and promote sustainable equity and equality (Afou, 2017). The paper aims to examine in detail the development of research on digital banking. The authors provide bibliometric mappings of keyword patterns, journals, and research paths in digital banking innovation-themed papers published between 1996 and 2022. In addition, this study will investigate these data to review development strategies from relevant literature that Indonesian banks can adopt.

## LITERATURE REVIEW

Digital banking emerged in the mid-1970s with the advent of automated teller machines (ATMs). ATMs were a crucial turning point in the development of digital banking (Indriasari et al., 2022). In "Digital Banking Manifesto: The End of Banks," the Massachusetts Institute of Technology categorizes digital banking innovation into three stages (i). The "incrementalists"

represent the first wave of digital banks. In this chapter, the banks' primary conventional banking practices and the steady growth of digital banking, from ATMs in the 1970s to internet banking in 1996, are examined. (ii) Second-wave companies: digital hybrid banks, which serve as intermediaries between conventional banking and digital banking. Third-wave businesses: digital natives - these banks were formed in the digital age. New data and mobile communications systems are used by banks.

The financial sector is a prime example of how digital innovation and data-intensive technologies are triggering industry-wide reforms and significant social impacts. This innovative technology serves as the foundation for digital services including internet banking, mobile payments, crowd-funding, peer-to-peer lending, Robo-Advisory, and online views. AI is utilized to power automated customer service chatbots, to construct efficient systems to spot fraud and money laundering, and to improve automated activities that utilize huge quantities of data (such as risk profiles or credit ratings). Direct consumers and the larger society will experience the effects of this new data-intensive banking technology (Aitken et al., 2021).

In order for banks to remain competitive, they must adapt their strategies and business models to be more customer-centric. Traditional institutions have felt the disruption's effects and are attempting to shift their business strategy from product-centric to customer-centric (Stojkovski & Nenovski, 2021). In a similar vein, Mărăcine (2020) identifies five key areas where FinTech might improve a bank's business model: delivering a specialized platform, addressing ignored consumer niches, expanding client selection, reducing bank operational costs, and optimizing bank business procedures. In addition to improving digital banking capabilities and rising costs, the bank's operational model must be modified.

Digital technology is employed as a new information channel to develop and maintain new connections with partners and to give new interfaces for customers and vendors (Khin & Ho, 2018). Additionally, it will enhance the user experience and create new revenue streams (Svahn et al., 2017). The expanding digitalization of financial services poses a serious threat to the business strategies of conventional banks. Banking and financial services are among the first industries to face the problem since they have been digitalized more than any other sector in the globe (Komulainen & Makkonen, 2018). Today, successful banks require distinctive value standards that make it

impossible for rivals to replicate digital technologies (Ross et al., 2017; Rabie et al., 2016).

The objective of digital transformation is to focus on technology, business models, and procedures to generate new value for consumers, employees, and other organizational components. In most industries, such as running a business, capturing the benefits of digital transformation is crucial. Therefore, planning has become an inescapable necessity for banks in order to identify the main drivers of the organization, provide applicable solutions to reduce confusion, and expand their business.

Digital innovation and its far-reaching, systemic repercussions are frequently referred to as disruption and erode the basis of any industry (Bonnet & Westerman 2021). Banks have given clients with value through a variety of activities, such as financing, investment, and transactions for those with greater financial demands (Dietz et al., 2022). The industry is commonly regarded as one of the information technology (IT) priority for connecting services and clients (Chemingui 2013). Banking service providers have developed unique solutions over time (Nejad, 2016).

Adopting new digital technology disrupts business models due to structural and organizational challenges (Horlacher & Hess, 2016). Digital technology profoundly challenges adaptability and innovation by undermining traditional corporate processes, capacities, and structures (Clarke, 2019). These technologies will revolutionize industries and institutions, eventually spreading to establish new ones. Digital disruption occurs when new digital technologies alter customer experiences, business models, procedures, and how ecosystem actors produce value. These tactical or strategic modifications to business models enable firms to develop new techniques of value addition (Haffke et al., 2016).

Rapid technological advancements are causing the financial services industry and banks to migrate from traditional interpersonal services to digital financial services (Kollmann et al., 2021). Digital technology is altering how banks adapt to new client requests for new products and services due to the rapid expansion of information technology (Lestari & Rahmanto, 2021). Utilizing cutting-edge innovation and technology to propel growth will result in an efficient and competitive banking system (Diener, 2021). The banking business faces disruptive innovation, forcing them to adapt to virtually any digitally-related collaborative process. Digital transformation presents the opportunity for

business model innovation (Sund, 2021). Moreover, the disruptive technology known as blockchain can potentially disrupt the banking sector. As a developing new technology, blockchain permits individuals to record transactions on a decentralized distributed ledger, a cutting-edge system without a centralized governing authority, such as in the banking system (Muralidhara, 2021; Rahman & Dawood, 2019).

Four main areas in which disruptive Artificial Intelligence (AI) technologies can significantly improve bank performance are improved profitability, large-scale personalization, intelligent omnichannel experiences, and rapid innovation cycles (Carson et al., 2021). Modern AI technologies make the ecosystem for financial services more accessible and equitable. These innovations will contribute to delivering new values on a developing service platform to establish a symbiotic relationship between health and wealth that may have substantial consequences for future generations (Lau & Leimer, 2018).

## METHOD

This study utilizes Scopus-indexed academic papers on Digital Banking Innovation from 1996 to 2022. These journals are accessible online in published journals. This study employs a qualitative methodology with descriptive statistics from 350 publications on Digital Banking Innovation. A qualitative research approach is founded on the postpositivism concept, which investigates the state of natural objects (as opposed to experiments), with the researcher serving as the primary instrument. The data collection technique is triangulation, the data analysis is inductive/qualitative, and the results of qualitative research prioritize meaning over generalization (Sugiyono: 2008). The following is a flow diagram in searching for keywords related to digital banking innovation which is the topic of research.

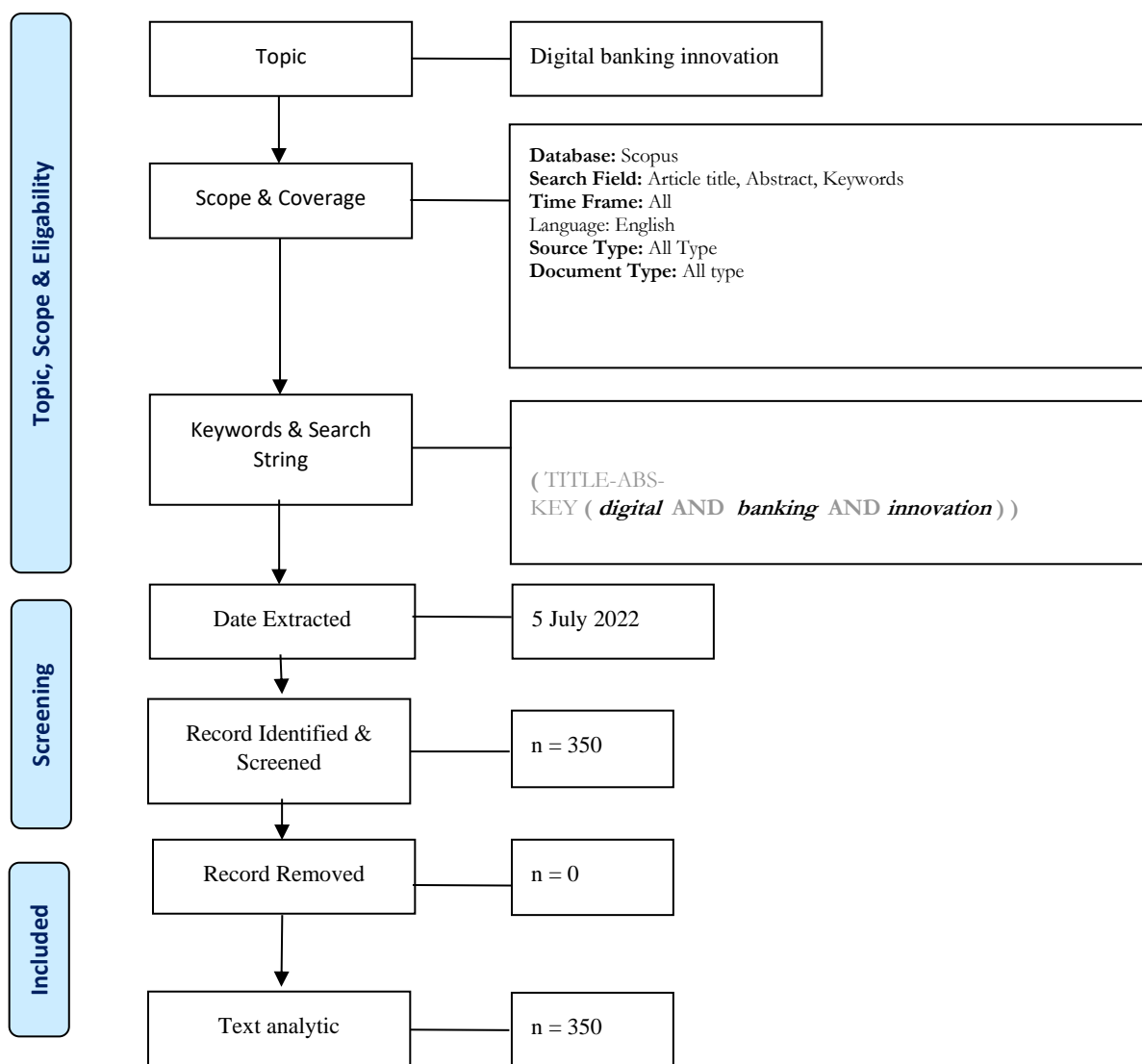


Figure 1. Flowchart in keyword search

The investigation is then followed using bibliometric analysis. In the field of information science, bibliometric studies are investigations that can indicate patterns of document use, the evolution of literature, or information sources within a topic area (Taqi et al., 2021; Srisusilawati et al., 2021; Marlina et al., 2021; Laila et al., 2020). Bibliometrics comprises two sorts of studies: descriptive and evaluative. Descriptive studies analyze authorship patterns by observing author gender, author employment, collaboration frequency, the author's productivity, the author's institution, and the article's subject. By tallying citations to research articles, or other publications, interpretative research examines a literature's prominence (Pattah, 2013).

Descriptive research is qualitative. The analyzed data neither supports nor refutes the theory (if any). Instead, the research findings explain the observed symptoms and are not limited to numbers or coefficients between variables (Subana and Sudrajat: 2005). According to Wijaya (2013), descriptive statistics is a branch of statistical science investigating the strategies for gathering, summarizing, and presenting a summary of study data. As a basis for decision-making, the data must be accurately presented in tables, charts, or graphic presentations (Wijaya: 2013).

This study used a non-probability, purposive sampling technique. The purpose of this sampling method is to comprehend specific facts. This sampling comprises two types of samples. First, decision

sample, the researcher controls sampling units according to defined conditions based on the scope of the study. Second, a quota sample is a sample selected based on a specific limit or classification that describes the dimensions (proportions) of the population (Wijaya: 2013). This study refers to 350 papers on Digital Banking Innovation from 1996 to 2022 as its criterion. This study utilizes Scopus-indexed academic papers on Digital Banking Innovation from 1996 to 2022. These journals are accessible online in published journals. This study employs a qualitative methodology with descriptive statistics from 350 publications on Digital Banking Innovation. A qualitative research approach is founded on the postpositivism concept, which investigates the state of natural objects (as opposed to experiments), with the researcher serving as the primary instrument. The data collection technique is triangulation, the data analysis is inductive/qualitative, and the results of qualitative research prioritize meaning over generalization (Sugiyono: 2008).

## RESULT AND DISCUSSION

### Three Fields Plot

The relationship between the three fields is depicted in gray ribbons, which start at the name of the journal, continue to the author, and finish at the topic of each author's article.

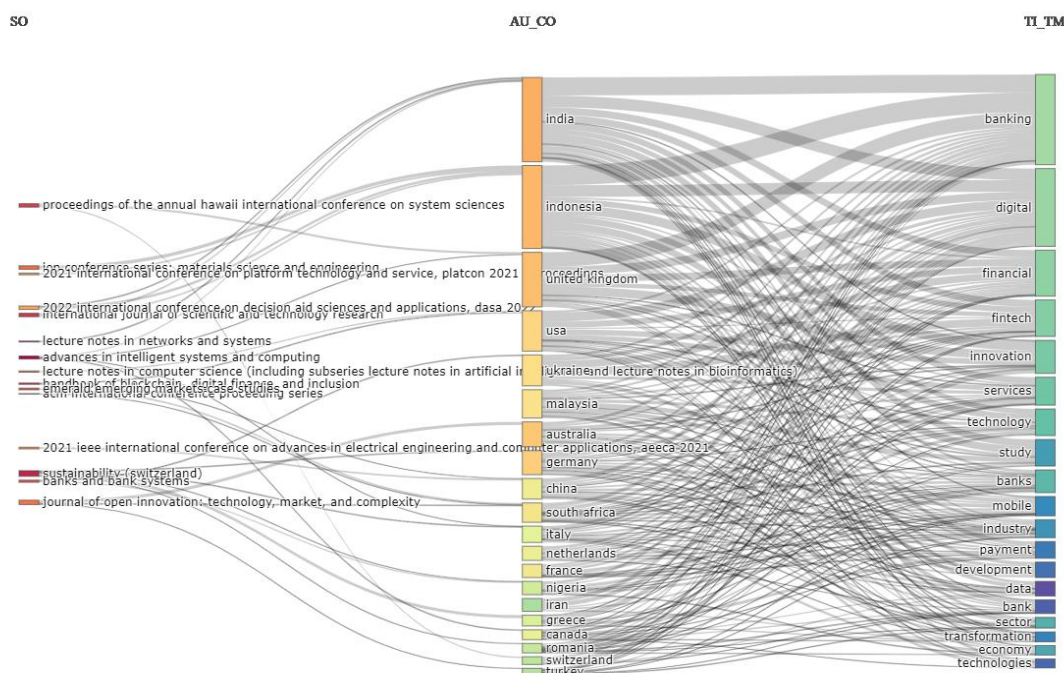


Figure 2 Three Fields Plot

The size of the rectangle of each item shows the number of connected papers. The items on the left are the name of the journals. The plot identified fifteen journals. The journal that published the most papers on this topic is Sustainability, represented by a red rectangle and linked to several countries, including Ukraine, Australia, Italy, and Greece. The center field is comprised of the names of countries. Countries such as India, Indonesia, the United Kingdom, the United States, Ukraine, Australia, South Africa, Italy, Nigeria, Greece, Canada, Romania, and Switzerland, have published articles in reputable journals on the left field. Some authors, however, have no links to Malaysian publications, the Netherlands, France, or Iran. In this plot, the top 19 countries are listed. India, Indonesia, and the United Kingdom have larger rectangles, indicating that these nations have produced more work on digital banking innovation than other countries.

Additionally, each country is linked to the right field, which lists the terms associated with the most prevalent subjects. Finally, each subject is linked to the country that publishes on that subject. There are nineteen keyword themes listed, and "Banking" is the most prevalent, as demonstrated by the size of the green rectangle, which dwarfs the other rectangles. In addition to banking, this plot contains several other standard terms, such as "digital" and "financial." It appears that nearly all registered writers utilize the topic of Banking

in their respective countries, which is consistent with this study's focus on scholarly works on the innovation of digital banking.

### Trend Topics

Additionally, Biblioshiny can analyze document titles to reveal research trends. The image above provides an overview of the evolution of Digital Banking Innovation-related themes over the years. The graph helps explain which topics have been used for a long time and which have been picked up recently. The log axis also indicates the occurrence frequency of each word. The higher the bar, the more frequently the word is used; the further to the right, the more recently it is used. In 2006, the subject of Digital Banking Innovation began to receive attention. Intelligence, financial services, technology, and development are the most recent and popular terms. From 2006 to 2020, the most occurring term is the internet.

In contrast, intelligent financial services is the most occurring term in 2022. Covid-19 and the consequent rise of remote working may explain this trend. In addition, the education sector is becoming increasingly digital, with online learning platforms, libraries, and e-learning systems to facilitate student learning.

### Trend Topics

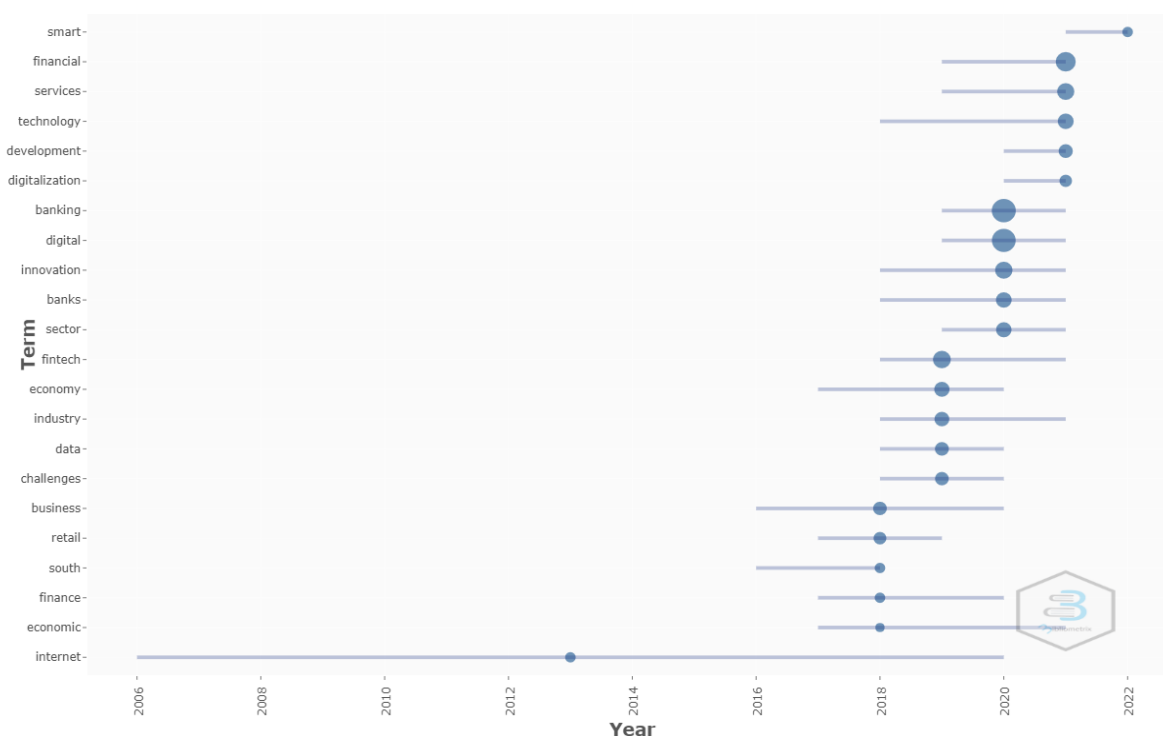


Figure 3. Trend Topics

Similarly, digitalization in business has become more sophisticated with rapidly evolving payment systems. Now, numerous applications are available to assist consumers. Every sector will be digital in the future.

### Thematic Map

Thematic Map illustrates density and centrality, classified into four topological regions. These outcomes result from a semi-automatic system that assessed the titles of all the references in the database and additional relevant keywords (besides author's keywords) to capture more variations.

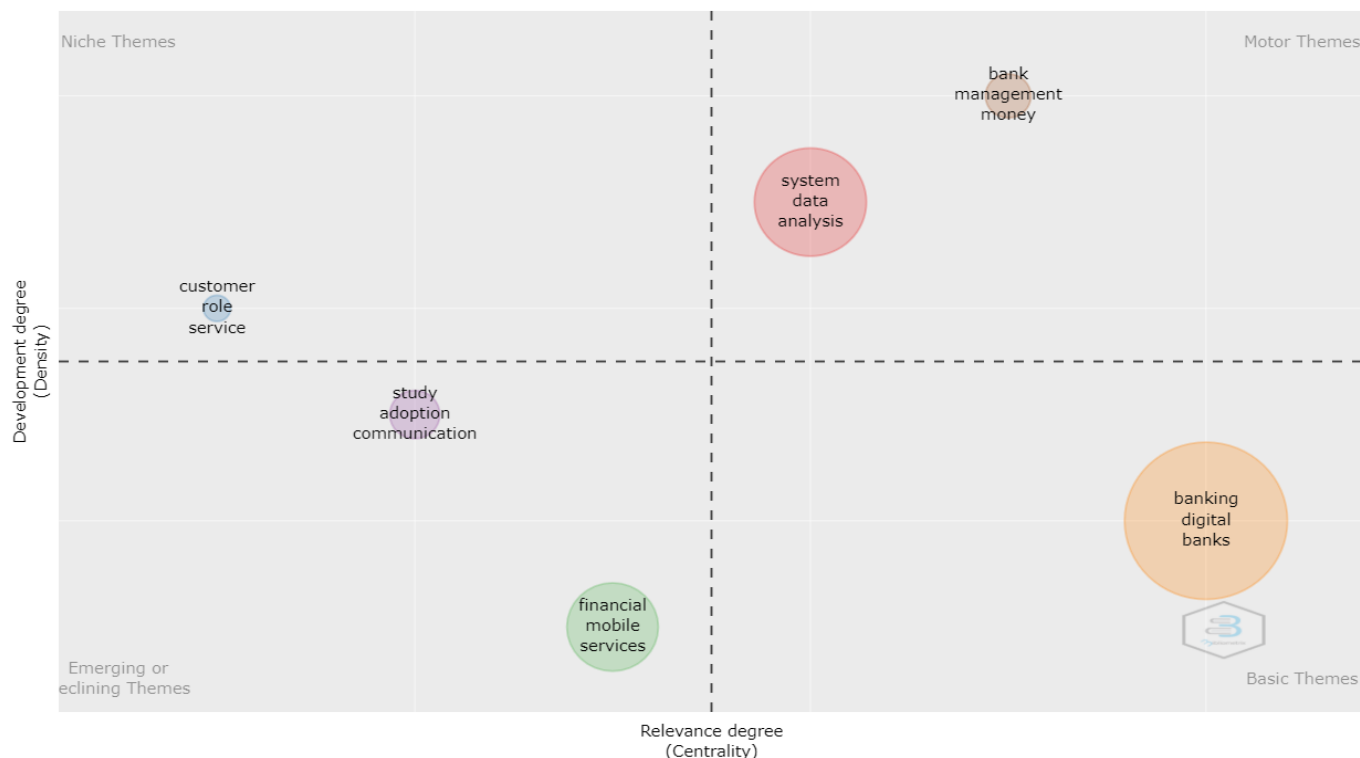


Figure 4. Thematic Map

The upper right quadrant includes the "driving" themes, namely "system, data, analysis" and "bank, management, money." These themes hold a high significance. Hence future studies should expand on these subjects. "Customers, roles, and services" are underreported but undergoing rapid development, as demonstrated by their high density but low centrality in the upper left quadrant. The lower left quadrant includes "study, adoption, communication" and, to a lesser extent, "financial, mobile, service." The lower left quadrant covers themes that have been utilized for a time but are suffering a decline, as shown by low centrality and density. Finally, the lower right quadrant comprises the vital topics, as indicated by their high centrality but low density; this topic is essential for broad inquiry and includes "banking, digital, banks."

### Clustering (Multiple Correspondence Analysis)

By tracing the link between one term and another, the system constructs a visual representation of the contextual structure of each keyword in the subject. Each keyword is positioned according to Dim 1 and Dim 2 values. Dim is a Diminutive particle, a quantitative representation of the degree of similarity between the values of keywords. This map has four sections, each having related words: the red, green, blue, and orange areas. As seen above, the red area has a large quantity and variety of words, showing that many research articles discuss the link between the words identified in this region. This area has the three most frequently occurring keywords, digital banking, innovation, and financial technology.

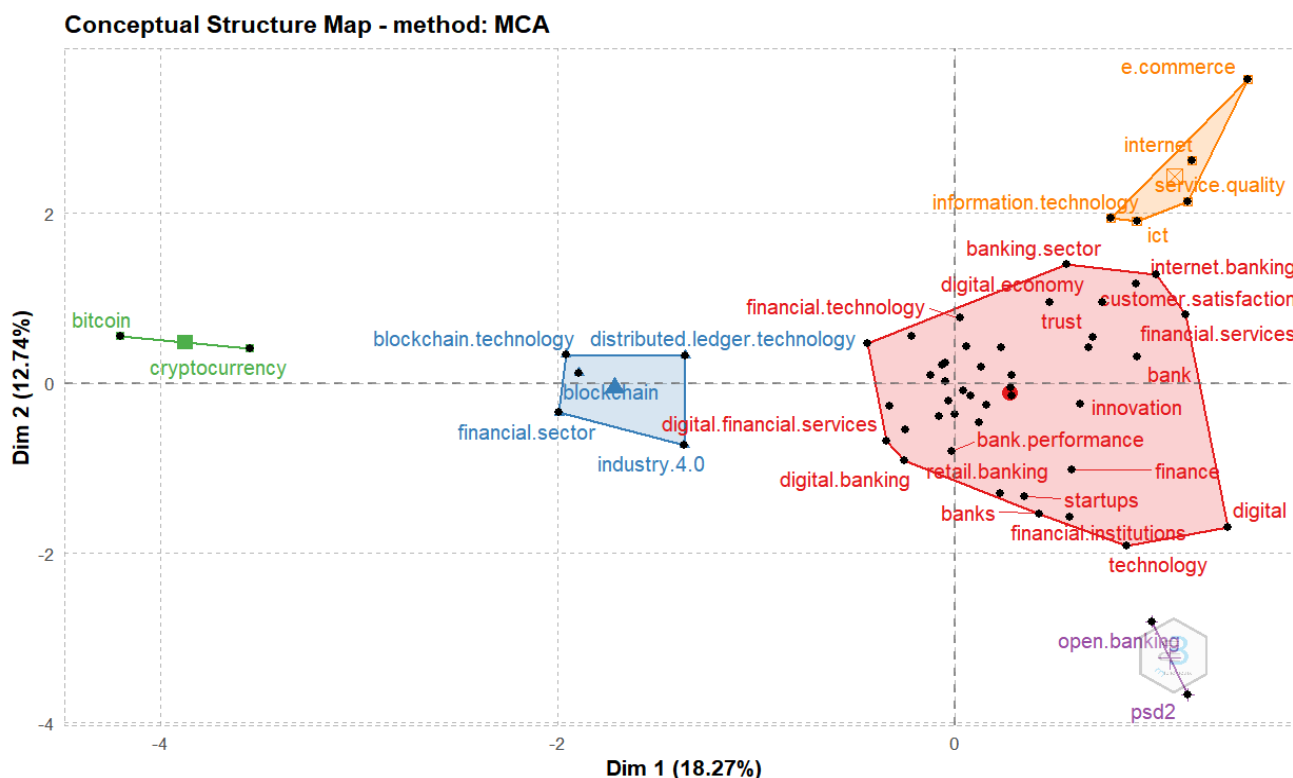


Figure 5. Multiple Correspondence Analysis

Finally, the authors offer nine research paths based on the MCA (Multiple Correspondence Analysis) keyword cluster mapping results. The authors searched the Scopus database utilized in this study for publications containing the keywords identified on the cluster map and screened them based on whether they are directly relevant to this investigation. It is worth noting that each existing cluster is not merely a distinct line of inquiry, as one cluster may not cover a single theme, and keywords from one cluster may already be included in another. Moreover, two keywords inside the same cluster may constitute distinct topics. This evaluation is conducted by analyzing the abstracts of each article containing keywords from the preceding MCA map.

#### *Research path 1: intention to use digital currency*

Roussou et al. (2019) provide a business viewpoint on implementing a digital currency for daily transactions. This study proposes a mixture of the innovation-decision process model and the technology acceptance model (TAM), with the addition of perceived safety constructs, to analyze the determinants of digital currency adoption. The study uses a sample of 254 respondents. Perceived safety and perceived usefulness were significant determinants. Indirectly, compatibility with existing values and practices also influences the use of cryptocurrencies. This research area can be extended

by researching different economies and customer behavior in making digital currency payments via banks.

#### *Research path 2: Open banking and PSD2*

Open Banking and Open API have gained traction and evolved from purely technological sophistication to a commercial necessity. Open Banking is a novel concept in banking competition and customer engagement. The banks must provide clients with superior and more adaptable services. Customers should be able to manage finances more efficiently, make more informed choices, and control their expenses. In the European Union, digital disruption, FinTech, and compliance with rules like the revised Payment Services Directive (PSD2) have expedited competition and compelled banks to open their systems. APIs enable banks to interface with internal systems and key stakeholders in a more streamlined, protected, and standardized method. Several papers examine the effects of open banking on European banking competitiveness (Borgogno & Manganelli, 2021; Premchand & Choudhry, 2019; Svato, 2021). This concept can be implemented in other domains and related to the efficiency and profitability of the banking industry.

#### *Research path 3: customer experience in digital banking*

One subfield of digital banking innovation focuses on customer experience quality. One similarity

amongst research in this field is that they frequently cite service quality as one of the primary determinants of customer experience. Additional studies can enrich this body of research using SEM and the variables described in the studies listed below.

[Mbama et al. \(2018\)](#) investigated managers' attitudes regarding the influence of digital banking on customer experience and bank profitability. They interviewed bank managers in the United Kingdom to get their perspectives on the subject. Service quality, functional quality, perceived value, service customization, service speed, employee-customer engagement, brand trust, perceived usefulness, and perceived risk shape customer experience. These variables impact customer loyalty and financial performance. Additionally, the research finds correlations between these characteristics (e.g., trust and brand loyalty).

According to [Arya et al. \(2019\)](#), the breakthroughs in Indian digital banking led to a subsequent drop in service quality. The study reviews bank reports regarding the issue and reports that the banks cited reasons, including personnel sensitization and technological issues. However, responses from branch employees indicate a different phenomenon. Fierce competition among banks shifts the emphasis from service to customer acquisition to service. The majority of personnel must be in the field during office hours. Therefore only a few are present at the branch to provide customer service. This research investigates applying a critical Service Quality model in digitization to enhance banking service quality.

[Ryu & Ko \(2020\)](#) investigate the relationship between uncertainty and IT quality, which substantially impacts the intention to continue using fintech to promote its adoption. To achieve this, they combined an IT quality-based perspective with a trust-based paradigm to examine the desire to continue using fintech. According to the findings of the Structural Equation Model, system quality is inversely correlated with perceived risk, whereas information quality is positively correlated with trust. Therefore, controlling uncertainty and promoting the sustainable use of fintech depends on service quality above all else. Furthermore, the survey reveals that IT plays a more prominent role in fintech than other digital services.

[Manser Payne et al. \(2021\)](#) conducted a literature review and presented a digital services framework to comprehend the impact of AI services on perceived value, consumer engagement, and organizational performance measurements. The primary findings

suggest that the relationship between consumers, financial institutions, and fintech firms and the use of AI in the service ecosystem should be identified; how value is created among the multiple actors of the SD Logic-AI network should be analyzed, and the effect of consumer-AI interactions (lower and higher levels of engagement) should be investigated.

[Suroso & Wahyudi \(2021\)](#) analyzed the influence of Perceived Ease of Use, Perceived Usefulness, Perceived Risk, Perceived Service Quality, Perceived Functional Quality, Perceived Customer Experience, Brand Image, and Digital Innovation on customer satisfaction and loyalty for digital loans utilizing SEM with a basic TAM model. In their fintech-related study, [Pareek et al. \(2020\)](#) employed a similar methodology.

#### *Research path 4: customer satisfaction*

[Anjali & Suresh \(2019\)](#) identified several characteristics influencing user satisfaction with the BHIM online payment app in India. The study surveyed 130 BHIM users. The report describes how transaction speed, perceived ease of use, security, and customer service influence user satisfaction with the BHIM application. The transaction has the strongest correlation. Future research can recreate experiments similar to this study.

#### *Research path 5: awareness of digital banking services among rural women*

[Shaji & Mathews \(2020\)](#) investigated the use of electronic banking by rural women in Nelamangala, India. This study aims to compare the levels of awareness and customer satisfaction to see whether there is a significant difference between the two. Customers with higher education are more aware than customers with lower education, and younger women are more aware than older women. Therefore, appropriate steps must be implemented to enhance awareness among clients of all ages. However, only a tiny portion of the women had a solid comprehension of various e-banking products, indicating that rural female customers require additional support and direction to adjust to e-banking completely.

#### *Research path 6: the impact of fintech on conventional banks*

The modern breakthroughs in information systems disrupted business operations. Fintech companies' rapid growth in the creation of payment gateway and peer-to-peer (P2P) lending apps is one of the disruptive technologies affecting established

financial institutions. Challenges occur, however, when shifts in customer trends have different effects on established businesses. [Siek & Sutanto \(2019\)](#) provide quantitative methodologies such as statistical hypothesis testing and regression analysis employing convenience random sampling to sharpen the analysis of the influence of fintech on Indonesia's traditional banking business. The authors examine the impact of customer satisfaction, net promotion scores, promotions, and ease of use, the adoption of fintech or banking services. The research findings conclude that banks are indeed disrupted by fintech. Fintech firms embrace a customer-centric mentality and create products that deliver high customer satisfaction. However, the impact is not very strong because customers still prefer the safety of banks.

#### *Research path 7: entrepreneurial orientation*

Entrepreneurial orientation is another innovative research path. The results of the following study diverge from widespread expectations regarding bank digitalization. [Niemand et al. \(2017\)](#) observed 102 banks in Germany, Switzerland, and Liechtenstein. The study reveals that institutions with higher levels of EO report more excellent performance, and EO regulates the link between digitalization and performance. These results demonstrate that bank digitalization level does not affect profitability. Instead, digitalization becomes significant only when backed with innovation, competitive advantage, and risk-taking behavior.

#### *Research path 8: bank performance*

Despite the growing importance of digitalization, little is known about the factors that influence the success of digital banks. Two research on Russian banks attempted to address this lacuna ([Koroleva & Kudryavtseva, 2020](#); [Rutskiy et al., 2022](#)). The former studies the relationship between internal factors and performance is evaluated. They applied a regression model to a dataset containing sixteen digital banks. The performance of digital banks was measured by return on assets. The data indicate that digital banks with higher digital intensity perform better. However, the regression on long-distance banking loans and deposits shows inconclusive results. These findings indicate that the identified internal elements of the digital bank are crucial to its success. The second study develops an econometric model of the relationship between the profitability of bank assets and digitization elements. According to the modeling results, banking infrastructure is insignificant in comparison to measures of digitization, such as the volume of electronic

payments, the number of terminals, and the number of transactions. The authors did not locate any other studies with similar themes in the Scopus database. This void presents a chance for additional research.

#### *Research path 9: advantages/disadvantages and implications of Bitcoin*

This bibliometric analysis utilizes the Scopus database, which has several articles discussing Bitcoin's advantages, disadvantages, possibilities, and comparisons to other digital currencies. These papers analyze several types of literature and give contrasting viewpoints. [Balaskas & Franqueira \(2018\)](#) and [Muralidhara & Usha \(2021\)](#), for instance, present a taxonomic analysis of the Bitcoin Blockchain technology in its current state. In addition to examining the benefits, the two papers address the system's flaws and propose potential fixes. Lastly, one study offers a positive assessment of Bitcoin's ramifications for the financial sector, citing Bitcoin's transaction simplicity as one of its most significant features ([Martincevic et al., 2022](#)).

In contrast, [Zhukov et al. \(2019\)](#) give a more pessimistic and critical view of Bitcoin's anonymity, emphasizing that digital currency is merely another wealth concentration. [Bhat & Vijayal \(2017\)](#) compare Bitcoin and Ethereum, two digital currencies that utilize Blockchain technology and seek to explain the distinctions between them. In contrast, [Ally et al. \(2015\)](#) examines the effects of Bitcoin on the Australian economic and regulatory system, focusing on the tax implications for Bitcoin users.

One research examines the ramifications of adopting a digital currency issued by a central bank as the primary currency ([Belke & Beretta, 2020](#)). State money (legal cash) and digital currencies coexisting can have a disciplining influence on the central bank. However, there are still significant hazards connected with introducing central bank digital currencies, which should not be viewed as a perfect replacement for cash. Meanwhile, the disadvantages of digital currencies produced by central banks may not exceed the benefits. However, the essay focuses more on expanding the role of the central bank, even proposing the removal of cash in favor of adopting the central bank's digital currency. This suggestion contradicts the core aim of Bitcoin, which is decentralization ([Balaskas & Franqueira, 2018](#)). However, the authors could not locate any research that directly supports Bitcoin's decentralization purpose, which can become a research gap.

Bitcoin is still a novel and abstract notion to most people, including academics. Extant literature is still

attempting to comprehend the concept of Bitcoin and its ramifications for global banking. Therefore, this literature requires more debate about Bitcoin and Blockchain regarding security and privacy, as well as a clear and appropriate connection to a country's economy. In addition, this literature demands contributions from other schools of thought to deepen the discussion, particularly with the issue of Bitcoin's impact on the centralization/decentralization of money.

## Findings and Discussions

Digital Innovation in Banking is deserving of further research. As discussed in the research background, previous studies have highlighted the growing importance of the subject. Based on the study's findings, we analyze the subject from the viewpoints of prominent authors. Sustainable business model innovation in the banking industry catalyzes sustainable system change across industries and organizations (Yip & Bocken, 2018). For instance, big data analytics enables innovation in banking services (Lehrer et al., 2018). Banking has become the focus of technology-based banking services, which generates new client requirements. While some banks' innovation processes are sluggish, fintech uses digital technology to deliver customer-centric solutions (Benedict J. Drasch et al., 2018).

As the financial services sector evolves, the potential outcomes of disruptive innovation for consumers, governance, compliance, and reputational gains are gaining significance (Anagnostopoulos, 2018). The system of non-cash transactions is constantly expanding. With the expansion of the worldwide market and the development of financial technology, an increasing number of individuals are shifting from a cash system to a cashless one (Kandpal, 2019). It is

fascinating to comprehend how digital technologies and the vast sociotechnical systems embodied in these new peer platforms can expand in response to market and societal forces (Avital et al., 2014). The strategy in an effort to achieve the goals of digital banking will be described in the model concept map in figure 6.

## Omni-Channel

Omni-Channel is closely related to efforts to provide the best facilities to consumers, in this case customers, by providing qualified architecture and infrastructure. The banking industry in Indonesia can synergize with fintech to maintain its agility, on the other hand fintech can leverage bank customer data to strengthen the quality of its services to consumers.

## Open Banking

Open Banking aims to build a digital transformation interlink between banking and fintech. This connection will be achieved if each party, namely banks and fintech, is willing to open their customer data through the use of API (Application Programming Interface) technology. By building a banking system that is integrated with technology to provide services, the Bank will have a considerable advantage over other banking systems. The goal of digital banks is to become the foundation of a much larger financial ecosystem (Litvishko et al., 2020). These businesses will be greatly expanded to meet the financial demands of their clients by gaining access to a wider financial system through digital banks (Jana et al., 2021). At the same time, the Bank will benefit from receiving more information about the wishes and behavior of its clients, thereby closing the feedback loop. Thus, this becomes very crucial, especially for Islamic banks to be able to continue to adapt to the new digital ecosystem.

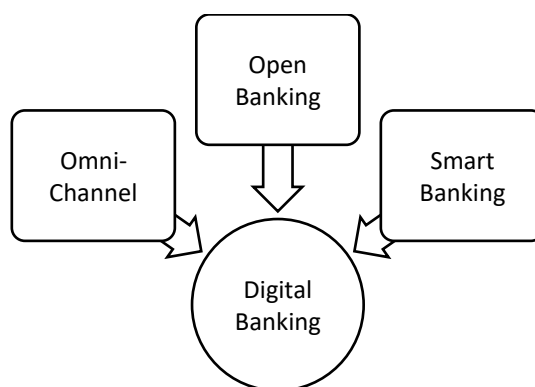


Figure 6. Concept Map of Digital Banking Development Strategy Model

**Smart Banking**

Data is the most valuable asset for financial organizations in today's technology-driven environment. Fintech has made banking much easier for users (Litvishko et al., 2020). By introducing big data, it has changed the financial environment and solved complex financial problems. If data analysis is applied effectively,

the data can be used to develop, and improve the banking sector, thereby making a greater contribution to the country's growth. Every completed transaction, call made, question asked, shopping made, every time an ATM card is used, application used, and so on all add up to an enormous amount of data, which has the potential to open up more avenues for the bank and opportunities for economic growth.

Table 1. Digital Banking Development Strategy Model

Development Strategy	Alternative Strategy
<p><b>Omni-Channel</b></p> <p>Banks have Branchless Banking services</p> <p>The bank has a digital account opening service application</p> <p>Core Banking System switch to Open system</p> <p>Application development is done in-house</p>	<p>Establish business and operational policies in branches in dealing with digital customers</p> <p>Marketing banking products by utilizing digital marketing models through popular media (social media) such as Instagram, Youtube and Tiktok.</p> <p>Make policy adjustments and application development to agile development</p> <p>Conducting FGD with existing customers to innovate financial products</p>
<p><b>Open Bank</b></p> <p>The bank is already connected real-time online</p> <p>Banks have Fintech/Startup incubation</p>	<p>Collaborating with fintech or startup in product development, marketing, and technology utilization</p> <p>Collaborating on product sales on a host to host bank basis with fintech/startup who are members of the bank incubation program</p>
<p><b>Smart Banking</b></p> <p>The Bank has a strategy for using the Big Data platform</p> <p>IT Bank has a chatbot facility to serve customers</p>	<p>Implementation of Big Data platform to build engagement with customers</p> <p>Building a digital HR system, not limited to training, remuneration and retention for old employees</p>

Diversification, the incorporation of technical improvements, and customer data are essential for creating value and can be amplified by network effects and hyperconnectivity (Lee & Lim, 2018). This requires a significant pattern of organizational restructuring, as well as sufficient resources to support it. In the end, the true winners are those who are able to overcome those challenges with the right strategies, plans, and change management. The players in the banking industry must pay close attention to this atmosphere. Appropriate policies and strategies are the determining factors for the success of the banking industry in responding to the challenges of an ever-evolving era.

The banking industry in Indonesia has made significant efforts to supply their complicated digital

channel products in an environment where simplicity is required to engage an increasing number of impatient online shoppers. Indonesian consumers have always benefited from the availability of convenient web and mobile banking options, while at the same time misrepresenting these services as complimentary additions to their checking account. The number of consumers who prefer searching online for banking products and services continues to rise, despite the fact that the majority of them still visit bank offices to execute their transactions. Significant effort is required to acquire and retain online clients, with the success of this effort having an increasing impact on the growth of overall sales.

Indonesia and the rest of the world are embracing this digital revolution by creating new opportunities for all parties involved in the Digital Banking System and their customers. In this context, the government has made a commitment to support and promote digital initiatives as a potent weapon for modernizing governance, enhancing the knowledge and openness of our society, fostering economic growth, and empowering individuals.

## CONCLUSION

This study aims to identify, from 350 Scopus-indexed journals published between 1996 and 2022, the research development map for the topic of Digital Banking Innovation. The keywords banking, digital, financial, fintech, and innovation are the most relevant to digital banking innovation. Several prominent subjects and keywords are employed in this theme, and they have the potential to be explored further, particularly in specialized fields of the banking business, which is facing challenges in the digital age. In addition, academics working on themes relevant to the growth of Digital Banking Innovation can utilize several of the most productive publications as references. Therefore, it is vital to encourage scholars, particularly in Indonesia, to contribute to studying the digital banking industry.

Ultimately, digital transformation generates both opportunities and challenges. The banking industry must provide services and innovations through digital channels to be a solution. Finding the optimal balance between attempts to maximize benefits and implementation of various digital technologies to avoid risks is crucial, particularly in banking digitization.

Based on the mapping results, the authors determined that there are at least nine research lines related to the topic of digital banking innovation, namely: 1) interest in using digital currency; 2) open banking (Open banking) and PSD2; 3) customer experience in digital banking; 4) satisfaction customers; 5) awareness of digital banking services among rural women; 6) the impact of fintech on conventional banks; 7) entrepreneurial orientation; 8) bank performance; and 9) the disadvantages of digital banking innovation.

To negotiate the changing competitive landscape, three strategies were provided, namely: 1) Omni-Channel; 2) Open Bank and 3) Smart Banking. This includes incumbents addressing customer retention, challengers pursuing a low-cost digital experience, niche companies providing banking as a service, and social media platforms developing payment platforms. In addition, the significance of the Digital Bank revolution

and how it facilitates banking as a service were discussed. This study concludes that the banking industry must continue to create product innovations and digitize services as a form of brand building that satisfies the needs of digital customers. In this case, regulators play a role in ensuring the power of law by providing policies that oversee the successful implementation of digital banking innovations to increase financial contributions to the Indonesian economy.

This study makes a substantial contribution to the existing body of knowledge, albeit with notable shortcomings that can be addressed in future research. This research focuses on the trend of literature creation related to digital banking innovation in the banking industry and how these banks modify their approach, although additional research is needed on several alternate viewpoints. For instance, more researchers can perform studies focusing on customer experience so that bankers can gain a customer's perspective. With the Digital Bank Innovation methodology, bankers can finally alter client expectations.

In addition, it is predicted that scholars would be able to conduct research on this subject utilizing newer and better data and more in-depth and exhaustive explanations using more sophisticated methods and approaches.

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