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A Comparative Study of Green Banking Implementation between Indonesia Banks and Singapore Banks

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ABSTRAK

Kerusakan lingkungan alam telah menjadi isu global yang signifikan, Green Banking adalah program dimana lembaga keuangan memprioritaskan kepedulian terhadap lingkungan dalam operasi dan kegiatan bisnis mereka. Penelitian ini bertujuan untuk menguji dan membandingkan kemajuan bank-bank di Indonesia dan bank-bank di Singapura dalam mengimplementasikan green banking. Penelitian ini menggunakan laporan tahunan ROE, catatan perbankan digital, dan proyek-proyek hijau yang diikuti oleh bank-bank dari tahun 2019 hingga 2023. Hasil analisis menunjukkan bahwa Indonesia dan Singapura mengalami kerugian pada tahun 2019, tetapi kemudian berhasil memperbaiki posisi ekuitas mereka pada tahun 2020 dan terus berlanjut hingga tahun 2023. Sebuah pernyataan dari laporan tahunan bank-bank tersebut mengindikasikan bahwa perbankan digital berperan dalam mempertahankan ekuitas bank sepanjang tahun, menunjukkan keberhasilan implementasi perbankan digital di Indonesia dan Singapura. Sementara investasi dan pinjaman ramah lingkungan di Indonesia memprioritaskan dukungan terhadap usaha-usaha kecil yang ramah lingkungan, pendekatan Singapura adalah membantu perusahaan-perusahaan besar yang ingin mengadopsi praktik-praktik ramah lingkungan. Penelitian ini mengungkapkan bahwa Indonesia dan Singapura telah berhasil menerapkan perbankan hijau, dan masing-masing negara telah mengembangkan pendekatannya sendiri untuk implementasi ini.

Kata Kunci: perbankan hijau, singapura, investasi hijau, perbankan digital indonesia, ROE

ABSTRACT

The deterioration of the natural environment has become a significant global issue, Green Banking is a program where financial institutions prioritize environmental concerns within their operations and business activities. This research aims to examine and compare the progress of Indonesian banks and Singaporean banks in implementing green banking. This research employed ROE annual report, digital banking record, and green projects that banks participated in from 2019 to 2023. The analysis revealed that Indonesia and Singapore experienced a loss in 2019, but subsequently recovered their equity footing in 2020 and continued to do so through 2023. A statement from the banks' annual report indicated that digital banking played a role in maintaining banks' equity throughout the year, demonstrating the successful implementation of digital banking in both Indonesia and Singapore. While Indonesia's green investment and loans prioritize supporting small green businesses, Singapore's approach is to assist larger enterprises that aim to adopt environmentally friendly practices. This research has revealed that both Indonesia and Singapore have successfully implemented green banking, and each country has developed its own approach to this implementation.

Keywords: green banking, singapore, green investment, digital banking indonesia, ROE



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INTRODUCTION

The issue of environmental degradation has emerged as a significant global concern, particularly in the context of climate change, pollution, and resource depletion. These environmental challenges, if left unaddressed, have the potential to precipitate a range of natural disasters. Air pollution is a pervasive issue in urban areas, with motor vehicle fuel emissions representing a significant contributor. The prevalence of private vehicles, which are often powered by toxic fuel, has further exacerbated the problem. Furthermore, there are numerous instances where factories have exploited excessive resources and materials (Nguyen et al. 2023)

In response to this issue, governments have enacted policies aimed at preventing and reducing the risk of climate change and environmental hazards. These policies encompass a range of initiatives, from community-level socialization programs designed to educate and engage residents in environmental stewardship to comprehensive national strategies for mitigating and adapting to environmental change. Further examples of the policies that the government has established include support for renewable energy consumption, forest conservation policy, and other innovative programs (Rahman, 2023)

In addition to their contributions to the prevention of climate change and environmental degradation, bank departments are also engaged in the implementation of green banking policies. These policies include the transition to online transactions and the reduction of paper document usage, as well as the provision of loans for renewable energy programs such as residential solar power systems and the reduction of solar power usage. Green banking represents a novel environmentally conscious practice that encourages investment in environmentally beneficial activities. One such initiative is the installation of green décor within the bank premises, as well as the implementation of paperless communication and transactions. These are but a few of the ways in which a bank can operationalize green banking within its daily operations.

The implementation of paperless communication and transactions has become one of the most prevalent green banking products in numerous banks, with a high level of customer awareness and engagement in Indonesia. This product was first introduced in 2011 by BCA Bank, which released its mobile banking app and gained significant popularity during the initial stages of the Covid-19 pandemic, when online transactions became a prominent mode of communication between customers and sellers. Green banking represents one of the avenues through which banks and other financial institutions can contribute to the reduction of environmental damage.

In Indonesia, the government has initiated a series of measures with the objective of implementing a green economy and sustainable development. These include the preparation of a series of strategies for the use of new and renewable energy (EBT), as well as the issuance of green bonds with environmentally friendly projects in the financial industry. The Indonesian Financial Services Authority (OJK) has indicated that eight banks in the country have pledged to implement green banking practices in their operations. Some of the aforementioned banks are Bank Mandiri, Bank Rakyat Indonesia, Bank Central Asia, Bank Negara Indonesia, Bank Muamalat, and BRI Syariah.

The financial performance of the banking industry on a global scale, including that of Nigeria, is influenced by a multitude of factors, including economic instability and financial crises. A number of variables have been employed in different countries to improve the financial performance of deposit money banks. However, only a few have adopted green banking practices. A study by Masukujiman (2015) examined the effect of green banking practices on the financial performance (return on assets) of quoted

deposit money banks in Nigeria. The findings indicated that green banking practices exert a significant influence on return on assets. Consequently, it can be concluded that green banking practices have enhanced the financial performance of quoted deposit money banks in Nigeria.

Another research by Ria and Fasa (2018) aims to analyze the progress of green banking implementation at Bank Muamalat. The intensifying competition within the business sector has led to a growing disregard for the natural environment, this has led to a growing awareness among corporate entities of the need to become more involved in activities that can have a positive impact on both the social and natural environment. The banking industry is also required to play a role in the suppression of environmental damage, it is considered necessary for the banking industry to adapt to the environment in a way that is interdependent, which is known as Green Banking. Bank Muamalat was selected as the subject of this research. This study shows that to support the green banking movement Bank Muamalat has; prioritize finance distribution to corporate customers engaged in the palm oil sector, environmentally friendly organizations, and organizations that implement the concept of sustainability, has carry out green offices or green buildings movements by utilizing and managing energy efficiency, use of water, management and reduction of waste, and efficient use of paper (paperless), to minimize the risk of global warming.

It is regrettable that the implementation of green banking in some banks has been found to be inadequate, with only a few bank branches having implemented green banking in their operational procedures. Indeed, numerous research findings indicate that green banking can exert a considerable influence on bank income. There are numerous reasons why banks were still inclined to propose green banking in their operations. These include the perception that green banking requires high costs, the concern that it is burdensome for banks to try new and different things, and the belief that there is a lack of demand for green banking products. The implementation of green banking is still underway, albeit at a relatively slow pace.

To help in the assessment of green banking development in Indonesia, this research plans to use sample data from Singapore banks whom has implement green banking in their daily operation as a pinpoint. Known as the pioneer of green finance in east asia Singapore has implement green banking to most their banks and financial departments. Green finance, or the issuance of green bonds, has gained considerable momentum in Singapore. A study by Youngho (2019) reviews the current state of green finance in Singapore and identifies existing barriers to its further development. Singapore, a well-established financial hub in Asia, has set its sights on becoming a hub for green finance in Asia. The Monetary Authority of Singapore (MAS), the central bank of Singapore, has established a network with seven other central banks around the globe, collectively known as the Central Banks and Supervisors Network for Greening the Financial System. This network's objective is to facilitate the sharing of experiences and best practices in green finance with other countries. In addition to establishing the network, the MAS has established a Green Bond Grant scheme with the objective of promoting and ensuring the issuance of green bonds in Singapore. The MAS has facilitated numerous financial institutions in Singapore to prioritize green finance funding and green banking implementation.

This research endeavors to ascertain the advancement of green banking implementation in Indonesian banks by utilizing the Singaporean banking sector as a benchmark. This approach aims to inform the progress of green banking implementation in Indonesia. What role have Indonesian banks played in the advancement of the green economy? What is the current position of Indonesia in the

field of green banking in Southeast Asia? What is the perception of the bank customer regarding green banking, and how is the progress being made thus far?.

METHODS

This research will employ a qualitative study design. This study will also use a comparative method to compare the implementation of green banking between Indonesia banks and Singapore banks and to help determine how updated the Indonesia banks and Singapore banks is in green economy. This research will use documentations for data collection obtained from the financial report of the banks in Indonesia and Singapore from 2019 - 2023. This study will also employ a purposive sampling method to choose namely two Indonesia banks and two Singapore banks.

The criteria used to select the samples used for this research were; (1) Owns mobile banking product and have been running it for 5 years or more, (2) Has provides green bond product for 5 years or more, (3) Bank has implemented green economy project in their daily operation such as paperless transaction, contactless interaction with customers, and greening attempt inside banks. With these criteria's, two banks from Indonesia and two banks from Singapore will be used as the sample, namely Bank Central Asia (BCA) and Bank Rakyat Indonesia (BRI) from Indonesia and The Development of Bank of Singapore (DBS) and Oversea-Chinese Banking Corporation (OCBC) from Singapore.

This research project employed data provided by the Indonesian Financial Services Authority (OJK). To ascertain the advancement of BCA Bank and BRI Bank in adopting a green financial approach, this research will utilise the financial statements published on their respective websites for the period between December 2019 and December 2023. The data provided by the Monetary Authority of Singapore (MAS) will be used to examine Singapore's banking statistics between 2019 and 2023. In order to ascertain the extent of progress made by DBS Bank and OCBC Bank in the implementation of green finance and banking, this research will use the financial statements published on their respective websites. This research will examine the following financial data from the banks' annual reports and sustainability reports for the period between 2019 and 2023, namely ROE, number of Registered digital banking account, number of Recorded digital transactions, and Recorded green bonds and green project that the bank participated.

In this study, qualitative comparative analysis (QCA) will be employed to facilitate the examination and evaluation of the disparate conditions. This analysis will provide insight of the performance of the banks over the course of the year. The records of registered digital accounts and digital transactions from 2019 to 2023 will be subjected to be analysed in order to ascertain the extent of progress made in the field of digital banking.

RESULTS AND DISCUSSION

Figure 1 exhibits that BCA bank, BRI bank, DBS bank and OCBC bank has all suffered a slight decline in 2020 then regained their footing in 2021 and has been increasing since then. The return on equity (ROE), which primarily reflects a bank's profitability, can assist in evaluating green banking by examining the impact of green banking on overall profitability and shareholder value.

From 2019 to 2020, BCA experienced a 0.02% decline in equity. However, from 2021 to 2023, there was a notable recovery, with an increase of 0.018% each year. Similarly, BRI also experienced a decline in equity from 2019 to 2020, with a loss of 0.08%. However, there was a subsequent recovery in 2021, with an increase of 0.05%. From 2022 to 2023, BRI experienced a greater increase in profit than BCA, with an

equity growth of 0.02%. In 2020, DBS observed a decline in equity of 0.02%. However, from 2021 to 2023, there was a consistent increase in equity, ranging from 2% to 3%. At the 2020 level, OCBC experienced a decline of 3%. However, from 2021 to 2023, there was a recovery in equity, with an increase of 2%.

In Indonesia, banks witnessed a significant recovery in their equity from 2021 to 2023, primarily driven by the digital banking sectors. This research posits that, in the year following the onset of mass self-isolation, a considerable number of bank customers opted to register for digital accounts, a trend that persisted until 2023. Singapore also experienced a decline at the onset of the pandemic. However, Singapore's decline in equity was relatively minor due to the country's early adoption of digital banking. DBS Bank commenced operations of its digital bank in 2017, demonstrating Singapore's readiness to embrace digital financial services. Banks in Singapore have largely transitioned to digital operations, a shift that has proven effective for both customers and the banking sector

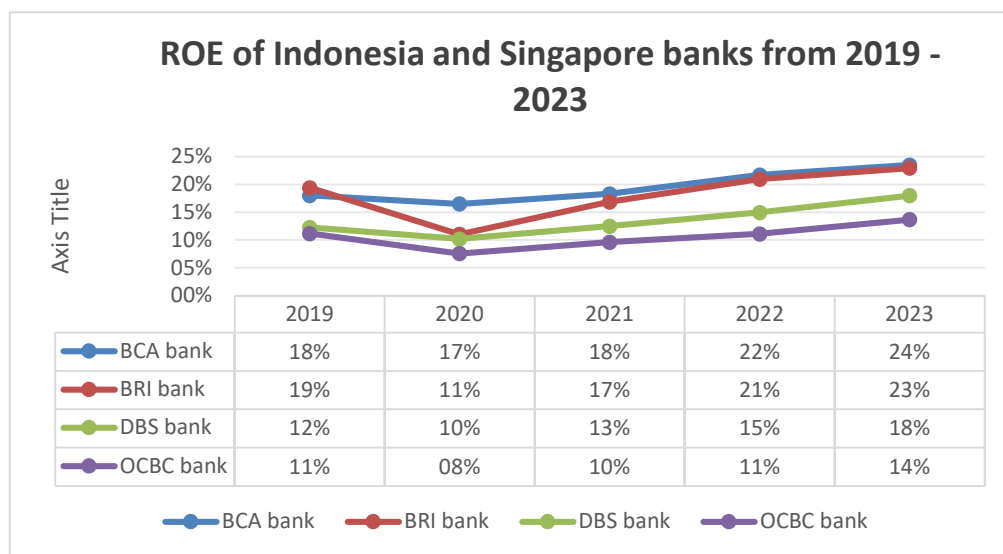


Figure 1. Banks ROE analysis comparative between Indonesia banks and Singapore banks 2019 - 2023

Figure 1 shows that the ROE of Singapore banks has consistently been lower than that of Indonesian banks. However, both have exhibited a similar upward trajectory following the decline in 2021. There is a paucity of literature on the specific factors contributing to Singapore's relatively lower ROE. One hypothesis, postulated by this paper's researcher, is that Singapore's population, which is smaller than Indonesia's, may have resulted in a diminished demand for loans and other financial products in Singapore. Although Indonesia was relatively tardy in introducing digital banking products, the country's banking institutions were nevertheless able to successfully introduce these products to both new and existing customers. The digital banking products were able to help maintain the banks' equity and subsequently gained popularity.

In 2020, a significant number of customers opted to terminate their traditional banking services, citing concerns about the potential **impact of the global pandemic on the financial sector**. Many customers who sought to borrow credit or save with traditional banks were deterred by the perceived risk of recession. Consequently, a notable decline in transactions was observed, including savings and borrowing. It is encouraging to note that both BCA and BRI have developed their own digital banking

platform. This has prompted a shift among bank customers towards digital banking for transactions and easy access to their savings, without the necessity of visiting the bank in person. As of the present date, BCA mobile and BRIImo have become two of the most popular digital banking platforms in Indonesia.

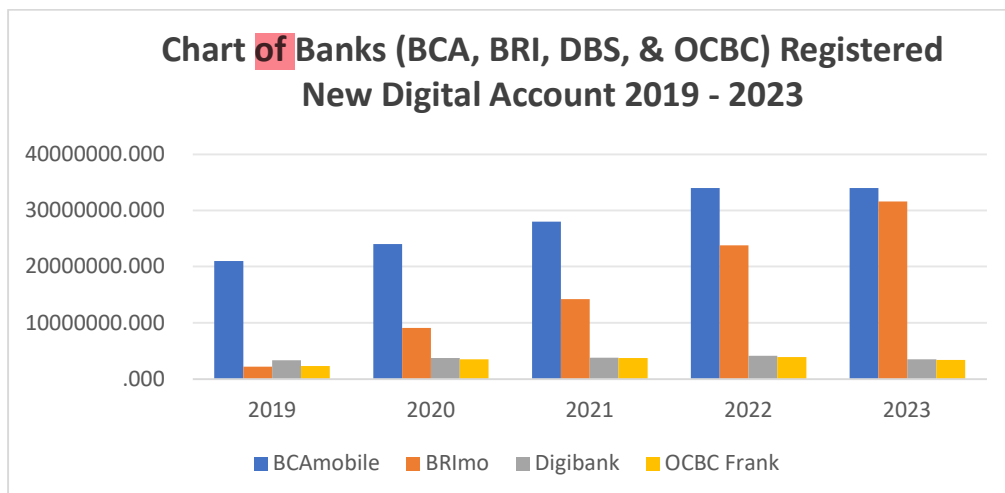


Figure 2. Banks Digital Account Progress

In Singapore, DBS is launching Digibank, which will be the first digital banking platform in Singapore. This will be followed by the launch of digital banking platforms by OCBC and UOB. The advent of digital banking in Singapore in 2010 coincided with a surge in popularity among younger generations, who were drawn to its convenient, one-button access. Over time, digital banking has become the dominant paradigm for banking in Singapore. When the global outbreak of the novel coronavirus began, Singapore also encountered economic challenges, similar to those experienced by Indonesia, due to an economic downturn. Nonetheless, Singapore's banking sector demonstrated remarkable resilience in the wake of the global financial crisis. This was due in part to the sector's inherent adaptability and the robust regulatory support provided by the Monetary Authority of Singapore (MAS) in the digital banking domain.

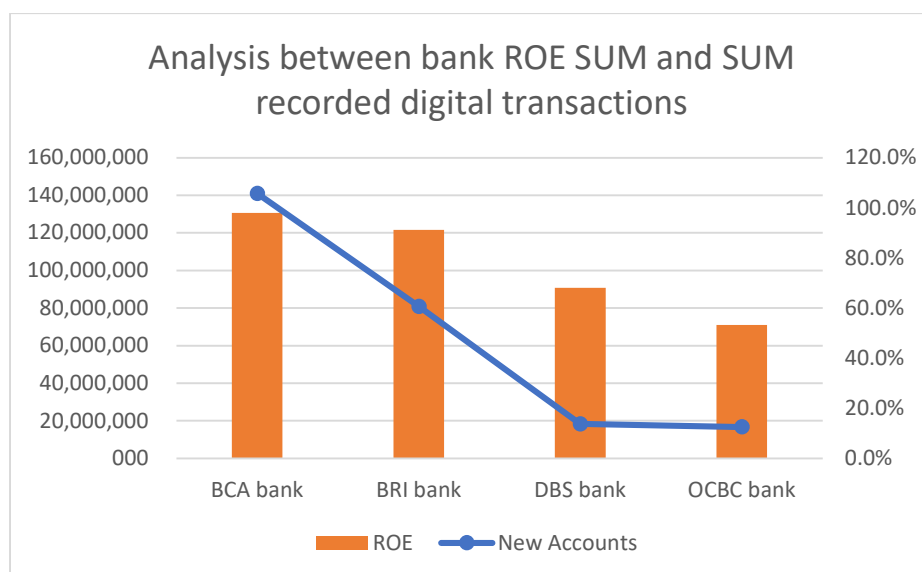


Figure 3. Analysis between bank ROE SUM and SUM registered new digital accounts

The data illustrated in the chart indicates a consistent upward trajectory in the adoption of digital banking services across the entire banking sector. Both BCAmobile

and OCBC Bank have experienced a notable influx of new customers registering for digital accounts (Figure 2). This analysis found that during the period spanning early 2019 to 2023, digital banking emerged as a popular banking product. In Indonesia, the rate of increase in digital banking was particularly pronounced, with a considerable number of customers registering for digital banking.

However, despite the charts indicating no progress in Singaporean banks' customers registering for digital banking (Figure 3), the data elucidates the number of new customers who opted to register each year. Consequently, the analysis concluded that Singapore's early initiation of digital banking, preceding 2019, resulted in a negligible growth in registered new digital banking account. Analysis also revealed that In comparison to Singaporean banks, Indonesian banks have experienced a notable increase in return on equity (ROE) due to the influx of new customers to digital banks. Conversely, Singaporean banks have not witnessed a significant growth in ROE, despite an influx of new customers.

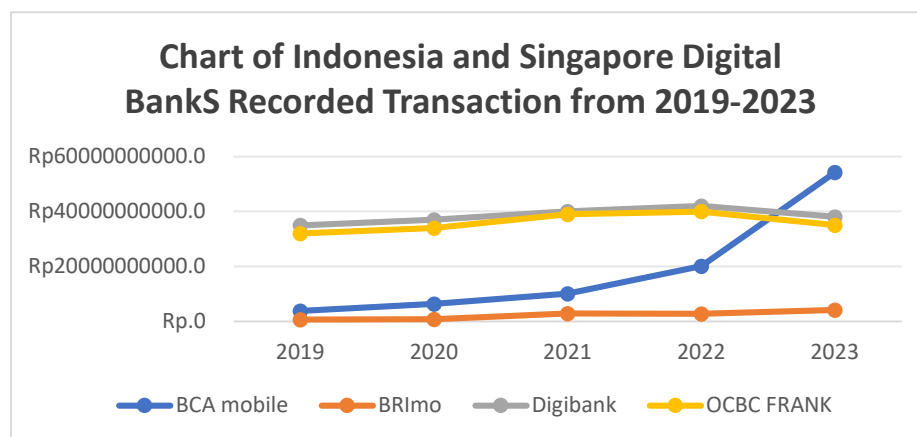


Figure 4. Numbers of Digital banking transactions of BCA, BRI, DBS, and OCBC banks

The data presented in this study is derived from the digital transactions reported in each bank's annual report for the period between 2019 and 2023. Notwithstanding the challenges posed by the global pandemic, the number of digital transactions conducted by BCA mobile and BRIimo increased in 2020 as shown at Figure 4. The advent of the pandemic prompted a shift towards digital banking, with individuals utilizing online platforms to conduct financial transactions. This trend continued in 2022 and 2023, with digital banking becoming the preferred mode of transaction for many individuals, thereby superseding the necessity to visit physical banking locations. A study by Mufarih examined the factors influencing customers' use of digital banking in Yogyakarta. The findings indicate that ease of use, social image, and perceived trust are key determinants of customers' decisions to use digital banking. The increasing popularity of digital banking, coupled with its perceived ease of use and positive social image, has prompted many bank customers in Yogyakarta to shift to digital banking. Moreover, the absence of any reported incidents or breaches has reinforced customers' trust in the security of digital banking.

Furthermore, both Digibank and OCBC FRANK have exhibited a modest uptick. Singapore was the inaugural nation to implement digital banking, preceding the global pandemic. The digital bank in Singapore has observed a modest increase in transactions, with a consistent volume maintained. A journal by Barquin, which examined the factors influencing the shift towards digital banking in Asia, revealed that younger individuals are the primary adopters of digital banking. The ease of use and effectiveness of digital banking have contributed to this trend, as customers find it more

convenient to connect with their banks via smartphones. This has led to an increase in the frequency of interactions and transactions conducted by customers with their banks.

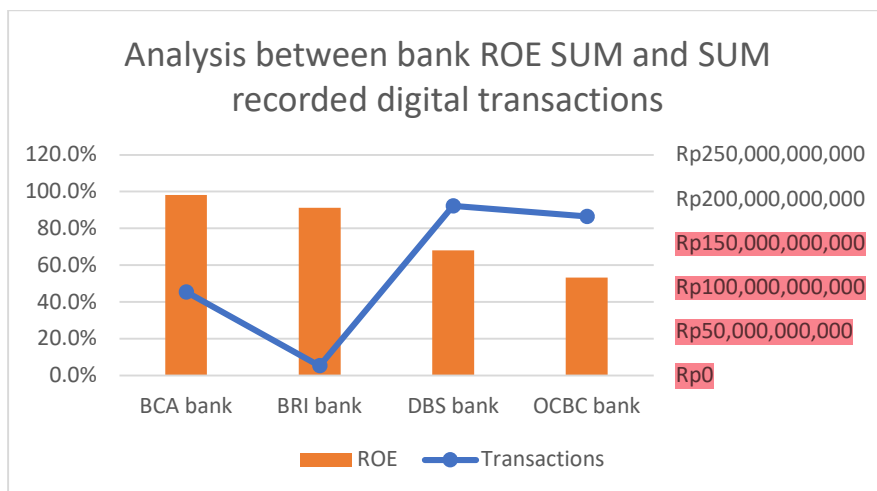


Figure 5 Analysis between bank ROE SUM and SUM recorded digital transactions

Digibank and OCBC exhibited a commendable pace in digital transactions from 2019 to 2022. However, there was a notable decline in 2023. Additionally, neither the study nor the existing literature has documented this decrease in transactions. It is not possible to provide a definitive conclusion at this time; however, an exploratory analysis may be warranted based on recent news reports regarding Singapore digital banking and the potential impact of recent outages. This analysis is based on the researcher's current understanding of the situation and is subject to further improvement in subsequent research.

Despite the comparatively lower total number of transactions over the past five years, Indonesian banks have achieved a significant increase in their return on equity (ROE). This is in contrast to the performance of Singaporean banks, which have not experienced a similar growth in their ROE over the past three years (figure 5). BCA has experienced a significant increase in popularity from 2020, even exceeding other financial institutions.

The rise in digital transactions in Indonesia has contributed to the resilience of its banking sector, whereas Singapore has witnessed a relatively stable ROE despite the surge in digital transactions over the same period. In Singapore, digital banking has become a prevalent norm, whereas in Indonesia, it is still in its early stages of development. This suggests that the growth in digital transactions in Indonesia has not yet reached a point where it is significantly impacting the ROE.

Table 1. Green Bond and Green projects from Indonesia bank and Singapore bank in the last 5 years

Bank	Green Investment	Green Finance
PT Bank Central Asia Tbk (BCA) (Sustainability report & annual report)	BCA bank has issued their own digital banking, facilitate online credit, facilitate a new QR transactions, and has upgrade their contacless payment with credit cards and debit cards	- BCA Bank has issued a green bond that is worth IDR 1.635 billion to finance environmentally friendly projects. - BCA distribute a report of Sustainability-Linked Loans, which focuses in helping

	• BCA is Taking part in the development of Indonesia's electric vehicle ecosystem and facilitate IDR 1,275 billion • 99,7% of total transactions have been conducted through digital channels	• lending to save credit to help build environmentally friendly businesses in society. • Have facilitate capital loans to Renewable energy & eco-efficient products business
PT Bank Rakyat Indonesia Tbk (BRI) (Sustainability report)	• Committed to Science-Based Target Initiatives (SBTi) related to greenhouse gas emission reduction target • Installed solar panels at BRI workplaces • Implemented the Zero Waste to Landfill program	• BRI has issued a Green Bond worth IDR 6 trillion • BRI has issued IDR 777.28 trillion for sustainable financing consisting of distribution of sustainable credit and investment in corporate securities • Allocated credit to Sustainable Business Activity Categories (KKUB) in both the MSME sector and Environmentally Aware Business Activities (KUBL)
Development Bank of Singapore Ltd (DBS) (Sustainability report and annual report)	• Providing advisory and financial solutions to support business under DBS wings in their decarbonisation and transition plans • DBS is providing loans to individuals to buy affordable housing through HDFC of up to USD 750 million • Committed USD 5.6 million to programmes on futureready skills and food security for vulnerable segments	• DBS issued a green bond of USD 500 million to fund projects that contribute to environmental sustainability • DBS Bank has extended USD 665 million loans to support micro-enterprises and capital needs, and facilitated 21 million investments in green funds. • Have facilitate capital loans to energy-saving projects
Oversea-Chinese Banking Corp (OCBC) (Sustainability report)	• Became a signatory to the United Nations-convened, industry-led Net-Zero Banking Alliance (NZBA) • Provides lending, advisory and investment offerings designed to facilitate the low-carbon transition, aligning financial activities with sustainability goals. • Receive Building and Construction Authority (BCA) Green Mark award for 10 OCBC Bank Singapore branches	• OCBC issued its green bond in the amount of USD 500 million, this green bond will be used to finance projects that have a positive environmental impact • Achieved \$56 billion in sustainable finance commitments • Achieved the Cyber Trust Mark(Advocate), a testament to OCBC's robust cybersecurity practices in Singapore

Source: Data Processing Results 2025

In the sustainability section of the BCA Annual Report for 2023, BCA Bank has issued a green bond with an approximate value of 1.635 million rupiah (Table 1). The objective of this bond is to provide financing for environmentally friendly projects, including renewable energy, green transportation, and wastewater management. Table 1 demonstrates BCA Bank's commitment to green banking, as evidenced by its issuance of green bonds and green loans to environmentally friendly businesses. Additionally, the success of BCA's green bond from Sri Kehati, which has a market value of 3.45 trillion, illustrates the bank's proficiency in green finance and green bonds.

In its 2023 Sustainability Report, BRI revealed that it had issued its inaugural green bond in December 2022. The green bond, valued at 6 trillion rupiah, represents BRI's commitment to supporting sustainable development and environmental protection in Indonesia. The proceeds from the green bond will be allocated to projects that promote renewable energy, energy efficiency, and pollution prevention. BRI Bank is renowned for its provision of credit support to small and medium-sized enterprises (SMEs) and sustainable projects. BRI Bank has demonstrated its commitment to green investment, as evidenced by its provision of sustainable credit and support for green business ventures. This illustrates the efficacy of green banking implementation through their green investment.

As detailed in DBS Bank's sustainability report 2023, the bank has been an active participant in the green bond market, facilitating sustainable financing. In May 2021, DBS issued its inaugural green bond, amounting to USD 500 million. The proceeds from this issuance will be utilized to fund initiatives that advance environmental sustainability. DBS has demonstrated its role in promoting a green economy through the issuance of green loans, which provide support to micro businesses, and the facilitation of green investment. This has evidenced the successful implementation of green banking by DBS.

The OCBC Sustainability Report 2023 has demonstrated that OCBC is engaged in the green bond market, thereby providing support for sustainable development initiatives (Table 2). In 2018, OCBC issued its inaugural green bond, amounting to USD 500 million and will be utilized to finance projects that have a positive environmental impact, including initiatives pertaining to energy efficiency, green buildings, and sustainable water. This issuance is consistent with OCBC's dedication to sustainability and its strategy to integrate environmental, social, and governance (ESG) considerations into its business operations. The most recent data indicates that OCBC has achieved success in its implementation of green banking practices, as evidenced by the issuance of a green bond. This bond will be utilized to finance environmentally friendly projects, including initiatives related to energy efficiency and the development of green buildings. OCBC has effectively contributed to the advancement of green banking through the use of its green bond.

The Indonesian bank has demonstrated its commitment to green banking through the provision of green finance, green bonds, and green investment. Singapore has also made significant contributions to the advancement of green banking, evidenced by the issuance of green bonds, green loans, and green investment. The data presented demonstrate that Indonesia has successfully implemented green banking through the issuance of green finance, green bonds, and green investment. Furthermore, Indonesia has achieved a level of green investment and green finance issuance that is comparable to that of Singapore.

Table 2. Indonesia and Singapore banks Green Banking progress

Banks	BCA	BRI	DBS	OCBC
Green Investment	Issued their own digital banking	Implemented the Zero Waste to Landfill program	Providing advisory and financial solutions to business in their transition plans	Receive Building and Construction Authority (BCA) Green Mark award
Green Loans and Credits	IDR 1,275 billion on Electric vehicle	IDR 777.28 trillion for investment in corporate securities	USD 665 million loans to support micro-enterprises and capital needs	USD 56 billion in sustainable finance commitments
Green Bonds	IDR 1.635 billion	IDR 6 trillion	USD 500 million	USD 500 million
Digital Transactions from 2019 - 2023	Rp.94.570.000.000	Rp.11.016.000.000	Rp.192.000.000.000	Rp.180.000.000.000
ROE average from 2019-2023	98,0%	91,2%	68,0%	53,2%

Source: Data Processing Results 2025

The analysis of the return on equity (ROE) of Indonesian and Singaporean banks from 2019 to 2023 reveals a decline in Indonesia's banking sector during the 2019-2020 period, largely attributed to the impact of the global pandemic. However, with the support of digital banking solutions, Indonesian banks demonstrated resilience in maintaining equity in the subsequent period, 2021-2023. Singaporean banks also experienced a decline during the pandemic. However, Singapore did not suffer a significant decline in their equity report. Singapore was well-positioned to mitigate the risks associated with the 2020 pandemic due to the country's early adoption of digital banking. Following this, banks in Singapore have focused on enhancing their digital banking offerings, with this product becoming increasingly popular among younger customers.

The data presented in the recorded digital products from Indonesia and Singapore banks charts illustrate the growth in registered digital bank accounts and recorded digital transactions between Indonesia and Singapore banks. The number of digital transactions conducted via BCAmobile and BRIimo has increased, indicating the success of the implementation of digital banking in Indonesia as a green banking product. The green bond data collected from each banks table reveals that Indonesia has demonstrated a strong commitment to green banking through the implementation of green projects, including green investment and green bonds. These initiatives aim to provide financial support for environmentally friendly business and projects. The data collected indicates that the Indonesian banking sector has demonstrated a commitment to the green economy, effectively integrating it into its operational and financial activities.

Singapore was able to maintain its stability through the successful implementation of digital banking, which also demonstrates the success of Singapore's green banking implementation. The table that collected each banks green bond data indicates that Singapore banks have also been successful in issuing green bonds and facilitating green

business and investment projects. The data demonstrate that Singaporean banks have demonstrated concern for the green economy and have successfully implemented green practices in their operations and financial work, maintaining stability from 2019 to 2022.

The Indonesian banking sector, represented by BCA and BRI, has demonstrated a commitment to green finance through the issuance of green bonds and the provision of green loans to small, environmentally friendly businesses. Furthermore, Indonesia's banking sector has demonstrated its commitment to green investment in its daily operations. Many bank branches now utilize solar panels to generate electricity, and the banking industry has developed its own waste management system to contribute to green banking practices. Additionally, Indonesia's banking sector has initiated efforts to facilitate the development of electric vehicles and support emission reduction initiatives.

In addition, Singapore's banking sector has demonstrated its commitment to green finance through the issuance of green bonds and the provision of loans to environmentally friendly enterprises. For instance, banks such as DBS and OCBC have provided funding for renewable energy projects, including initiatives aimed at improving energy efficiency and supporting the development of new energy resources. Additionally, the Singapore bank has demonstrated its commitment to green investment by providing support for environmentally friendly businesses. This includes offering financial expertise, guidance, and showcasing various strategies for businesses to adopt sustainable practices. Furthermore, the bank has received a Green Mark certification for its sustainable building construction practices, which include incorporating more green spaces and utilizing alternative energy sources.

The implementation of digital banks in Singapore and Indonesia exhibited contrasting patterns in the early years of the 2020s. However, there was a notable convergence in their approaches from 2021 to 2023. This parallel can also be observed in the green projects that the four banks initiated. Both countries demonstrated the capacity to effectively operationalize green banking principles.

CONCLUSION

This research project aims to ascertain the advancement of green banking implementation in Indonesia and Singapore banks by analyzing the progress of green banking implementation and the manner in which both Indonesia banks and Singapore banks implement green banking in their activities. The analysis of the return on equity (ROE) of Indonesian and Singaporean banks from 2019 to 2023 reveals a decline in Indonesia's banking sector during the 2019-2020 period, largely attributed to the impact of the global pandemic. Nonetheless, Indonesian banks demonstrated resilience in maintaining equity during the subsequent period, 2021-2023, with the support of digital banking. Similarly, Singaporean banks also experienced a decline during the period of the global pandemic. However, Singapore did not experience a notable decline in its equity report, in contrast to Indonesia. Singapore was able to mitigate the risks associated with the 2020 pandemic due to the country's early adoption of digital banking, which enabled the banking sector to maintain stability and resilience throughout the pandemic.

The digital banking data presented in account and transactions charts indicate the success of the implementation of digital banking in Indonesia as a green banking product that was also able to help Indonesia banks maintain a good equity through the last 5 years. Furthermore, the chart illustrates that Indonesia banks has demonstrated its commitment to green investment in its daily operations. Many bank branches now

utilize solar panels to generate electricity, and the banking industry has developed its own waste management system to contribute to green banking practices. Additionally, Indonesia's banking sector has initiated efforts to facilitate the development of electric vehicles and support emission reduction initiatives.

As illustrated the ROE 2019-2023 chart, DBS Bank and OCBC Bank have demonstrated resilience in maintaining their ROE throughout the year. Singapore was able to maintain its stability through the successful implementation of digital banking, which demonstrates the success of Singapore's green banking implementation. Although unlike Indonesia banks, Singapore does not receive a major influx in their digital banking useage rate up. Singapore banks ROE influx did not receive any noteable change from the last 5 year, but Singapore bank are still able to keep their equity in stability though not many major update has been recorded. Table providing banks green bond data indicates that Singapore has also been successful in issuing green bonds and facilitating green business and investment projects. The data illustrate that Singaporean banks have demonstrated a commitment to the green economy and have effectively implemented green practices in their operations and financial activities, maintaining stability from 2019 to 2022.

The advent of digital banks in Singapore and Indonesia was marked by divergent trajectories during the initial years of the 2020s. However, there was a discernible convergence in their approaches from 2021 to 2023. Both countries have demonstrated the capacity to effectively operationalize green banking principles. The objective of this analysis, as presented in this research paper, is twofold: firstly, to provide insight into the progress of green banking implementation in Indonesia; and secondly, to contextualize this progress within the broader landscape of green banking in the region. This study aims to elucidate the similarities and differences between the Indonesian and Singaporean green banking implementations, which have been in place since the early 2010s.

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