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Digitalization and diversification strategies for effective bank liquidity management in emerging markets

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Abstract: The purpose of this study is to examine the impact of income, assets, and geographic diversity on bank liquidity in the Indonesian banking sector. This study uses purposive sampling and multiple regression analysis (MRA) to investigate the impact of digital banking on bank liquidity, as measured by the loan-to-deposit ratio (LDR) and liquidity ratio. The sample used is 87 banks in Indonesia, which include state-owned banks, commercial banks, regional development banks, and Islamic banks. The key findings of this study indicate that income and asset diversification significantly affect bank liquidity, with income diversification having a negative effect on the Loan-to-Deposit Ratio (LDR). The use of digital banking simplifies the relationship between diversification strategy and liquidity, thereby improving banks' ability to manage liquidity. However, despite digital integration, asset diversification continues to show an adverse correlation with liquidity, indicating limitations in its effectiveness. The study concludes that while digital banking enhances the effect of income diversification on liquidity management, it limits its effect on asset diversification. This suggests that digital utilization is a strategic resource for increasing liquidity, although it requires focused implementation. These findings offer important insights for bank management and policymakers in formulating digital transformation plans that enhance efficient cash management and financial stability, particularly in developing countries like Indonesia. Keywords: income diversification, asset diversification, digital banking, bank liquidity, financial stability.

Keywords: *Asset diversification, Digital banking, bank liquidity, Financial stability, Income diversification.*
JEL Classification: *G20; G21.*

1. Introduction

The advent of information technology has transformed the competitive dynamics and revenue generation models in the banking sector. However, compared to other industries, banks have been slower to adopt e-commerce revenue elements King [1]. Despite extensive research over five decades, there is no consensus on the optimal business model for banks, especially in developing nations like Indonesia. Chiorazzo [2] incorporated Stigler 's [3] survival notion, suggesting that banks adhering to traditional practices, such as offering loans, accepting deposits, and maintaining physical branches, are more likely to endure. This is particularly true for small banks with assets between $50 million and USD 10 billion.a

Digital technology is transforming banks' operational models, diversifying their assets and services, and increasing non-interest revenue. Lipton et al. [4] emphasized that banking activities are predominantly technological and mathematical, enabling many operations to become technology-driven digital services. During this digital transformation, financial institutions face challenges requiring strategic, technological, legal, and managerial adjustments, as well as new ways of interacting with staff

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and consumers Al-Okaily [5]; Diener & Špaček [6]; Kanungo & Gupta [7]; S. Lee [8]; Mavlutova [9]; Paulet & Mavoori [10]; Stefanovic [11] .

According to King [1], the rise of technology companies in banking has increased the need for fundamental banking functionalities to expedite service delivery, reducing the emphasis on expanding physical branches. Investing in information technology has surged, enhancing the consumer experience and shifting service patterns from traditional banks to digital platforms Valverde [12] and Peña [13] . Digital disruption is transforming traditional banking, reducing the need for physical branches and allowing competitors to mimic physical service-dependent banks Vives [14]. Digitalization has reduced costs and increased income for financial institutions (Forcadell [15] ; Paulet & Mavoori [10] . The relevance of physical bank branches is a topic for ongoing research.

The banks' digitalization exhibits an inverse relationship with liquidity, particularly for banks operating under a traditional framework that primarily relies on lending or financing activities as their primary source of income Roulet [16]. The references cited in the text include works by Banerjee [17]; Bellavite Pellegrini [18]; Y. Chen [88]; Z. Chen [19] ; Coffie [20]; Liu [21]; Saunders [22] . The subsequent advancements in research by [V. D. Dang [23]; V. D. Dang & Dang [24]; Davydov [25]; Viverita [26] indicate that, apart from GDP, monetary policy plays a role in shaping the generation of bank liquidity. Bank's traditional framework is because the capacity for liquidity is influenced by the overall economic environment, as highlighted by Beck [27] ; Niu [28] . This phenomenon is particularly significant in developing nations, where bank loans serve as a form of economic capital. The studies conducted by Berger & Sedunov [29] and Beck [30] have demonstrated that the conventional services provided by banks, and their role as intermediary institutions in generating liquidity, significantly impact the actual economy.

Multiple research findings demonstrate liquidity management's significance in auguring bank rivalry. According to the study conducted by Jiang [31], an escalation in rivalry among banks has been observed to harm the provision of crucial banking services in terms of liquidity creation. In contrast, previous studies Ali [32]; D'Avino [33] ; T. T. H. Nguyen [34]; Sahyouni [35]; Toh & Jia [36] have demonstrated that the presence of robust market power in banks leads to an augmentation in liquidity creation. Intense competition is prevalent. The relationship between capital and liquidity has been explored in some research, including those conducted by Fu [37] and T. V. H. Nguyen [38]. These studies have found evidence of an inverse relationship between liquidity creation and capital. In addition, T. Le [39] examines the interdependent association between liquidity creation and bank capital in Vietnam. The results indicate a positive relationship between the presence of large banks and the expansion of liquidity creation. According to a study conducted by Oino [40], evidence suggests that banks with higher levels of capitalization exhibit a greater propensity to disburse loans. This finding carries significant implications for enhancing profitability within the banking sector. Additional research has revealed that implementing elevated bank capital requirements has a notable and favourable impact on liquidity levels. Put simply, the amount of capital a bank holds will impact the bank's business attributes and revenue streams.

Banks with higher capital ratios tend to shift focus from traditional liquidity creation to cost-based banking services and securities Toh, [41]. During the pandemic, Viverita [26] noted a decline in liquidity generation, suggesting banks prefer secure investments over liquidity generation through assets. Increased competition among banks reduces essential services like liquidity creation Jiang [31]; Luck & Schempp [42] found that liquidity's reliance on intermediation has decreased, prompting banks to diversify revenue streams. V. D. Dang [89] noted that bank liquidity decreases as income from non-traditional banking rises. Revenue and asset diversification do not enhance bank stability Abuzayed [43] and Korean banks do not benefit from diversity Baek [44]. Asset diversification negatively impacts profitability and asset quality in traditional banks Chen [45]. Islamic banks gain less from diversification compared to conventional banks Paltrinieri [46]. Income diversification adversely affects profitability, profit efficiency, and financial stability Duho [47]. Non-interest revenue negatively impacts ASEAN commercial banks' performance Phan [48]. Further research is needed to explore

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factors influencing liquidity within banking institutions.

As a developing country, the atmosphere of banks in Indonesia exhibits similarities to other nations in similar stages of economic development.

Table 1.
Bank Interest Income and No-Interest Income 2015-2021.

(In billion rupiahs)							
Income type	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Interest income	646,614	681,460	717,761	742,327	828,197	794,091	773.902
Operational income other interest	210,957	249,691	231,513	261,214	318,252	407,621	460.019
Non operational income	24,080	20,712	30,242	24,927	27,176	26,831	20,216

Source: Central Bank of Indonesia financial statistics report

Over the past five years, Indonesia has seen a significant shift in income diversification between loans and non-loans. In absolute terms, income from interest income is greater (see Table 1). However, in terms of growth, interest income is actually lower than non-interest income.

Nevertheless, when examined through the lens of growth, there was a notable surge in non-interest income.

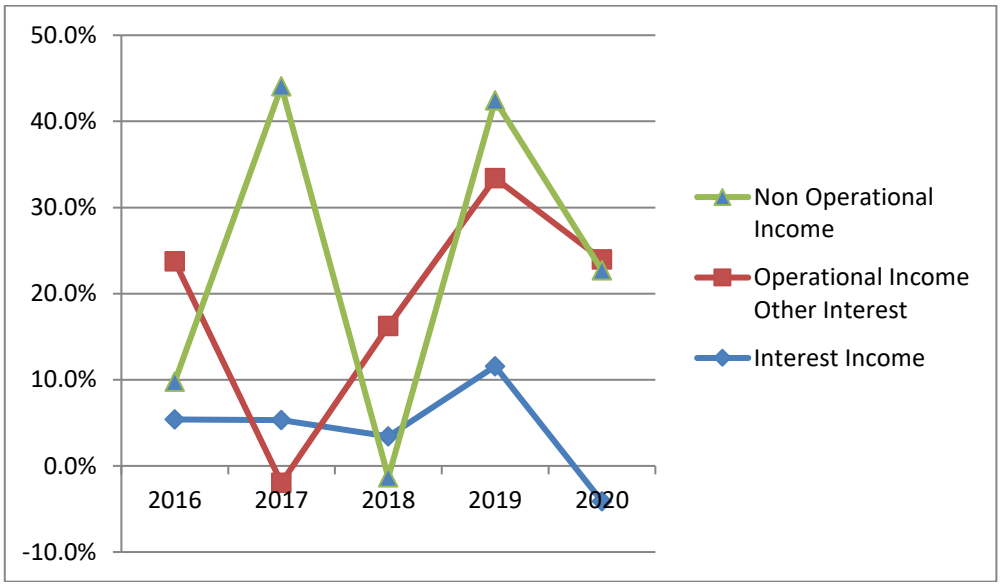

Figure 1.
Interest and non-interest income growth
Source: Indonesian Financial Service Authority elaborated by the authors (2023).

Figure 1 divides banking income in Indonesia into three categories: interest income, non-interest operating income, and non-operating income. Over the past five years from 2015 to 2020, interest income has been more dominant than the other two sources of income in absolute terms. However, when viewed from the growth side, as presented in Figure 1.1, income from non-operating income and non-interest income is higher than income from interest income.

This article addresses many issues about the functioning of banking institutions, focusing on income, and assets diversification to bank liquidity as critical attributes of conventional banks. To the best of the author's understanding, the examination of investment in information technology over the

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past twenty years has yet to reveal any association with bank liquidity, which is fundamental to the bank's job as an intermediary. According to the studies conducted by Asadi [49] ; Pérez-Martín [50], it has been observed that a significant portion of bank IT investments is primarily directed towards digital technologies to enhance the overall customer experience. Numerous other scholarly investigations are currently examining the various trends in consumer behaviour on the adoption of technology advancements Bureshaid [51]; Harris & Wonglimpiyarat [52]; Ho [53]; Preciado-Ortiz [54]. Banks have embraced technology to enhance transactional convenience, usability, and cost-effectiveness Roussou & Stiakakis [55]. According to Lee & Kim [56], implementing technology in the banking sector is expected to yield favourable outcomes in terms of cost efficiency. According to Chedrawi [57], competition will compel banks to establish virtual channels.

The present paper is structured into five distinct sections. The initial section provides an introduction and a concise overview of the empirical study examining the impact of digital technology on bank income and asset diversification. It specifically focuses on the empirical evidence derived from Indonesia, a developing country. The subsequent section provides an overview of the theoretical framework. The third section provides comprehensive details regarding the research purpose, methods, and data. The fourth section provides an account of the outcomes and subsequent analysis. The final section, namely the fifth section, serves as the conclusion.

2. Literature Review

The business model depends on liquidity conditions. Dang [23] found that banks with higher liquid assets adopt a conservative risk approach, focusing less on loans, leading to lower returns. Toh [41] observed banks shifting from traditional lending and deposits to fee-based and transactional services. Higher capital ratios lead to more diversity, but this increase is uneven between large and domestic banks. Toh [41] identified a negative correlation between bank liquidity and market power, affected by competitive conditions. Dang [89] and Hoang [58] reported a negative relationship between non-traditional banking income and liquidity generation. This study investigates the correlation between income diversification and liquidity. These findings form the basis of an initial hypothesis.

Hypothesis 1: Bank income diversification reduces bank liquidity.

Various business activities involve different levels of risk. In their study, Rokhim & Min [59] found a significant inverse relationship between liquidity and risk in the banking sector, where higher liquidity leads banks to be more cautious in taking risks. To reduce risk and improve operational efficiency, especially in uncertain situations, organizations must pursue diversification strategies Nguyen [60] . Bank competition negatively affects asset diversification, thereby reducing liquidity production, according to a study by Toh [61]. Bank competition can reduce or eliminate the liquidity impact for banks with highly diversified asset portfolios. In the context of loan portfolio diversification, Huynh [62] states that diversifying loan portfolios reduces non-performing credit risk but lowers bank returns. Based on the above considerations, the hypothesis regarding the correlation between asset diversity and liquidity is as follows:

Hypothesis 2: Diversification of bank assets reduces bank liquidity.

According to T. D. Le & Ngo [63] , using IT in service delivery, such as issuing bank cards and ATMs, enhances bank profitability, with retail banking being a key driver. According to Japparova & Rupeika-Apoga [64], digitalization is critical for banking progress, with electronic payment systems being highly influential. Asongu & Nwachukwu [65] highlighted ICT's role in improving banking services and reducing excess liquidity. Dong [66] showed that mobile banking promotes financial inclusion in emerging nations. Vives, [67] noted that digital enterprises focus on comprehensive consumer service, setting new standards. In financial intermediation, Benston & Smith [68] emphasized transaction cost analysis, with technology transforming financial products and institutions. Dang [89] and Hoang [58] found that non-traditional banking income reduces bank liquidity generation, underscoring the need for technological innovation in non-traditional income sources.

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Hypothesis 3: Adopting digital banking moderates bank income diversification's impact on bank liquidity.

Organizations must diversify to manage risk and improve efficiency during unpredictable conditions Nguyen [60]. According to Toh [41] , bank competition can reduce liquidity for banks with diversified asset portfolios, making diversification critical. According to Huynh [62], loan portfolio diversification lowers non-performing credit risk but reduces bank returns, which impacts liquidity. In the digital era, banks must partner with firms with strong digital platforms to stay competitive, as technology decreases concentration levels in banking Wójcik [69]. Banks should adapt their business models with product diversification to meet customer needs Chu & Deng [70]. The fifth hypothesis follows this premise.

Hipotysis 4: Digital banking mitigates the effect of asset diversification on bank liquidity.

3. Methodology

The study used a quantitative research approach to examine the impact of bank revenue diversification (interest and non-interest income), asset diversification, and geographical diversity on liquidity. The study also explores the moderating role of digital banking adoption in this relationship.

The present study was undertaken at 87 state owned banks, private banks, sharia banks and the regional development banks (BPD) operational throughout all provinces inside Indonesia. The study employed a purposive sample technique, wherein specific criteria were established to select participants. The criteria employed in this study encompass three key aspects: (1) the inclusion of regional development banks that have been actively functioning during the timeframe of 2011-2021, (2) the selection of companies that have finalized their financial statements for the period spanning 2011-2021, and (3) the requirement for companies to adhere to a consistent reporting period, specifically concluding on December 31st of each year. According to data provided by the Financial Services Authority, there are currently 106 operational commercial banks in Indonesia. However, a total of 87 banks that possess the necessary qualifications and possess accessible data are identified as having a substantial number of branch offices dispersed across various regions inside Indonesia. The data utilized in this study is obtained from the annual reports of each bank, covering the period from 2011 to 2021. The E-Views 10 application is utilized for conducting panel data regression analysis.

The regression equation utilized in this investigation is presented as follows:

Equation 1:

$$LIQit = \alpha 0 + \beta 1DIVINit + \beta 2DIVASit + \varepsilon it$$

Equation 2:

$$LIQit = \alpha 0 + \beta 1DIVINit + \beta 2DIVASit + \beta 3DIGILit + B4DIVINit * DIGILit + B5DIVASit * DIGILit + \varepsilon it$$

Equation 3 :

$$LIQit = \alpha 0 + \beta 1DIVINit + \beta 2DIVASit + \beta 3DIGILit + B4DIVINit * DIGILit + B5DIVASit * DIGILit + B6SIZEit + B7CAPit + B8RISKit + B9MARKET it + \varepsilon it$$

Table 2.
Scale of the research model.

Variable		Codes	Scale	Reference
Dependent variable	Liquidity (Loan to deposit ratio)	LIQ	The size of a bank's liquidity position is also a measure of financial intermediation.	[76]; Ebenezer et al., [72]
	Liquidity (Liquid asset	LIQ	The ability to convert an asset into cash is	[78]; [79];[80]; [81]; Doan & Bui,

	ratio)		known as liquidity.	[77]
Independent variable	Income diversification	DIVIN	*Hirshman-Herfindahl Index*	Elsas et al [78]
	Asset diversification	DIVAS	*Hirshman-Herfindahl Index*	[83]
Moderation variable	Digital banking adoption	DIGIL	The ratio of each bank's total assets to its software and hardware investments	Beccalli [79] ; Valverde et al [12]
Control variable	Bank size	SIZE	We use the natural logarithm of total assets (LogTA).	S. P. Lee & Isa, [80]
	Capital	CAP	the ratio of total equity to total assets.	[86]; (Berger & Bouwman [82]
	Risk (Non-performing loan)	RISK	NPLs are a measure of a bank's credit risk.	Beck et al [30]; Abedifar et al., [83]
	Market share	MARKET	Market share is measured as (DI/TD)2, where "Di" represents the total deposits of bank i and TD represents the total deposits in the banking system.	Hoang et al., [58]

Where: LIQ represents bank liquidity, this study considers liquidity as the dependent variable, which is measured using two indicators: the loan-to-deposit ratio and the liquid asset ratio.; DIVIN represents bank income diversification; DIVAS represents a diversification of bank assets; DIGIL represents digital banking adoption; DIVINit * DIGILit represents the interplay between income diversification and digital adoption; DIVASIt. DIGILit refers to the integration of asset diversification with the process of digital adoption. The concept of DIGILit refers to the interplay between regional diversification and digital uptake. The variable "SIZE" represents the company's size, precisely measured by the natural logarithm of total assets. "CAP" refers to the bank's capital, while "RISK" represents the level of financing risk, specifically measured by the proportion of non-performing loans. Lastly, "MARKET" denotes the market share of the company.

4. Results and Discussion

Table 3 demonstrates that a mere 18.93% of banks as the observation have a diversified income structure, encompassing both interest and non-interest income. Their income structure implies that bank operation in Indonesian are comparable to those of banks in other nations, as they continue to derive a significant portion of their revenue from interest on loans. A considerable proportion, precisely

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49.15%, of commercials Indonesian banks have undertaken asset diversification. Assets are allocated among various financial instruments, including cash, loans, inter-bank loans, securities, and other types of assets. The geographical diversification of commercial banks is limited to 0.459% due to their focus on serving local areas within a single province. If a commercial bank establishes a branch office beyond its jurisdiction, it is often situated in the capital city of the respective nation. Even, the regional development bank (BPD) considers facilitating significant customer transactions, particularly for organizations whose networks and commercial operations are linked to the national capital. The ownership of regional development bank shares is vested in provincial governments. The acceptance and investment in bank digititalization remain limited, with only 16.795% of banks embracing this transformation. It is mainly due to the almost of commercial bank in Indonesia, which primarily cater to customers who predominantly require micro-banking services.

Table 3.
Descpriptive statistics.

	N	Mean	Minimum	Maximum	Std. deviation
Liquid ratio	871	0.32366	0.112654	1.116800	0.11611
LDR	871	0.89612	0.008400	2.475600	0.22027
Div_income	871	0.18927	0.005260	0.499850	0.12419
Div_asset	871	0.49152	0.093355	0.730000	0.09142
Digital	871	0.16795	0.000363	0.843700	0.18067
Size	871	4.54962	2.523746	14.361090	2.10460
Capital	871	0.16259	0.021250	1.184830	0.10264
NPL	871	2.90750	0.000000	275	9.47218
Market	871	0.00459	0.000008	0.156950	0.01020

4.1. Income Diversification and Bank Liquidity

The intermediary function of traditional banks hinges on effective liquidity management. While collecting deposits can increase a client's savings, banks must balance the funds disbursed as loans. To mitigate the risk of sudden withdrawals, maintaining sufficient liquid assets is essential.

Table 4.
Regression results: Income diversification to liquidity.

	LDR (Test 1)		LDR (Test 2)		LDR (Test 3)		LDR (Test 4)	
	Sig.	Coef.	Sig.	Coef.	Sig.	Coef	Sig.	Coef.
DIVIN	0.000***	-0.650	0.000***	-0.502	0.000***	-0.670	0.000***	-0.506
DIGIL			0.000***	0.312			0.000***	0.292
DIVIN*DIGIL			0.000***	-0.229			0.000***	-0.249
Size					0.000***	0.162	0.000***	0.15
Capital					0.000***	0.101	0.005***	0.07
Risk					0.617	-0.013	0.512	-0.016
Market					0.852	-0.006	0.55	-0.017
R Squared	0.422		0.479		0.449		0.498	
F Stats	636.71***		267.94***		142.93***		124.08***	
Observation	871 Observations		871 Observations		871 Observations		871 Observations	

Note: *Significant at 10%
** Significant at 5%
***Significant at 1 %

In Indonesian commercial banks, Table 4 presents an empirical analysis of the relationship between income diversification and bank liquidity. Test 1 reveals a statistically significant negative correlation, indicating that increased revenue from both interest and non-interest income reduces bank liquidity.

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This reduction stems from liquidity generation strategies aimed at enhancing banks' intermediary function by acquiring funds for lending. These findings are consistent with Toh [41], who noted a shift from traditional savings and loan operations to fee-based services and transactional ventures. Income diversification strategies help banks reduce reliance on a single credit source.

Moreover, Dang [89] and Hoang [58] demonstrated a negative relationship between income from non-traditional banking and bank liquidity generation. Prior research indicates that the shift to non-traditional practices reduces liquidity. This association remains statistically significant when considering company size, capital, financing risk, and market conditions, as shown in Test 3.

If banks rely solely on conventional services to generate income from loans or financing, they will not achieve optimal liquidity. Dang [89] and Hoang [58] show that bank liquidity decreases with higher income from non-traditional segments. Recent research by [43] supports these findings, indicating that liquidity dependent on intermediation is ineffective. Intense competition drives banks to adapt and diversify their income sources.

In the previous examination, the strong inverse correlation between income diversification and liquidity persisted. In Test 2, digitization significantly moderates the relationship between these opposing factors, though it slightly affects the link between digitization and liquidity. We expect digitization to increase fee-based income while maintaining stability in interest-based income. These findings support Hypothesis 1, confirming the correlation between income diversification and liquidity, and Hypothesis 4, which posits digitization as a moderating factor. Benston & Smith [68] highlighted that transaction cost analysis is fundamental to financial intermediation theory. Technological evolution and shifting transaction costs have significantly transformed financial products, their delivery, and the entities involved.

The findings of Forcadell [15] indicate that business reputation and digitization are valuable assets that enable banks to effectively attain strategic objectives and mitigate organizational constraints. In addition, they highlighted the importance of market-leading organizations leveraging their strategic resources along with new resources, such as digital capabilities, to effectively respond and adapt to the digitalization process.

4.2. Asset Diversification and Bank Liquidity

The findings presented in Table 4 demonstrate a statistically significant inverse association between asset diversification and bank liquidity. The diversity of assets leads to a drop in liquidity when assets are diversified among cash, loans, inter-bank loans, securities, and other assets. This diversification also affects the indicator of bank intermediation, causing it to drop (test 1). The results of test 3 demonstrate the robustness of the findings when controlling for variables such as size, capital, risk, and market. Specifically, the analysis reveals a substantial inverse association between asset diversification and bank liquidity. The findings from tests 2 and 4 prove that digitization is not a moderating factor in the link between asset diversification and liquidity. Commercial banks in Indonesia as a developing country, primarily allocate a significant proportion of their assets towards loan portfolios. To clarify, commercial banks continues to fulfil the conventional function of a bank intermediary by gathering money and disbursing them through loan provisions. According to contemporary financial intermediation theory, banks play a crucial role in the economy by generating liquidity, facilitating investment by supplying funds, and delivering essential financial services to consumers [90], [91] .

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Table 5.
Regression results: Asset diversification to liquidity.

	LDR (Test 1)		LDR (Test 2)		LDR (Test 3)		LDR (Test 4)	
	Sig.	**Coef.**	**Sig.**	**Coef.**	**Sig.**	**Coef.**	**Sig.**	**Coef.**
DIVAS	0.000***	-0.403	0.000***	-0.382	0.000***	-0.431	0.000***	-0.411
DIGIL			0.069*	0.29			0.157	0.218
DIVAS*DIGIL			0.467	-0.118			0.551	-0.093
Size					0.003***	0.108	0.014**	0.087
Capital					0.000***	0.258	0.000***	0.229
Risk					0.727	-0.010	0.653	-0.013
Market					0.004***	-0.103	0.003***	-0.105
R squared	0.161		0.191		0.234		0.248	
F stats	168.381***		69.472***		54.066***		41.934***	
Observation	871 observations		871 observations		871 observations		871 observations	

Note: *Significant at 10%
** Significant at 5%
***Significant at 1 %

This study's findings support hypothesis 2 since they reject the alternative hypothesis, which posits a correlation between asset diversification and liquidity. The results also provide evidence against the fifth hypothesis, which posits that digitalization does not alter the link between the two variables. The conditions in the study conducted by Dang [90] differ from those described in the user's text. Specifically, banks with higher levels of liquid assets are observed to prioritize asset diversification as a risk reduction strategy rather than focusing primarily on loan services. Furthermore, Toh et al [41] have demonstrated that banks characterized by extensive asset diversification in intense competition tend to diminish their liquidity levels due to their lack of exclusive concentration on lending activities.

The fourth hypothesis can be supported by the explanation that banks respond to technological advancements by innovating and introducing new products and services. These products diminish the prominence of productive asset accumulation through loans, which serve as a gauge of banks as financial intermediaries. The advent of digitization creates possibilities for the emergence of additional products that leverage digital innovation. The bank offers a range of products and services that are facilitated by digital technology. Therefore, demonstrating the notion that the use of digital technology will mitigate the impact of diversifying assets on liquidity is highly logical.

The results of this research are in line with the findings [20] that to get a positive impact in terms of increasing revenue, profitability and reducing credit risk, companies must make adjustments to structural changes as the key to adopting digital transformation. Asset diversification and bank digitalization are two important strategies for financial institutions to remain competitive and maintain liquidity in the current financial landscape [92] Asset diversification helps banks manage risk and protect themselves from potential losses by spreading their investments across different types of assets and sectors Mirzaei et al [87].

5. Conclusion

The primary objective of this study is to analyze the impact of bank income diversification, namely in terms of interest and non-interest activities, as well as asset and geographical diversity, on liquidity. Additionally, this research investigates the moderating role of digital banking adoption in this relationship. This study is unique in its exploration of the correlation between digitalization and the operational framework of contemporary banks, which prioritize fee-based transactions as a primary source of income, as opposed to conventional banks that primarily generate revenue through interest income while fulfilling their intermediary position. The data utilized in this study is obtained from state-owned banks, private banks, regional development banks and sharia banks in Indonesia. This study presents a novel finding that bank digitalization does not modify the association between asset

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diversification and liquidity. On the other hand, digitalization moderates Income diversification and geographical diversification to the bank liquity. Consistent with the intermediation thesis, banks in developing nations continue to fulfil their function as intermediaries by offering loans for developmental investments. Conversely, the process of digitization serves to minimize income dispersion and geographical factors, establishing a notable inverse correlation with bank liquidity.

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