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**The Effect of Electronic Banking Transactions on  
Banking Fee-Based Income  
(A Study on Commercial Banking Companies in Indonesia Listed  
with the Financial Services Authority (OJK) for the  
2021-2024 Period)**

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**ABSTRACT**

This study aims to analyze the effect of electronic banking transactions, consisting of ATM, Mobile Banking, and Internet Banking transactions, on Fee based income in Indonesian banks. The data used in this study were obtained from 10 conventional commercial banks listed on the Otoritas Jasa Keuangan (OJK) for the period 2021-2024, with a total of 40 observations. The analytical method employed is multiple linear regression using SPSS version 26. The SPSS analysis results show an adjusted R<sup>2</sup> value of 0.464, indicating that the independent variables explain 46.4% of the variation in Fee Based Income. The F-test results in an F-value of 65.962 with a significance level of 0.000 < 0.05, suggesting that ATM, Mobile Banking, and Internet Banking simultaneously have a significant effect on Fee Based Income. However, the t-test reveals that only Mobile Banking (t = 4.523; sig. = 0.000) and Internet Banking (t = 2.290; sig. = 0.028) have a positive and significant partial effect. In contrast, the ATM variable (t = 0.891; sig. = 0.379) does not have a significant effect. These findings indicate that digital banking services such as Mobile Banking and Internet Banking are playing an increasingly important role in enhancing banks' non-interest income, while traditional ATM services appear to be declining in their effectiveness in contributing to such income.

*Banking, Elektronik Banking, Fee Based Income.*

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**INTRODUCTION**

Economic activities in Indonesia, particularly in conducting financial transactions, are inseparable from banking services. The banking sector plays a crucial role in the growth and development of the national economy; therefore, its regulations and operational activities are extensively governed by law.

Based on Law of the Republic of Indonesia No. 10 of 1998 concerning Banking (Article 1, paragraph 2), a bank is defined as a business entity that

collects funds from the public in the form of deposits and distributes them back to the public in the form of credit and/or other forms, with the aim of improving the standard of living of the people. This definition explains that, in general, the main function of banks is to collect funds from the public and redistribute them.

Currently, electronic-based banking services in Indonesia continue to increase along with the growth of internet and smartphone users, as well as regulatory support from financial authorities such as Bank Indonesia and the Financial Services Authority (OJK). The COVID-19 pandemic also accelerated digital transformation in the financial sector, as people were required to minimize physical contact, including in banking activities (OJK, 2022).

Rapid technological development has driven major transformation in the banking sector, particularly in service delivery and transaction systems. Electronic banking transactions, such as mobile banking, internet banking, and modern ATM services, have become primary solutions to meet customer demands for speed, efficiency, and convenience. This shift from conventional services to digital platforms not only improves operational efficiency but also opens opportunities for banks to increase non-interest income, known as fee-based income.

According to Kasmir (2012), fee-based income refers to income derived from banking services and other non-interest sources. The main profit in conventional banking businesses is obtained from the difference between deposit interest and loan interest (spread-based income). If a bank experiences a condition where deposit interest is higher than loan interest, it is referred to as a negative spread. In addition to these core activities, banks also provide supporting services aimed at facilitating fund collection and distribution. The more complete the services offered, the greater the potential profit, as banks generate additional income from service fees (fee-based income).

Based on payment system statistics published by Bank Indonesia, there have been fluctuations in transaction volumes from 2020 to 2024. This trend indicates a shift in customer behavior from conventional transactions to electronic banking, as well as the increasing role of information technology in supporting banking business activities ([www.bi.go.id](http://www.bi.go.id)).

The following table presents transaction volume data for ATM, mobile banking, and internet banking services:

**Table 1.**  
**Transaction Volume of Banking Services**

<b>Description</b>	<b>Year</b>	<b>Volume</b>
<b>ATM</b>	2020	6.65 Billion
	2021	464.8 Million
	2022	596.2 Million
	2023	7.60 Billion
	2024	6.95 Billion
<b>Internet Banking</b>	2020	-
	2021	572.8 Million
	2022	429.2 Million
	2023	584.9 Million
	2024	583.5 Million
<b>Mobile Banking</b>	2020	513.7 Million
	2021	4.2 Billion
	2022	3.2 Billion
	2023	4.22 Billion
	2024	20.5 Billion

*Source: Bank Indonesia (processed data, 2025)*

Based on Table 1, there is dynamic growth in the transaction volume of electronic banking services, including ATM, internet banking, and mobile banking from 2020 to 2024. This reflects changes in customer preferences toward digital financial activities and indicates strong potential for increasing fee-based income.

ATM transaction volumes show significant fluctuations, with a sharp decline in 2021 due to customer migration to digital services during the pandemic. However, the trend recovered in 2022 and surged in 2023. Despite remaining significant, reliance on ATMs has gradually decreased due to the convenience of digital services.

Internet banking demonstrates relatively stable growth, commonly used by corporate clients and individuals with complex transaction needs. Each transaction typically incurs administrative fees, contributing consistently to fee-based income.

Meanwhile, mobile banking shows the most rapid and significant growth, reflecting increased technology adoption and changing consumer behavior. The sharp increase from 513.7 million transactions in 2020 to 20.5 billion in 2024 indicates that mobile banking has become the primary transaction tool for daily activities. With high transaction frequency, this service has become a major source of fee income.

Overall, the increase in electronic banking transactions highlights the significant opportunities for banks to enhance non-interest income through digitalization. Electronic services such as ATM, mobile banking, and internet banking have become key drivers in generating sustainable fee-based income, supported by customer preferences for speed, convenience, and accessibility. Therefore, investment in digital infrastructure and innovative service features is a strategic necessity for banks to remain competitive and improve profitability in the digital banking era (OJK, 2024).

The growth of digital transactions not only improves service efficiency but also serves as a major source of banking revenue in the form of fees, such as administrative charges, interbank transfer fees, ATM withdrawal fees, and other digital service charges. Fee-based income has become increasingly important, especially amid declining interest margins, rising competition, and global economic uncertainty ([www.bi.go.id](http://www.bi.go.id)).

Bank Indonesia, through regulations such as PBI No. 12/21/PBI/2010 and the implementation of QRIS and BI-FAST, actively promotes payment system digitalization to improve efficiency and financial inclusion (BI, 2022).

Previous studies by Gumilang and Azib (2019) show that mobile banking, internet banking, and ATM services have a significant positive effect on fee-based income. Similarly, Pasaribu (2023) finds that electronic banking contributes positively to bank profitability, although service performance still needs improvement. However, other studies, such as Pasaribu (2022) and Sudaryati et al. (2018), indicate negative or insignificant effects due to high operational costs associated with electronic services.

Despite differing findings, increasing use of electronic banking services generally contributes to higher fee-based income, particularly through mobile and internet banking. These services offer strong opportunities due to high adoption among Millennials and Generation Z.

**Table 2.**  
**Number of Internet Users in Indonesia (2023–2024)**

Year	Number of Internet Users	Total Population	Internet Penetration Rate
2023	215,626,156	275,773,901	78.19%
2024	221,563,479	278,696,200	79.5%

Source: APJII (processed data, 2025)

Based on APJII data, internet users in Indonesia continue to grow significantly. This increase reflects widespread digital transformation across economic and financial activities. High internet penetration has encouraged the

transition from conventional banking to electronic banking services such as mobile banking, internet banking, digital wallets, and QRIS.

This trend directly impacts fee-based income, as increased digital transactions provide banks with opportunities to expand non-interest income. Although fee-based income is generally smaller than interest income, it is more stable and less risky, making it a strategic revenue source for maintaining financial sustainability (Kasmir, 2014).

Therefore, the growth of digital banking transactions during 2021–2024 serves as a key driver of fee-based income in Indonesia. Based on this background, this study is conducted under the title: “The Effect of Electronic Banking Transactions on Banking Fee-Based Income (A Study on Banking Companies in Indonesia for the Period 2021–2024)”

### **Industrial Revolution**

The development of information technology has prepared the banking industry to face significant changes and transformations. Information technology has now reached the stage of the Industrial Revolution 4.0. This era has transformed how people live, work, and interact, particularly with the emergence of electronic-based banking systems in recent years. The banking sector, along with other financial industries, faces increasing challenges. The digital era has become deeply integrated into the lifestyle of Indonesian society, especially within the financial sector, including banking institutions, insurance companies, and multifinance firms.

According to the Financial Services Authority, the emergence of digital banking and the Industrial Revolution 4.0 presents several challenges, including:

1. Changes in consumer behavior and the growing demand for simple and fast services, leading to shifts in how people use financial services.
2. The increasing adoption and socialization of financial technology (fintech), including payment systems and peer-to-peer (P2P) lending.
3. Public confidence in the security of digital banking platforms.
4. Regulatory issues that form the foundation for digital banking operations.
5. The need to understand and develop customer profiles, particularly millennials, to expand market reach and service accessibility.

To support digital banking innovation, financial institutions must respond rapidly to these changes. The banking sector is currently undergoing a transformation toward digitalization. This transformation is supported by regulatory frameworks such as Financial Services Authority Regulation No. 12/POJK.03/2018 concerning digital banking. These regulations enable banks to provide digital services while mitigating risks. Changes in consumer

behavior encourage banks to continuously innovate, maintain their existence, and enhance customer loyalty. Digital banking services eliminate time and space constraints, promote financial inclusion, and improve public access to financial services.

### **Theory of Needs and Satisfaction**

Dr. Abraham Maslow introduced the Hierarchy of Needs Theory, which explains that individuals attempt to satisfy lower-level needs before progressing to higher-level needs. Once basic needs are fulfilled, higher-level needs emerge (Sumarwan, 2003). In business contexts, understanding consumer needs, wants, and demands is fundamental. Marketers do not create demand, as it inherently exists within individuals. In banking services, customer needs include access to financial products, security, convenience, recognition, social relationships, and status. Customer satisfaction reflects the extent to which services meet customer expectations and needs. In the context of this study, the theory is relevant as electronic banking services provide convenience, accessibility, and efficiency, thereby enhancing customer satisfaction. The better the quality of electronic banking services, the higher the level of customer satisfaction.

### **Signaling Theory**

Signaling Theory in this study explains the relationship between electronic banking transactions and banking performance, as measured by fee-based income. According to signaling theory, high-quality companies provide signals to the market, enabling stakeholders to distinguish between high- and low-quality firms (Zhao Ani dan Peter, 2004). These signals must be credible, interpretable, and difficult to imitate. Signals may take the form of financial or non-financial information, including performance indicators. Financial disclosures serve as signals to external parties in decision-making processes (Brigham & Houston, 2010). These signals may represent positive (good news) or negative (bad news) information depending on interpretation. Transparency in financial reporting enhances stakeholder trust. In this study, electronic banking transactions and fee-based income serve as signals reflecting a bank's performance and its ability to generate non-interest income.

### **Definition of Bank**

According to Law No. 10 of 1998 concerning Banking, a bank is a business entity that collects funds from the public in the form of deposits and redistributes them in the form of credit or other financial services to improve public welfare. Kasmir (2019) defines a bank as a financial institution that primarily collects funds through savings, demand deposits, and time deposits, and distributes them through lending activities. Thus, a bank can be defined as

an economic institution that intermediates funds from the public and reallocates them to support economic activities and improve societal welfare.

### **Banking Management**

Bank management, according to Koch and MacDonald (2014), involves supervising and controlling banking activities to achieve organizational goals while managing risks. This includes financial planning, risk management, asset-liability management, customer relationship management, and strategic decision-making. Effective bank management requires a deep understanding of financial systems, regulatory frameworks, and market trends. Activities include financial analysis, credit risk management, investment management, treasury operations, marketing, human resource management, and regulatory compliance.

### **Fee-Based Income**

According to Kasmir (2019), fee-based income refers to revenue earned from banking services other than interest income. Taswan (2013) defines it as non-interest income derived from banking service commitments. Lapoliwa and Kuswandi (2000) describe it as income from fees and commissions. Thus, fee-based income is operational revenue generated from banking services outside interest income, supporting the bank's core intermediation activities.

In this study, fee-based income is calculated as:

FBI = Total Fee-Based Revenue

FBI = ATM Fees + Internet Banking Fees + Mobile Banking Fees

### **Digital Banking**

Digital banking refers to banking services delivered through electronic channels owned by banks and accessed via digital media by customers. These services enable customers to perform a wide range of activities independently, including account opening, financial transactions, communication with the bank, and access to financial information. The development of digital banking is closely associated with advancements in information technology, which have transformed traditional banking services into more efficient, accessible, and user-oriented systems.

Electronic banking (e-banking) encompasses various digital service platforms such as Automated Teller Machines (ATM), Electronic Data Capture (EDC), internet banking, mobile banking, and SMS banking. These platforms provide significant benefits for both banks and customers, including time efficiency, cost reduction, and ease of access without geographical limitations. From the customer perspective, digital banking eliminates the need to visit physical bank branches, as transactions can be conducted anytime and anywhere through internet-connected devices.

Among the primary components of digital banking, ATMs serve as electronic devices that allow customers to conduct transactions such as cash withdrawals, fund transfers, and balance inquiries. ATM services have evolved into several types, including cash withdrawal machines, cash deposit machines (CDM), and multifunctional ATMs that integrate various banking services in one device. In addition, internet banking enables customers to perform financial transactions via web-based platforms using computers or smartphones, offering services such as fund transfers, bill payments, account monitoring, and access to financial information. Furthermore, mobile banking represents a more advanced and flexible service, as it allows customers to conduct banking transactions through mobile applications. This service provides greater convenience and accessibility, enabling users to perform transactions in real time regardless of location, thereby becoming one of the most widely adopted digital banking channels in modern banking systems.

## **RESEARCH METHODS**

This study employs a quantitative research design grounded in statistical analysis to examine the relationship between electronic banking transactions and fee-based income in the Indonesian banking sector. The approach emphasizes precise measurement of variables to generate generalizable conclusions independent of time and context. The research was conducted using secondary data obtained from the Financial Services Authority (Otoritas Jasa Keuangan/OJK) and official banking reports for the period 2021–2024. The population consists of 36 conventional commercial banks registered with OJK, from which 10 banks were selected as samples using purposive sampling based on specific criteria, including data completeness on ATM, mobile banking, internet banking transactions, and fee-based income. Data collection techniques include documentation and literature review, drawing from financial reports, academic journals, and official institutional publications.

The variables in this study consist of three independent variables – ATM transactions, mobile banking transactions, and internet banking transactions – and one dependent variable, namely fee-based income. Each variable is operationalized using measurable indicators, particularly the annual transaction volume for each electronic banking channel and the total non-interest income derived from transaction-related fees. The analytical framework applies multiple linear regression to assess both partial and simultaneous effects of the independent variables on the dependent variable. Prior to regression analysis, classical assumption tests are conducted, including

normality, heteroscedasticity, multicollinearity, and autocorrelation tests, to ensure the validity and reliability of the regression model.

Hypothesis testing is performed using t-tests to evaluate the partial effect of each independent variable and F-tests to assess their simultaneous influence on fee-based income, with a significance level of 5 percent. Additionally, the coefficient of determination ( $R^2$ ) is used to measure the explanatory power of the model in describing variations in the dependent variable. Data processing involves stages of data editing, tabulation, and statistical testing using SPSS version 25. Overall, this methodological framework is designed to systematically analyze the extent to which electronic banking services contribute to increasing non-interest income in the banking industry.

## RESULT AND DISCUSSION

### Classical Assumption Tests

Prior to conducting regression analysis, classical assumption tests were performed to ensure that the regression model met the required statistical criteria. These tests include normality, multicollinearity, heteroscedasticity, and autocorrelation tests. The purpose of these tests is to verify that the regression model produces unbiased, consistent, and efficient estimators. The results indicate that all classical assumptions have been satisfied, meaning that the regression model is appropriate for further analysis.

**Table 3.**  
**Normality Test (Kolmogorov-Smirnov)**

Variable	Asymp. Sig. (2-tailed)	Conclusion
Unstandardized Residual	0.200	Normally Distributed

The normality test was conducted using the Kolmogorov-Smirnov method. The results show that the significance value is greater than 0.05, indicating that the residuals are normally distributed. This implies that there is no violation of the normality assumption, and the model is suitable for hypothesis testing.

**Table 4.**  
**Multicollinearity Test**

Variable	Tolerance	VIF	Conclusion
ATM	0.216	4.628	No Multicollinearity
Mobile Banking	0.172	5.799	No Multicollinearity
Internet Banking	0.590	1.695	No Multicollinearity

Furthermore, the multicollinearity test was performed by examining the Variance Inflation Factor (VIF) and tolerance values. All independent variables have VIF values below 10 and tolerance values above 0.10, which indicates that there is no multicollinearity problem among the independent variables.

**Table 5.**  
**Heteroscedasticity Test (Glejser)**

Variable	Sig.	Conclusion
ATM	0.146	No Heteroscedasticity
Mobile Banking	0.587	No Heteroscedasticity
Internet Banking	0.803	No Heteroscedasticity

The heteroscedasticity test was carried out using the Glejser method. The results show that all independent variables have significance values greater than 0.05, indicating that there is no heteroscedasticity problem. This means that the variance of residuals is constant across observations (homoscedastic).

**Table 6.**  
**Autocorrelation Test (Durbin-Watson)**

DW Value	dL	dU	4 - dU	Conclusion
1.669	1.328	1.657	2.343	No Autocorrelation

Additionally, the autocorrelation test using the Durbin-Watson method shows that the value falls within the acceptable range ( $DU < DW < 4 - DU$ ), confirming that there is no autocorrelation in the model. Overall, these results confirm that the regression model meets all classical assumptions.

### Multiple Linear Regression Analysis

The multiple linear regression analysis aims to determine the effect of ATM transactions, mobile banking, and internet banking on fee-based income. Based on the analysis, the regression equation is formulated as follows:

$$FBI = 0.801 + 0.063(ATM) + 0.481(Mobile Banking) + 0.412(Internet Banking) + e$$

The results indicate that mobile banking and internet banking have a positive and statistically significant effect on fee-based income, while ATM transactions show a positive but insignificant effect. Among the variables, mobile banking has the strongest influence on fee-based income.

### Coefficient of Determination (R<sup>2</sup>)

**Table 7.**  
**Coefficient of Determination (R<sup>2</sup>)**

R Square	Adjusted R Square	Interpretation
0.464	0.419	Moderate explanatory power

The coefficient of determination ( $R^2$ ) value of 0.464 indicates that 46.4% of the variation in fee-based income can be explained by ATM, mobile banking, and internet banking, while the remaining 53.6% is influenced by other variables not included in this study.

### Hypothesis Testing (Simultaneous and Partial)

Hypothesis testing was conducted using both F-test (simultaneous) and t-test (partial) to evaluate the effect of independent variables on the dependent variable.

**Table 8.**  
**Combined F-Test and t-Test Results**

Variable	t-value	Sig.	Result (Partial)
ATM	0.891	0.379	Not Significant
Mobile Banking	4.523	0.000	Significant (Accepted)
Internet Banking	2.290	0.028	Significant (Accepted)
F-Test	65.962	0.000	Significant (Model Accepted)

The results of the F-test show that the calculated F-value (65.962) is greater than the F-table value, and the significance level is below 0.05, indicating that all independent variables simultaneously have a significant effect on fee-based income. This confirms that the regression model is statistically valid. Meanwhile, the t-test results reveal that mobile banking and internet banking have a significant positive effect on fee-based income, as their significance values are below 0.05. In contrast, ATM transactions do not have a significant effect, as the significance value exceeds 0.05. Therefore, hypotheses H2 and H3 are accepted, while H1 is rejected. Overall, these findings indicate that digital banking services, particularly mobile and internet banking, play a crucial role in increasing fee-based income in the banking sector.

### Discussion

#### The Effect of ATM Transactions on Fee-Based Income

The results of the regression analysis indicate that ATM transactions do not have a significant effect on fee-based income. This is evidenced by a regression coefficient value of 0.076 and a significance level (Sig.) of 0.379, which is far above the threshold of 0.05. Statistically, this means that an increase in ATM transactions does not provide a meaningful contribution to fee-based income during the observed period.

ATM transactions remain one of the electronic banking services widely used by customers, particularly for routine activities such as cash withdrawals, transfers, and bill payments. However, in the context of current digital banking development, the contribution of ATM services to non-interest income appears

to be declining, as it is increasingly replaced by more modern services such as mobile banking and internet banking, which offer greater flexibility and efficiency.

These findings suggest that although ATM transaction volumes remain relatively high, their contribution to fee-based income is not as strong as expected. This may be due to high operational costs and the limited range of fee-based services offered through ATMs. The results also indicate that banks may not have fully optimized the monetization of ATM services compared to other electronic transaction channels.

This finding is consistent with previous studies, such as Rofiqoh Istiqomah (2022), which concluded that the number of ATMs does not significantly affect non-interest income in Indonesian banks. Similarly, Gumilang and Azib (2019) found that although ATM transactions had a significant effect, the coefficient direction was negative, indicating that increased ATM activity could actually reduce non-interest income. Therefore, this study supports the conclusion that ATM transactions do not significantly influence fee-based income.

#### **The Effect of Mobile Banking Transactions on Fee-Based Income**

The regression analysis shows that mobile banking has a positive and significant effect on fee-based income. This is supported by a t-value of 4.523, which is greater than the t-table value of 2.028, and a significance level of 0.000, which is below 0.05. The regression coefficient of 0.481 also indicates a positive contribution of mobile banking transaction volume to the increase in non-interest income.

Thus, the higher the volume of mobile banking transactions, the greater the fee-based income generated by banks. Mobile banking represents a technological innovation that provides convenience and accessibility for customers to conduct transactions such as fund transfers, payments, purchases, and balance inquiries through mobile devices. The increasing use of smartphones has significantly driven the adoption of this service.

These findings support the theory that the digitalization of banking services contributes significantly to efficiency and profitability. Mobile banking not only provides instant services to customers but also creates new revenue streams through administrative fees, transaction fees, and premium application-based services.

This result is in line with previous studies. Gumilang and Azib (2019) found a significant relationship between mobile banking transactions and fee-based income. Similarly, Andrew P. Marunduh (2024) concluded that e-banking transactions, including mobile banking, have a strong and positive effect on fee-

based income. Active utilization of mobile banking enhances bank financial performance through increased commission income and operational efficiency.

### **The Effect of Internet Banking Transactions on Fee-Based Income**

The regression analysis indicates that internet banking has a positive and significant effect on fee-based income. This is shown by a t-value of 2.290, which is greater than the t-table value of 2.028, and a significance level of 0.028, which is below 0.05. In addition, the regression coefficient of 0.412 confirms a positive relationship with fee-based income. Therefore, an increase in internet banking transactions contributes to higher non-interest income.

Internet banking is an electronic banking service that enables customers to access and manage their accounts online through computers or internet-connected devices. It allows users to perform various banking activities such as fund transfers, bill payments, financial product purchases, and transaction monitoring. Many of these services involve transaction fees, which directly contribute to fee-based income.

As a digital channel that serves both retail and corporate customers, internet banking plays a crucial role in improving operational efficiency and expanding service reach without geographical limitations. This demonstrates that internet banking is not only a service channel but also a strategic source of fee-based revenue that can be optimized by banks.

These findings are consistent with previous studies. Amalia and Guntur (2023) found that internet banking has a positive and significant effect on fee-based income. This is further supported by Arisanti and Prihatiningsih (2019), who showed that e-banking transactions positively influence non-interest income. Additionally, Haris and Suryanto (2024) stated that internet banking contributes to increased non-interest income, particularly through transaction fees and digital financial product services. Therefore, optimizing internet banking services is an important strategy for improving profitability and revenue efficiency in modern banking.

### **The Simultaneous Effect of ATM, Mobile Banking, and Internet Banking on Fee-Based Income**

Based on the multiple linear regression results, ATM, mobile banking, and internet banking simultaneously have a significant effect on fee-based income. This is indicated by an F-value of 65.962, which is greater than the F-table value of 2.866, and a significance level of 0.000, which is below 0.05. This means that collectively, these three variables can explain variations in fee-based income among the sampled banks.

These findings indicate that the utilization of electronic banking services – ATM, mobile banking, and internet banking – represents an effective strategy

for generating alternative revenue sources beyond interest income. Fee-based income is derived from administrative fees, transaction services, digital payments, and other value-added services provided through electronic channels. Collectively, electronic banking expands service reach without proportionally increasing operational costs, thereby enhancing efficiency and profitability.

Although ATM services contribute to non-interest income, their impact is not as strong as that of mobile banking and internet banking. Therefore, banks need to continuously innovate and develop adaptive digital services to maximize fee-based income potential.

This result is consistent with previous research by Lenawati Haryanto et al. (2024), which found that electronic banking services collectively have a significant effect on fee-based income. Similar findings were also reported by Utaminingsih and Sularto (2015), indicating that electronic banking contributes positively to improving service quality and bank revenue. Overall, while all three variables significantly influence fee-based income simultaneously, only mobile banking and internet banking show a significant partial effect, whereas ATM does not exhibit a strong individual impact during the observation period.

## **CONCLUSION**

This study aims to provide empirical evidence on the effect of electronic banking transactions, proxied by the number of ATM, mobile banking, and internet banking transactions, on fee-based income in conventional commercial banks registered with the Financial Services Authority during the 2021–2024 period. The results indicate that ATM transactions do not have a positive and significant effect on fee-based income, leading to the rejection of the first hypothesis (H1). In contrast, mobile banking and internet banking transactions are proven to have a positive and significant effect on fee-based income, supporting the acceptance of the second (H2) and third (H3) hypotheses. Furthermore, when examined simultaneously, ATM, mobile banking, and internet banking collectively have a positive and significant effect on fee-based income, thereby confirming the fourth hypothesis (H4). These findings suggest that while ATM services still play a supporting role, digital banking channels, particularly mobile and internet banking, are the main drivers of non-interest income growth in the modern banking sector.

## SUGGESTION

Based on the findings, several recommendations can be proposed. Banking institutions are encouraged to continuously optimize mobile banking and internet banking services, as these have been proven to significantly enhance fee-based income; this can be achieved through feature innovation, improved transaction security, and greater accessibility to increase user adoption. Although ATM services are not statistically significant, they should still be maintained as complementary infrastructure to support banking transactions. Regulators, including the Financial Services Authority and Bank Indonesia, are expected to further promote banking digitalization through policies that support cost efficiency, system security, and public education on digital financial services. For future research, it is recommended to incorporate additional relevant variables, extend the observation period, and expand the sample size to include a broader range of banking institutions, such as rural banks, in order to obtain more comprehensive and representative findings regarding the determinants of fee-based income in Indonesia's banking sector.

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