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ISLAMIC FINTECH'S ROLE IN SUSTAINABLE FINANCE: EMPOWERING WOMEN IN ACEH

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Abstract

This research examines the influence of Islamic Fintech as inclusive finance on sustainable finance in the Aceh province, with women's empowerment as a moderating variable. The research approach used is quantitative, utilizing multiple regression analysis (MRA) for the linear regression model. The research methodology involves several steps, including data observation, identifying key issues, setting research objectives, literature review, data collection, data processing, results analysis, and research evaluation. The study aims to investigate the extent to which the existence of Islamic Fintech contributes to sustainable financial development in Aceh. Additionally, the research focuses on women's empowerment as a moderating variable, specifically its impact on the relationship between Islamic Fintech and sustainable finance. By employing a quantitative approach, this study seeks to generate empirical evidence that can provide an in-depth understanding of the influence of Islamic Fintech on sustainable finance and to evaluate whether women's empowerment can moderate this relationship. The research findings show that Islamic Fintech significantly impacts sustainable finance, while women's empowerment does not moderate the relationship between Islamic Fintech and sustainable finance.

Keywords: ***Islamic Fintech, sustainable finance, women's empowerment***

INTRODUCTION

Aceh Province is known for its strong foundation in Islamic values (Hadi, 2016). It has adopted the digitalization of Islamic finance and embraced innovations in Islamic Financial technology (Fintech) to promote financial systems aligned with Sharia principles (Rahim et al., 2019). Despite these advancements, significant challenges remain, particularly concerning the economic empowerment of women (Surti et al., 2024). One of the main issues women face in Aceh's rural areas is the lack of access to digital and traditional Islamic banking services. Geographic distances, limited financial infrastructure, and inadequate transportation create significant barriers for women (Kemenkeu, 2022). Additionally, as Komnas Perempuan, (2020) noted that women in Indonesia, including Acehnese, face significant gaps in digital literacy and technological access, which are critical in this digital era. Addressing these gaps is essential to enabling women to benefit from the rapidly growing financial services sector.
Women's role as household financial administrators, typically family treasurers, is crucial (Noviriani et al., 2022).

However, their reliance on joint decision-making with other family members, such as their husbands, can hinder their financial independence and participation in economic decisions (Zuhrah, 2013). This reliance, while collaborative, can sometimes limit women's financial autonomy. The role of Islamic Fintech in empowering women in Aceh aligns with broader efforts to support women in contemporary Indonesia (OJK, 2022). As (Sakai, 2019) highlights the crucial intersection of Islam, work, and family to understanding women's economic empowerment in Indonesia. Sakai & Fauzia, (2022) have explored how middle-class Muslim women engage in economic activities while navigating Islamic practices, ultimately contributing to poverty reduction and broader economic inclusion through innovative Islamic financial tools. The development of Islamic Fintech, particularly in microfinance, crowdfunding, and peer-to-peer lending platforms, provides accessible Sharia-compliant financial solutions for women, thereby supporting their financial independence (Koto, 2021). The innovation of Islamic Fintech is closely linked to the achievement of the Sustainable Development Goals (SDGs), particularly in terms of poverty reduction and the enhancement of financial inclusion (Hudaefi, 2020). Data from the Central Bureau of Statistics (BPS) shows that the poverty rate in Aceh has been steadily decreasing every year, and one of the key factors contributing to this positive trend is the expansion of Sharia-based financial inclusivity (BPS, 2023).

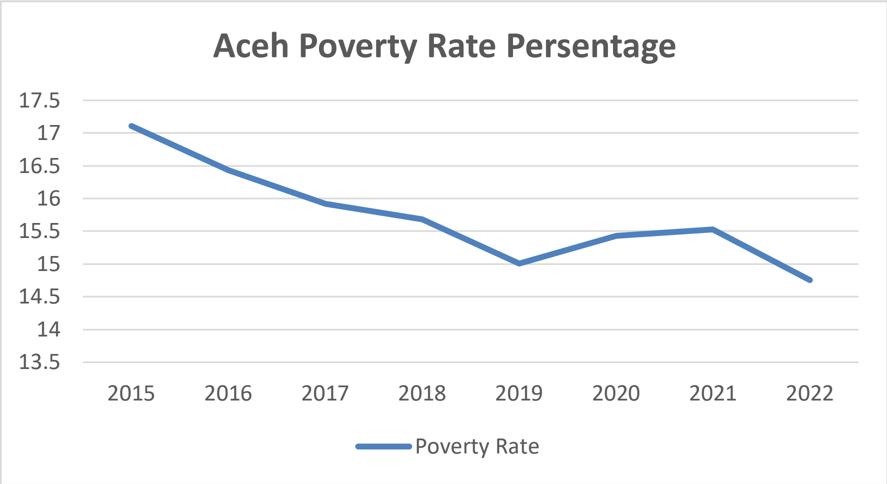

Figure 1. The Poverty Rate Percentage in Aceh
(Source: Badan Pusat Statistik, 2023)

Sharia-based financial products, including innovations in Islamic Fintech, have significantly expanded access to sustainable financial services (Hassan et al., 2022). Islamic Fintech, through Sharia-compliant microfinance and peer-to-peer lending platforms, has provided crucial financial solutions that allow women, particularly in areas with high poverty rates, to engage in micro and small enterprises (Nurfadilah & Samidi, 2021). This expanded access to inclusive financing is critical in boosting their income and improving the economic conditions of their families and communities (Aziz et al., 2022). Islamic Fintech provides a range of Sharia-compliant financial products designed to meet the needs of individuals who may otherwise be left out of the conventional financial system, particularly women in rural areas (Lia, 2021). This inclusivity is important for fostering long-term economic sustainability, as access to finance allows women to start or grow businesses, create employment opportunities, and contribute to the local economy (Bedoui & Aaminou, 2021). By empowering women to participate more actively in the economy, Islamic Fintech enhances financial independence and helps address gender inequalities in access to financial resources.

The role of Islamic Fintech extends beyond financial inclusion (Baber, 2020). It also catalyzes sustainable economic growth in Aceh by promoting poverty reduction and financial inclusivity. By offering an alternative to conventional financial systems, Islamic Fintech provides a bridge for those who are unbanked or underbanked, helping them access much-needed capital and financial services (Demirdöğen, 2020). This financial inclusion helps to uplift marginalized communities, particularly women, by providing them with the tools they need to improve their livelihoods. Moreover, the principles of Sharia that govern Islamic financial products ensure that these services are ethical and socially responsible, promoting fairness and transparency in financial dealings (Rabbani, 2023). The ongoing development of Islamic Fintech in Aceh significantly contributes to achieving the Sustainable Development Goals (SDGs), particularly in areas such as poverty reduction, gender equality, and economic growth (Najih, 2017). By facilitating financial inclusion and providing opportunities for income generation, Islamic Fintech plays an essential role in reducing the wealth gap and fostering a more equitable economic landscape in Aceh. As more individuals and businesses access these financial services, the economy benefits from increased entrepreneurial activity, job creation, and enhanced financial stability.

LITERATURE REVIEW

Islamic Fintech

Islamic Financial Technology (Islamic Fintech) applies financial technology that complies with Shariah law. It focuses on providing financial solutions that are free from riba (interest), gharar (excessive uncertainty), and haram activities, making it unique compared to conventional Fintech (Musjtari et al., 2022). Islamic Fintech encompasses various modern innovations in the financial sector, enabling platforms that bridge the gap between ethical finance and financial inclusion, particularly in regions with a Muslim majority (Oseni & Ali, 2019). The rapid development of Islamic Fintech has created opportunities for sustainable economic growth by promoting inclusivity, particularly in areas where conventional banking has failed to reach (Tajudin et al., 2020).

Impact of Islamic Fintech on Sustainable Finance

Sustainable finance is the integration of environmental, social, and governance (ESG) factors into investment decision-making processes (In et al., 2019). In Indonesia, Islamic Fintech has become a critical tool in promoting sustainable financial solutions encouraging financial inclusion for marginalized groups, particularly women (Lia, 2021). By providing Shariah-compliant financial services, Islamic Fintech fosters the growth of ethical finance, which helps reduce poverty and enhance social equity (Mohamed, 2020). Innovations such as crowdfunding, microfinance, and peer-to-peer (P2P) lending provide financial services to underserved populations, contributing to inclusive economic growth (Barata, 2019). The focus on sustainability also aligns Islamic Fintech with global initiatives such as the UN's Sustainable Development Goals (SDGs), particularly in poverty alleviation and financial equity (Nations, 2024).

Empowerment of Women in Islamic Fintech

Women's empowerment through Islamic Fintech is vital in advancing economic growth and social stability (Koto, 2021). Empowerment involves enhancing women’s ability to make financial decisions and transform their economic opportunities (Buvinic et al., 2022). In regions like Aceh, where conventional banking may be inaccessible, Islamic Fintech provides women with opportunities to gain financial independence through Shariah-compliant microfinance services (Srimulyani, 2013). These services allow women to engage in entrepreneurial activities, start small businesses, and generate income to improve their households' well-being. Empowering women financially is crucial to fostering broader economic development, particularly in rural areas where access to traditional financial services remains limited (Pakkana & Arsyad, 2017). Despite their significant role in managing household finances, many women in Aceh face barriers to financial literacy and access to resources (Zuhrah, 2013). Islamic Fintech can bridge this gap by providing accessible financial tools, helping women achieve independence, and overcoming these obstacles (AR, 2023). However, more focused efforts are required to address the gaps in technology access and digital literacy that continue to hinder women in rural areas from fully benefiting from Islamic Fintech platforms (Hasan et al., 2023).

The Role of Islamic Fintech in Promoting Financial Inclusion

Islamic Fintech has the potential to significantly expand financial inclusion by offering digital financial services to unbanked populations, particularly in rural area (Demirdöğen, 2020). The role of Islamic Fintech goes beyond economic inclusion it promotes social inclusion by aligning financial services with Islamic values, making them culturally acceptable and accessible to broader segments of the population (Mohamed, 2020). Digital platforms, such as Islamic microfinance institutions, enable users to access various financial services, including loans, insurance, and investment options, all compliant with Shariah principles (Spence, 2021). These platforms address critical gaps in conventional banking by providing financial solutions tailored to underserved populations, helping to reduce inequality and improve financial well-being (Beik & Arsyianti, 2021). By focusing on both economic and social aspects of inclusion, Islamic Fintech is crucial in ensuring that even the most marginalized communities, including women in rural areas, have access to the financial tools necessary for economic growth and empowerment (Lia, 2021).

Challenges and Opportunities in Empowering Women through Islamic Fintech

One of the primary challenges in empowering women through Islamic Fintech is the digital divide, particularly in rural regions like Aceh. Internet penetration in these areas remains low, creating a barrier to accessing digital financial services (Onitsuka et al., 2018). Furthermore, social and cultural norms often limit women's full participation in financial decision-making processes. These cultural constraints can prevent women from utilizing financial technology effectively, exacerbating their exclusion from economic opportunities (Nova et al., 2023). This digital and cultural divide highlights the importance of addressing both technological and societal factors when attempting to empower women through Islamic Fintech. However, there are significant opportunities to overcome these challenges throu(Kemenkeu, 2022)gh targeted interventions. Programs aimed at improving digital literacy and financial education can help mitigate the technological barriers women face, enabling them to make better use of Fintech platforms. Enhancing access to technology in rural areas, such as increasing internet availability and providing affordable devices, would also be a critical step toward bridging the digital divide (Yu & Wang, 2022). Moreover, Islamic Fintech platforms must develop more Shariah-compliant financial products that cater specifically to women's needs. As Shehab & Hamdan, (2021) emphasize, customized financial products designed to meet the unique requirements of female entrepreneurs in rural areas could play a transformative role in increasing their economic participation (Patrick et al., 2016). Such efforts and a supportive policy environment could significantly boost women's financial inclusion, contributing to long-term economic sustainability (Romano et al., 2020). At a global level, there is also the opportunity to learn from regulatory frameworks such as Spain's RegTech approach to Fintech sustainability. As outlined by Rambaud & Gázquez, (2022), countries can benefit from developing comprehensive regulations that support the safe expansion of Fintech while ensuring data protection and promoting financial transparency. Applying these lessons to Aceh could further enhance the integration of women into the financial system while ensuring that Islamic Fintech operates within a robust legal framework.

METHODOLOGY

Research Design and Methods

This study employs a quantitative research approach to examine the impact of Islamic Fintech on sustainable finance in Aceh, with a specific focus on the moderating role of women's empowerment. The research design encompasses the development of a structured survey instrument, purposive and quota sampling techniques, and applying multiple regression analysis to test the proposed hypotheses. Below is a comprehensive outline of this study's research design and methodologies.

1. **Research Approach and Rationale**
   The quantitative approach was chosen to facilitate the measurement of relationships between variables and to provide statistically significant results. This approach allows for the objective quantification of the influence of Islamic Fintech on sustainable finance and the evaluation of women's empowerment as a moderating factor. The study aims to generalize findings to a broader population within Aceh by employing statistical techniques.

2. **Population and Sampling**
   2.1. Population
   The population for this study comprises female individuals aged 20 to 60 and older residing in Aceh. According to the latest data from Badan Pusat Statistik (BPS) 2021, the total population of women within this age range in Aceh is approximately 2,731,657.
   2.2. Sample Size and Sampling Technique
   A sample size of 111 female respondents was determined to balance manageability and statistical power. The sampling process consisted of two stages:
   a. Purposive Sampling:
   This technique was employed to select women from various professional backgrounds across Aceh, ensuring that the sample included diverse occupations. Purposive sampling aims to capture various experiences and perspectives regarding using Islamic Fintech in daily financial activities, regardless of employment status. This approach ensures that the study reflects the broader population, including women employed in formal and informal sectors, unemployed women, and students.
   b. Quota Sampling:
   Quota sampling was used to ensure that the respondents were proportionally representative of different demographics, including age groups, educational backgrounds, and income generation. This method was designed to capture the diverse experiences of women in Aceh regarding their access to and use of Islamic Fintech services.

Table 1. Sample Study Characteristics

Characteristic	Categories	Frequency	Percentage (%)
Age Group	20-29	44	46%
	30-39	27	28%
	40-49	21	22%

Characteristic	Categories	Frequency	Percentage (%)
	50-59	7	7%
	> 60	1	1%
Educational Level	High School (SMA/Sederajat)	33	34%
	Diploma	10	10%
	Bachelor's Degree (S1)	44	46%
	Master's Degree or Higher Education	7	7%
Employment Status	Self-Employed (UMKM)	6	6%
	Employed in the Formal Sector	31	32%
	Unemployed	53	55%

(Source: Data Processed, 2024)

3. **Data Collection Instrument**

3.1. **S**urvey Instrument

A Likert scale is a common tool for measuring attitudes or perceptions. Respondents rate their agreement or feelings on a scale from 1 to 5. The scale typically ranges from "strongly disagree" to "strongly agree," with the middle point representing a neutral stance. This format allows researchers to quantify subjective opinions and analyze them systematically. Data were collected through a combination of online surveys and face-to-face interviews to ensure comprehensive coverage across different regions in Aceh.

3.2. Validity and Reliability

To ensure the validity and reliability of the survey instrument:

1. Construct Validity: Exploratory Factor Analysis (EFA) was conducted to verify the underlying structure of the constructs. Items with factor loadings below 0.50 were discarded to enhance construct validity.
2. Reliability: Cronbach's Alpha was calculated for each construct to assess internal consistency. All constructs achieved a Cronbach's Alpha value above 0.70, indicating acceptable reliability.

4. **Data Analysis Techniques**

4.1. Descriptive Statistics

Descriptive statistics were employed to summarize the respondents' demographic characteristics and the survey items' central tendencies. Measures such as mean, standard deviation, and frequency distributions provided an overview of the data.

4.2. Inferential Statistics

The primary analytical method used was Multiple Regression Analysis (MRA), which allowed for the examination of Islamic Fintech's direct and moderating effects on sustainable finance.

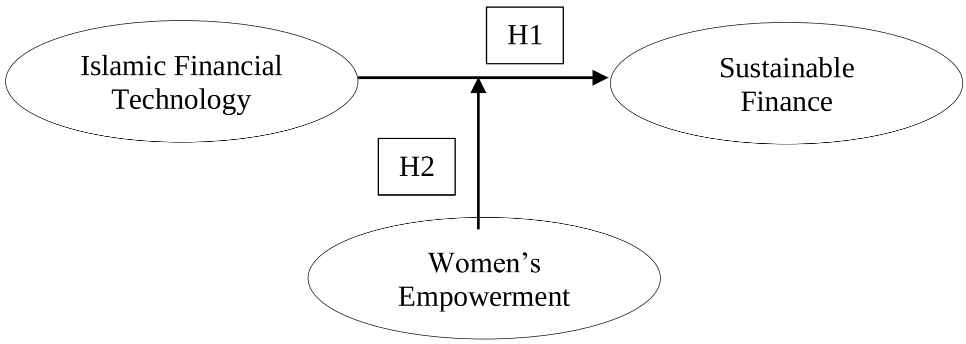

Figure 2. Conceptual Framework

4.3. Moderated Regression Analysis (MRA)

To test the moderating effect of women's empowerment, interaction terms were created by multiplying the standardized scores of Islamic Fintech and women's empowerment. The regression model was specified as follows:

$$\text{Sustainable Finance} = \beta + \beta_1(\mathit{Islamic\ Fintech}) + \varepsilon \qquad \textbf{... (1)}$$

$$\text{Sustainable Finance} = \beta + \beta_1(\mathit{Islamic\ Fintech}) + \beta_2(\mathit{Women'sEmpowerment}) + \beta_3(\beta_1(\mathit{Islamic\ Fintech}) * \beta_2(\mathit{Women'sEmpowerment})) + \varepsilon \qquad \textbf{... (2)}$$

4.4. Structural Equation Modeling (SEM)

Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed for a more comprehensive analysis using SmartPLS software. PLS-SEM facilitated the assessment of both the measurement model (validity and reliability) and the structural model (hypothesis testing).

Table 2. Hypotheses and Corresponding Models

Hypothesis	Model Type	Variables Involved
H1: Islamic Fintech significantly affects sustainable finance	Direct Effect Model	Islamic Fintech → Sustainable Finance
H2: Women's empowerment moderates the relationship between Islamic Fintech and sustainable finance	Moderating Effect Model	Islamic Fintech × Women's Empowerment → Sustainable Finance

RESULT AND DISCUSSION

1. Result

a. Outer Model

The outer model analysis in this study shows that all variables achieve convergent validity, as indicated by the outer loading values for each indicator. For the Islamic Fintech variable, outer loadings range from 0.815 to 0.882, while the Sustainable Finance variable has outer loadings between 0.692 and 0.896. The Women Empowerment variable displays outer loadings ranging from 0.750 to 0.919. Since all these values exceed the minimum recommended value of 0.50, it confirms that the variables used in this study demonstrate strong convergent validity. The discriminant validity of the model was assessed using the Fornell-Larcker criterion, where the Average Variance Extracted (AVE) values for each variable were higher than the correlations between the constructs. For instance, the AVE for Islamic Fintech is 0.831, for Sustainable Finance is 0.838, and for Women's Empowerment is 0.852. This suggests that each construct is more strongly associated with its indicators than the other constructs, confirming the distinctiveness of each variable.

Regarding reliability, Cronbach's alpha and composite reliability values for all variables are above the accepted benchmark of 0.7, indicating strong internal consistency. The Islamic Fintech variable has a Cronbach's alpha of 0.911 and a composite reliability of 0.931. Similarly, the Sustainable Finance variable has a Cronbach's alpha of 0.915 and a composite reliability of 0.934, while the Women Empowerment variable shows a Cronbach's alpha of 0.923 and a composite reliability of 0.940. These values indicate that the variables are measured reliably across their respective indicators.

b. Inner Model

Table 3. Variable Relationship Mode

Variable	R-Square	R-Square Adjusted	Path Coefficient	T Statistic	P Values	F Square
Sustainable Finance	0.631	0.621				

Islamic Fintech → Sustainable Finance	0.221	1.376	0.169	0.052
Women Empowerment x Islamic Fintech → Sustainable Finance	-0.048	1.302	0.193	0.017

(Source: Data Processed, 2024)

H1: Islamic Fintech Positively Impacts Sustainable Finance

The first hypothesis test (H1) results indicate that Islamic Fintech has no statistically significant effect on Sustainable Finance. The path coefficient for the relationship between Islamic Fintech and Sustainable Finance is 0.221, with a p-value of 0.169, greater than 0.05, indicating that this relationship is not statistically significant. Additionally, the T-statistic of 1.376 further confirms that the relationship is not strong enough to be considered significant. The R-squared value for this relationship is 0.631, meaning Islamic Fintech explains 63.1% of the variance in Sustainable Finance, but its impact is not statistically significant. The F-square value for this relationship is 0.052, indicating a small effect size.

H2: Women Empowerment Does Not Moderate the Relationship Between Islamic Fintech and Sustainable Finance

The second hypothesis test (H2) results indicate that Women's Empowerment does not significantly moderate the relationship between Islamic Fintech and Sustainable Finance. The path coefficient for the interaction between Women's Empowerment and Islamic Fintech is -0.048, with a p-value of 0.193, which is greater than 0.05, indicating that the interaction effect is not statistically significant. Furthermore, the F-Square value for the moderating effect is 0.017, compared to 0.052 for the direct effect of Islamic Fintech on Sustainable Finance, further confirming that the moderation effect is minimal and negligible.

Goodness of Fit (GoF)

The Goodness of Fit (GoF) value, calculated as the square root of the product of the average AVE and the average R-Square, is 0.667. This value, derived from the formula $\sqrt{0.706 \text{ x } 0.631}$, indicates that the combined performance of this study's outer and inner models is considered vital. The GoF score suggests that the overall model, in terms of measurement and structural components, performs well in explaining the relationships among the variables.

2. Discussion

Islamic Financial Technology (Islamic Fintech) is an innovation widely expected to support financial inclusion, particularly in regions with a majority Muslim population like Aceh (Ascarya & Sakti, 2020). This technology offers various Sharia-compliant services, such as microfinance, crowdfunding, and P2P lending, which are expected to provide solutions for communities that have previously struggled to access conventional financial services (Yudaruddin, 2023). However, the findings of this study indicate that Islamic Fintech has not had a significant impact on sustainable finance in Aceh. These findings are consistent with several studies showing that financial technology's impact in areas with low levels of financial literacy is often not significant.

According to Marhadi et al., (2024), financial literacy greatly influences how people use financial services, including Fintech. In Aceh, many people, especially in rural areas, have a limited understanding of utilizing Islamic Fintech to support their financial needs. Low digital literacy is also a significant barrier, as people are not yet accustomed to using internet-based technology for financial transactions (Seldal & Nyhus, 2022). This is consistent with the findings of Nugraha et al. (2022), who emphasized the importance of financial literacy in increasing the adoption of financial technology. Additionally, the lack of socialization regarding Islamic Fintech has hindered the adoption of these services in Aceh. Many people do not fully understand the benefits and workings of Islamic Fintech, resulting in low trust in the service (Darmansyah et al., 2021). Trust issues have become an important factor hindering the use of financial technology in Indonesia (Lubis et al., 2023). Research by Hong, (2015) shows that consumer trust in the security and privacy of online transactions is crucial to successfully adopting internet-based technologies. In Aceh, people accustomed to traditional financial methods are hesitant to adopt Sharia-based digital financial solutions. The lack of sufficient understanding regarding the security, benefits, and mechanisms of these Sharia-compliant digital financial services further slows the transition to this financial technology (Rivaldi & Dinaroe, 2022).

This study also found that women's empowerment has not played a significant role as a moderating variable in strengthening the relationship between Islamic Fintech and sustainable finance. This contradicts several studies that suggest that women's empowerment, particularly in financial aspects, can strengthen the adoption of financial technology. Caliyurt, (2016) emphasized the importance of women's involvement in economic decision-making to promote financial inclusion. However, in Aceh, social and cultural norms still limit women's participation in financial decision-making, especially at the strategic level, such as managing loans or investments (Nova et al., 2023). This limits women's potential to utilize Islamic Fintech to improve their economic well-being fully. On the other hand, this study's findings are consistent with those of (Hasan et al., 2023), who found that although women's empowerment can enhance financial inclusion, its impact is often limited when faced with social-cultural barriers and low financial literacy. In Aceh, male dominance in financial decision-making remains strong, so even though women manage household finances, they do not have full control over more significant financial decisions (Herman & Maulana, 2024). Therefore, steps that need to be taken to improve the effectiveness of Islamic Fintech in Aceh include increasing financial and digital literacy and more intensive socialization about its benefits. Additionally, women's empowerment should continue to be encouraged through technical training and addressing the social and cultural barriers that limit women's participation in economic decision-making.

CONCLUSIONS

This study demonstrates that Islamic Fintech significantly enhances financial inclusion in Aceh, particularly for communities that are challenging to reach through conventional financial services. By expanding access to Sharia-compliant financing, Islamic Fintech provides solutions for marginalized groups, including women. However, women's empowerment as a moderating factor in the relationship between Islamic Fintech and financial sustainability has not shown a significant impact. As a result, while access to financial services has increased, the benefits for women have not been fully optimized.

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