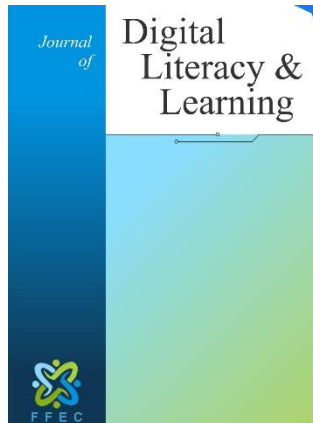




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Digital Literacy as a Catalyst for Digital Financial Inclusion: Impacts on Financial Stability and Environmental Sustainability in SAARC Countries

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Abstract

Economic and financial inclusion propels the efforts to enable all individuals and business entities to access appropriate and affordable financial products. It has become an important element in the development strategies of many economies, and more research is being carried out in this field. The typical and dissimilar objectives within the context of South Asian Association for Regional Cooperation (SAARC) countries are to advance the financial inclusion and encroachment on digital finance on the one hand and enhance the financial growth along with quality environment on the other hand, though the SAARC countries' financial objectives are quite contemplative. Thus, this paper aims to focus on digital financial inclusion in the SAARC context and its effects on financial stability and environmental sustainability during the period 2015-2020. GMM method was applied for data analysis. The findings of the study show that increased debit card usage positively influences economic growth, and the environmental costs associated with digital financial inclusion, particularly through increased CO2 emissions from ATM transactions and internet usage. This indicates a need for sustainable practices in the expansion of digital financial services. This research paper has implications for policy makers and financial institutions. It is critical to consider environmental sustainability along with economic growth. So that the environmental impact of increased digital financial activity could be mitigated by adopted useful strategies.

Keywords: Financial Inclusion, Financial Stability, Environmental Sustainability, SAARC countries

Introduction

One of the important catalysts for economic growth, poverty reduction and financial stability in the country is attributed to financial inclusion. It guarantees that the customers and the organizations can access cost effective and suitable financial services. Not only to the economic growth, but financial inclusion is also considered as a crucial element for sustainable development. This feature is duly highlighted by the international monetary fund (IMF) and the

world bank (WB). This aspect is not only important for mitigating economic inequalities but also promoting inclusive growth for developed as well as developing economies.

In the context of developing economies, SAARC region that includes Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka has worked significantly towards achieving financial accessibility. The statistical facts show that the proportion of adults with bank accounts in SAARC nations rose from 22% to 43% from 2011 to 2017. It is due to the technological development's government backed programs and the proliferation of microfinance firms. However, despite these advancements, there are some substantial obstacles, for instance financial literacy, limited infrastructure and cultural limitations restrict the access to financial services especially for underprivileged populations

It is pertinent to mention here that the access to financing stimulates innovation and growth for firms. Financial organizations can broaden their clientage and innovate new financial solutions by technologically advancing their facilities. Financial inclusion also has a role to play on a macroeconomic level. It tends to mitigate income disparity and fosters economic stability.

One of the important aspects of financial inclusion in the SAARC region is its convergence with environmental sustainability. It is very important to understand that inclusive financial systems enhance economic resilience by bringing additional persons and organizations to formal economy, however, they may alternatively lead to environmental damage if the growth is not synchronized with sustainable practices. Sadiq and Ali (2024) show that digital financial inclusion significantly adversely affects environmental sustainability by elevating CO₂ emissions. Thus, increased accessibility to credit and financial services frequently results in elevated consumption of energy-intensive products and services, potentially intensifying pollution and resource depletion.

Further, the dark side of digital financial inclusion is the tackling of accessibility issues. The bulge of mobile banking, digital wallets and other services although provide multiple and novel avenues to access marginalized groups yet highlight elevated operational expenses. It shows that the efficacy of digital financial services lies in the digital literacy. There is a huge number of citizens in SAARC nations who have insufficient abilities to utilize digital financial channels, rendering them susceptible to fraud and exclusion. In that context, reconciliation of financial inclusion with financial stability and environmental sustainability is a multifaceted task. It necessitates stringent regulatory supervision to alleviate the financial concerns.

This research aims to study the complex interconnections between financial inclusion, financial stability and environmental sustainability in SAARC region. The findings show positive relationship between the use and growth in GDP thus improving financial literacy. However, there are environmental costs using more ATM transactions and internet options contributing significantly to CO₂ emissions. Overall, it adds to the literature on the subject and provides valuable insights for the policy makers, financial institutions and researchers.

Literature Review

Financial development has become a prerequisite for long-term economic growth (Le et al., 2019). On the other hand, financial inclusion has an important role in the development of

the financial sector and institutions. However, the concept of financier is not so old that it was introduced by Chibba (2009) in the early 2000s, who showed that the main cause of poverty is financial exclusion. Financial inclusion implies that the majority of the country's population should have easy access to a wide range of financial services.

Despite the impact of financial development on economic growth (King & Levine, 1993; Levine et al., 2000; Christopoulos & Tsionas, 2004) and environmental quality (Boutabba, 2014; Li et al., 2022) is extensively studied in the literature, but the role of financial inclusion has not been explored in detail both in the context of economic growth and environmental quality. In this section, we first discuss the studies that have analyzed the impact of financial inclusion on economic growth, and then the impact of financial inclusion on CO2 emissions.

The link between financial inclusion and financial stability:

Most theoretical and empirical literature on the connection between financial inclusion and economic growth has consistently demonstrated a positive impact of financial inclusion on economic growth. The foundation of this relationship dates back to Schumpeter (1939), who emphasized that finance is a crucial driver of growth due to its role in fostering research and development (R&D), enhancing capacity, and enabling the mobilization and allocation of funds into capital formation and economic development.

According to Chen and Sivakumar (2021) the banking sector development has supported a more specialized financial system. This specialized financial system not only supports business activities but also promotes the overall economic growth via financial inclusion. It is the prerequisite for alleviating poverty and promoting economic growth. A study by Boukatem (2016) shows that financial inclusion contributes to poverty reduction and economic expansion significantly. Babajide et al (2021) show that improving total productivity factor lead to increase in economic output and business activities.

Kim et al (2018) and Pradhan et al (2021) show a bidirectional relationship between the financial inclusion and the economic growth. It means both reinforce each other. Vo et al (2021) on the other hand, found that financial inclusion enhances the overall efficacy of monetary policy, ensuring that policy interventions reach broader segments of the population.

Sarma and pais (2011) found that inclusive financial system create accessibility to capital and provides individuals across socio-economic strata with affordable and reliable financial services. This ultimately leads to fostering saving, investments and consumption. This finding is augmented by Dupas and Robinson (2013) by adding that the reliance and use of financial services by these socio-economic strata leads to the improvement in their standards of living ultimately.

Babajide et al (2021) further argue that the presence of an extensive deposit base in banks is associated with the improved resource allocation and effective fiscal policy implementation. However, the relationship between financial inclusion and economic growth is not linear. A study by Amponsah et al (2021) shows an inverted U-shaped relationship, suggesting although financial inclusion initially improves the economic growth, the benefits of financial inclusion may diminish even reverse if financial system become overextended or poorly managed

The link between financial inclusion and environmental sustainability:

Financial inclusion has the potential to either enhance or diminish environmental quality. Financial inclusion facilitates the availability and accessibility of financial services for firms and individuals, enabling more effective investment in technology era. verdant. A more inclusive financial system can positively influence the environment by enhancing its rationality and trustworthiness (Le et al., 2020). Conversely, enhanced inclusion facilitates improved access for enterprises to a broader spectrum of financial services, hence stimulating industrial and manufacturing activity within the economy and elevating CO₂ emissions (Wang et al., 2022).

On the demand side, customers can readily access credit facilities, leading to heightened demand for energy-intensive consumer items, such as automobiles, refrigerators, microwave ovens, irons, air conditioners, washing machines, and dishwashers, thereby elevating CO₂ emissions.

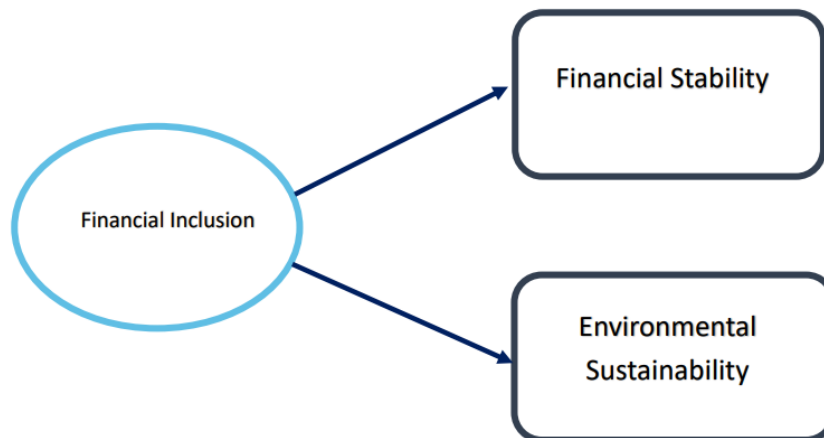
Financial Inclusion, Financial Stability, and Environmental Sustainability in SAARC Nations: Numerous research within the SAARC region have examined the interplay between financial inclusion, financial stability, and environmental sustainability.

Research in India has underscored the beneficial effects of financial inclusion on financial stability, highlighting the necessity for strong regulatory frameworks to mitigate potential risks (Mohapatra & Sahoo, 2019). Research in Bangladesh has recognized the capacity of inclusive funding to promote green projects, especially for climate change adaptation (Bhuiyan et al., 2021).

Underpinning Theory:

The finance-growth theory posited by Bagehot and Street (1915) contended that if a substantial segment of the population lacks easy access to financial goods commensurate with their repayment capabilities, it will result in income inequality and prolonged imbalance, hence hindering economic growth and development. Sparatt and Stephen (2013) contended that the execution of monetary policy in a nation is facilitated by financial inclusion and stability, both of which are essential for economic progress.

Theoretical Framework



Sadiq and Ali (2024) examined the relationship between digital financial inclusion and environmental sustainability in South Asian nations, including Pakistan, India, Bangladesh, and Afghanistan. The study employs GMM methodologies, and the empirical evidence indicates that DFI significantly adversely affects environmental sustainability by elevating CO2 emissions. The study suggests that the increasing number of internet users and renewable energy consumption significantly negatively impact CO2 emissions per capita. The study also highlights that population expansion significantly negatively affects CO2 emissions per capita, but GDP growth and industrialization have no substantial impact on environmental sustainability.

Data and Methodology

The study has obtained data for the year 2015 to 2020. SAARC region has been taken for the purpose of the underlying study. The selection of the time period is due to the availability of the data for all the variables of the study. Further, the selection of SAARC is due to the varying levels of economic development. The region tends to face gaps in infrastructure, digital divides and regulatory challenges that critically influence the economic effects of internet usage. Therefore, it is critical to see if the initiatives and working on the financial inclusion and sustainable environment translate in to economic growth or not.

The following table provides the details about the proxies and data sources

	Variable	Operational Definition	Data Source
1	Environmental sustainability	Co2 emissions	World Bank IMF
2	Economic Performance	GDP	World Bank
3	Financial inclusion	No of Atms as per 100,000 adults	IMF
3	Financial Inclusion	Card holders above 18 years of age.	World Bank

Table 1 variable used in the study

Econometric Model

$$GDP_{it} = \lambda_1 GDP_{it-1} + \phi_1 DFI_{it} + \phi_2 Internet_{it} + \phi_3 IND_{it} + \phi_4 EC_{it} + \phi_5 FDI_{it} + \phi_6 Inflation_{it} + \alpha_i + \epsilon_{it}$$

$$CO2_{it} = \lambda_1 CO2_{it-1} + \phi_1 DFI_{it} + \phi_2 Internet_{it} + \phi_3 IND_{it} + \phi_4 EC_{it} + \phi_5 FDI_{it} + \phi_6 Inflation_{it} + \alpha_i + \epsilon_{it}$$

Results

Table 4.1: Descriptive statistics of variables

	ATM	CO2	DC	GDP	IU
Mean	13.37966	4.34145	1.686142	4.466477	1.258648
Median	10.34	4.167219	1.655503	5.55	1.221397
Maximum	50.04	6.390613	2.002592	14.36	1.902384
Minimum	0	2.693005	1.470033	-33.49	0.568202
Std. Dev.	11.53075	1.041999	0.139779	5.501418	0.336388

The result illustrates the selected economic and environmental values of the member countries within the SAARC region for the study period. A review on the mean, median, maximum, minimum, as well as the standard deviation monitors the distribution and fluctuation of the data, which in return enhances the economic and environmental nature of the region.

High value of standard deviation in the variables such as GDP growth, ATM, and FDI mean to highly variability across the SAARC countries due to difference in economic

development and availability of financial systems. Due to the larger variability around the media than the mean, the median values, which are closer to the lower end of the range, imply that while some countries have made great progress in reaching the financially excluded population, others are trailing and can be potential targets for policy efforts and more efficient and skillful utilization of financial inclusion instruments.

Correlation Statistics

In order to establish relationships between the relevant variables more clearly, a regression analysis was performed. The correlation matrix presented in Table 4.2 shows the significant of the regression analysis's results. Since the correlation matrix shows how strong the relationship is and in which direction, it is used to establish relationships between such variables as ATM availability, debit card usage, number of internet users and GDP growth.

Table 4.2: Correlation matrix

ATM	DC	IU	GDP	
ATM	1	-0.65584	0.702622	-0.18749
DC	-0.65584	1	-0.70616	0.072039
LIU	0.70262	-0.70616	1	-0.30191
GDP	-0.18749	0.072039	-0.30191	1

In Table 4.2, the correlation coefficient of the number of ATMs and the GDP growth rate is -0.18749, which further speaks to a weak negative relationship. Perhaps this means that where there is more ATM, there is typically a slight decline in the growth of GDP. This fact complies well with the estimates obtained in the regression analysis, which showed the negative effect of ATMs on GDP growth.

The correlation of debit card and GDP as follows; Correlation coefficient 0.072, this is a very low value which shows there is a very weak positive relation between the two factors though the regression analysis show debit card has a positive effect on the GDP. This means that though there is low association between debit card usage and growth in economic terms, the impact when other factors are held constant is positive and statistically significant.

The value -0.30191 of correlation coefficient of internet users and GDP growth shows that both the variables have a moderate negative relationship. This implies that rise in internet users corresponds to a negative relationship with the GDP growth rate. Regarding this finding, it is in parity with the regression analysis whereby internet users exert a negative influence on the pattern of GDP growth.

The relationship between ATMs and debit card usage is also strongly negative; coefficient of -0.65584, this means that debit card usage is lower where there are more ATMs available in the certain region. This could be because customers in places with more ATMs continue using cash withdrawals than other online transactions.

The correlation found between ATMs and number of internet users is 0.70262, which means positive relationship with high level of significance. From this it will be inferred that developed regions, which have a high density of ATMs, also have high Internet usage. It could be due to various factors including probably a better overall financial and technology base in these areas.

The coefficient of correlation between debit card usage and internet users is -0.70616 which provides information about negative strength correlation. The above observation means that rising internet connection could reduce debit card usage potentially attributed to the emergence of online banking and mobile money services.

Impact of Debit Cards On GDP Growth

The results of the regression hypothesis suggest a strongly positive correlation between debit card usage (DC) and economic growth that is the proxy variable of GDP. For DC the coefficient is equal to 54.87403 with standard error equal to 21.47462, t statistic equal to 2.555297 and p value equal to 0.0128. This implies that if debit cards usage is occasioned by growth then a convergence has a positive impact on the growth of the GDP.

Table4.3: Regression results for debit cards and GDP growth

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(- 1)	-0.068603	0.017332	- 3.958092	0.0002
DC	54.87403	21.47462	2.555297	0.0128
J-Stats	6.55	P-value	0.36	

The results demonstrated to emphasize the significance of debit card usage for the GDP growth and can contribute relevant information for creating the economic policies and strategies. The obtained results also demonstrate the existence and character of the significant relationship, meaning that the debit card usage promotion can impose positive impact on economic results based on GDP growth indicators. This may be due to an effect of repayment capacity where improved means of digital payment for consumers' products enhances the economic activity.

This study finds that the mobile financial transactions through the debit cards improve the efficiency and security of economic activities, thereby promoting a broader penetration of the formal markets. Making this inclusion the business is capable of cutting down on the overall costs of transactions and thereby cutting down the time taken between each of them, as such

enhancing the economic productivity of the business. These circumstances dictate that the relevant policy makers should design favorable conditions that would ensure debit card usage growth, for instance, by developing ICT framework, strengthening cyber security, and increasing financial awareness among the public.

Impact of ATM On GDP Growth

In the analysis, econometrics regression reveals negative correlation of ATM transactions with GDP growth. The coefficient for ATM is -0.24065 and with the standard error 0.114512 and with the t-statistic -2.101523 the p-value = 0.0392. From this it can be deduced that any increase in the ATM transactions can result in a negative effect on GDP growth.

Table 4.4: Regression results for ATM transactions and GDP growth

Variable	Coefficient	Std. Error	T-Statistic	Prob.
GDP(- 1)	0.027691	0.038512	0.719017	0.4745
ATM	-0.24065	0.114512	- 2.101523	0.0392
J-Stats	5.61	P-value	0.47	

From these observations, it emerges that ATM annual transactions may negatively affect GDP growth. The coefficient of negative and highly significant suggests that while the frequency of transaction through ATM may be correlated with an increase in economic, the result maybe that it slows the pace of economic growth. This might be because the costs of running and maintaining ATM networks might be higher than the services that result from enabling more and improved financial access.

Policy makers should think on how best to enhance usage of ATM's and aligns with other wider value addition to financial inclusion that will not have negative effects on the economy. It includes encouraging more affordable and efficient like mobile banking; Internet banking which would mean the usage of physical ATMs will be reduced. Further, optimization of the general power usage of these devices, including ATMs, can reduce their negative effect on the economy.

Impact Of Internet Users On GDP Growth

From here we can see that there is a very strong negative correlation between LIU and the growth in the GDP of the countries under consideration. We have -7.60526 for LIU which

has a standard error of 2.379034; $t = -3.19678$; $p = 0.0021$ of LIU. But this only means that every increase in internet users has a negative and profound impact on GDP growth.

Table 4.5: Regression results for internet users and GDP growth

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	-0.21307	0.015053	-14.1547	0
IU	-7.60526	2.379034	-3.19678	0.0021
J-Stats	6.37	P-value	0.38	

These results pose a number of questions on the nature of the link between internet use and economic growth. The coefficient of correlation was also found to be strong negative which may be due to initial capital outlay and adjustment costs arising from greater Internet usage. In the same respect, no policy maker should focus on an effort to prevent internet usage bearing in mind its negative effects to the societies especially in causing adverse economic effects in the short run but should instead promote digital transformation and make the intend effects of usage of internet in the long run be effective.

The first stages of Internet usage can be characterized by some significant capital investments within such areas as physical provision and human resource development, which, in the short run, translate into disturbances in the general efficiency of the economy. Nonetheless, as the literacy in the use of the internet increases and the physical infrastructure that supports the internet is developed the benefit equation tips in favor of increase in usage of the internet. Public policy decision-makers should pay attention to consistent, sustainable approaches toward shaping digital change, for instance through funding for digital literacy, subsidies for internet connection, and promotion of the IT utilization.

Impact Of Atm Transactions On Co2 Emissions

By performing regression analysis, the result shows that ATM transactions are positively and significantly related with the CO2 emissions. The coefficient for ATM is 0.001491 with std.error of 0.000521 and t-stat of 2.862923 leading to P value of 0.0055. From this it can be deduced that ATM usage causes a very large growth in CO2 emissions.

Table 4.6:RegressionresultsfordebitcardsandCO2emissions

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CO2(-1)	0.443026	0.316175	1.401203	0.1656
DC	-0.90783	1.095275	-0.82886	0.41
J- statistic	5.250893	Prob(J- statistic)	0.51206	

From these related results, I thereby deduce that greater ATM transaction usage has a notably positive influence on CO2 emissions, which demonstrates a major ecological cost of expanding digital access to finance. Financial market activation via ATMs should be complemented with regard to environmental considerations, and the balance of CO2 emissions should be supported by measures to increase energy efficiency of ATM facilities.

The analysis of ATM transactions and its impact on CO2emissions reveals that with an enhanced number of financial transactions by means of ATM, energy productivity and pollutant releases are also on the rise. This reveals the need to employ long term solutions in the financial sector, such as energy efficient technologies and renewable energy sources for ATM network.

Policymakers should promote the use of green technologies in the financial sector, such as solar-powered ATMs and energy-efficient data centers. Additionally, encouraging the transition to digital financial services that require less physical infrastructure can help reduce the environmental impact of financial activities. This includes promoting mobile banking, internet banking, and contactless payments, which have a lower carbon footprint compared to traditional banking methods.

Impact Of Internet Users On Co2 Emissions

Another regression analysis was conducted to examine the relationship between internet users and CO2 emissions. The results show a significant positive relationship between LIU and CO2 emissions. The coefficient for LIU is 0.100819 with a standard error of 0.0358 and a t-statistic of 2.81613, resulting in a p-value of 0.0063. This indicates that an increase in internet users leads to a significant increase in CO2 emissions.

Table 4.7: Regression results for internet users and Co2 emissions

Variable	Coefficient	Std. Error	t- Statistic	Prob.
CO2(-1)	0.497378	0.089157	5.578703	0
LIU	0.100819	0.0358	2.81613	0.0063
J-Statistic	5.458624	Prob(J- statistic)	0.486472	

This means that there is a direct line; where internet users rise, and so the energy consumption and the CO2 emissions. This can be attributed to business expenditure on electricity needed to run data centers servers and other related information technology tools. Therefore, reduction of these environmental impacts calls for the promotion of an environmental considerations policy in the digital sector, including employing hardware power management and utilizing renewable energy sources.

Government agencies should ensure consumers increase purchasing of green technologies in the digital economy. This includes encouraging investments in energy efficient data centers, encouraging the use of renewable power and energy efficiency by consumers, and encouraging the manufacture and distribution of energy efficient consumer devices. Besides, activities to raise the awareness of the people about the environmental consequences of the online activities, initiatives to encourage people to use the Internet sparingly and in an environmentally friendly manner, can contribute to decrease the negative effects of the Internet usage on the environment.

Impact Of Debit Cards On Co2 Emissions

The regression analysis was aimed at identifying the significance level of debit card usage in connection with CO2 emissions. The findings reveal that there is an inverse, though, insignificant correlation between DC and CO2 emissions. The coefficient for DC is -0.907833 with standard error of 1.095275 while t statistic of -0.828864 and p value of 0.41. This indicates that changes in the usage of debit cards do not lead to changes in the CO2 emissions levels.

Table 4.8: Regression results for debit cards and CO₂ emissions

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CO ₂ (-1)	0.443026	0.316175	1.401203	0.1656
DC	-0.90783	1.095275	-0.82886	0.41
J- statistic	5.250893	Prob(J- statistic)	0.51206	

Based on these results, this evidence implies that managerial efforts to encourage the use of debit card do not influence the emission of CO₂; therefore, encouraging debit card transaction may not harm the environment. In this case, the policymakers can target debit card adoption as part of the digital financial instrument without necessarily incurring a major impact on environmental sustainability.

The insignificant findings imply that debit card transactions are less detrimental to the environment than other types of online financial transactions in line with the existing debit card and CO₂ emissions nexus. As highlighted earlier this means that promoting debit card usage within the context of digital financial services can be achieved environmentally innocuously.

Policy makers expect the key players in the financial sector to establish digital policies of financial inclusion, bear in mind the effect of debit card transaction. Promoting debit card usage instead of cash will in the long run impact positively on the environment because the use of physical currency has negative impact which includes production and transport of physical cash. Also, the inclusion of techniques of electronic payment will improve the competency, decrease of unemployment and pollution expansion as well as the reduction of negative environmental effects.

Discussion

First and foremost, the study establishes a theoretical and empirical link between digital financial inclusion and economic growth while also examining the environmental implications within the context of SAARC countries. The study opens new avenues for researchers to explore the broader impacts of digital financial inclusion on both economic and environmental outcomes.

The study revealed that increased debit card usage positively influences economic growth. This finding underscores the importance of promoting digital payment methods as a means to stimulate economic activity. Policymakers must emphasize programs that promote the adoption and utilization of digital financial services to leverage these economic advantages. The inverse correlation between ATM transactions and GDP growth indicates that shifting from conventional

financial services to more efficient digital alternatives may further improve economic performance.

Furthermore, the report underscores the environmental expenses linked to digital financial inclusion, especially due to heightened CO₂ emissions from ATM transactions and internet utilization. This signifies a necessity for sustainable procedures in the growth of digital financial services. Policymakers and financial organizations must prioritize environmental sustainability in conjunction with economic growth, adopting methods to alleviate the ecological consequences of heightened digital financial activity.

The results contain significant practical qualifications for stakeholders in the financial system, including politicians, regulators, and financial institutions. Advancing digital financial literacy and strengthening digital infrastructure are essential for optimizing the advantages of digital financial inclusion. These initiatives can guarantee that the populace is adequately prepared to utilize digital financial services, consequently promoting financial stability and economic prosperity.

The study advises policymakers to formulate comprehensive rules that facilitate the sustainable expansion of digital financial services. This encompasses investing in digital infrastructure, enhancing financial literacy, and fostering the adoption of sustainable technologies. Policymakers may promote an inclusive and sustainable digital financial ecosystem to ensure that the advantages of digital financial inclusion are attained without jeopardizing environmental sustainability.

The research indicates that financial institutions ought to prioritize the implementation of sustainable practices in their operations. This encompasses reducing the environmental impact of their digital services, advocating for energy-efficient technologies, and persuading clients to utilize digital payment methods with diminished ecological consequences. The study's findings are especially pertinent for rising nations within the SAARC region, where digital financial inclusion is swiftly advancing. The results offer significant insights for these nations as they address the problems and opportunities linked to digital financial revolution. By addressing the economic and environmental ramifications elucidated in this study, SAARC nations can formulate more efficacious and sustainable digital financial inclusion plans. Moreover, the study's findings are beneficial for international organizations and development agencies aiming to enhance financial inclusion in underdeveloped areas.

The results underscore the necessity of reconciling economic expansion with ecological sustainability, offering a framework for devising interventions that advance both aims. The study conveys essential information to investors and financial analysts about the effects of digital financial inclusion on economic performance and environmental sustainability. By comprehending these relationships, investors can make better educated judgments regarding the allocation of resources to enterprises that match both economic and environmental objectives.

The study's findings elucidate the intricate relationship among digital financial inclusion, economic growth, and environmental sustainability. This intricacy highlights the necessity for cohesive policy strategies that tackle many aspects of digital financial inclusion. The study enhances empirical literature by elucidating these links and establishes a basis for future research in this significant domain.

Conclusion

This research paper aims to bring out the various connections and correlations between digital financial inclusion, economic development, and environmental sustainability in SAARC nations. It further highlights the economic impacts of encouraging the use of other forms of electronic money such as debit cards that have a positive relationship between the use and growth in GDP thus improving the financial literacy. Still, the study also entails environmental costs of using more ATM transactions and internet options, a major factor affecting the CO2 emissions. Internet usage is therefore beneficial for economic development, at the same time it increases energy usage and emissions. The authorities are to reconcile the development of digital financial services with a decrease in the consequences for the environment. This includes popularizing energy efficient technologies and adopting renewable energy, besides mobile and internet banking in a bid to reduce dependence on energy intensive ATMs.

It is becoming increasingly clear that broadband networks must be built out in rural and other underserved regions so that everyone may take advantage of the growing information economy. In this respect, it is imperative that financial literacy programs are implemented to ensure that communities are well endowed with the necessary knowledge to empower them to engage in use of DFS. The study called for legal recognition and encouragement of green financial systems to increase lending for sustainable technologies. Future studies should also examine these relationships at longer time horizons and with reference to various geographic areas as well as explore the effects at the individual level and learn the meaning of financial literacy and regulation in this way can get clearer the potential of having the positive impacts of digital financial inclusion as well as the negative impacts to the environment. Furthermore, based on behavior variables, the understanding and promotion of trusts in digital services, as well as the analysis of customer penetration, the relevance and satisfactory levels of these services will be improved. By identifying and focusing on these dimensions, policy makers and financial institutions will be better suited to harness the economic gains of financial inclusion for digital services while at the same time respecting the environment. Lastly, the findings of the study align with the results of Sadiq and Ali (2024).

Limitations and Future Recommendations

In the future, a comparison of the study may be carried out with some advanced countries. Such a comparison would provide valuable insights into how digital financial inclusion impacts economic growth and environmental sustainability in different economic contexts. Additionally, future research could incorporate characteristics of other dimensions of digital financial inclusion, such as mobile banking penetration and fintech adoption, to provide a more comprehensive analysis.

The research may use alternative measures to study the environmental aspect. For instance, energy consumption, waste generation, air quality etc. to study the environmental consequences at a broader level. In addition to this, the behavioral aspects of financial inclusion such as financial literacy, trust in the digital financial services and user adoption rates may be incorporated in the research studies.

Studying the highlighted aspects in future can cause the researchers to build on the current study and provide more comprehensive understanding of the complex relationships between digital financial inclusion, economic growth and environmental sustainability. The diverse regional perspective may also be studied to enhance and empirically test the applicability of the financings globally.

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