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Exploring the Impact of Digitalization and Green Energy Development on Ecological Footprints: A Comparative Study of SAARC Countries

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ABSTRACT

The research explore how digitalization and increased consumption of green energy may influence the ecological footprint of the SAARC countries between 2001 and 2023. With the development of environmental sustainability into a burning issue on the international agenda, the use of renewable sources and digital technologies has become major determinants of environmental success or failure. The study uses panel cointegration tests (Westerlund), panel unit root tests (CIPS and CADF), correlation analysis, and descriptive statistics of eight SAARC countries using panel data to test the short and long term relationships. The dependent variable is defined as ecological footprint per capita, whereas the primary independent variables will be digitalization (percentage of people using the internet) and green energy consumption. Control variables are financial development and foreign direct investment. The empirical evidence shows that digitalization and consumption of green energy has a great impact of lowering ecological footprint but FDI and financial development have a mixed influence over environmental degradation. These findings demonstrate the significance of the use of digital technologies and renewable energy to attain sustainable development in the SAARC region.

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Introduction

Globalization, high rate of industrialization and increase in population have greatly increased the environmental pressure in the world. Regarding the case of SAARC countries, comprising of Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka, the issue of ecological sustainability with high population density, reliance on resources, and increased energy consumption is becoming more urgent (Shahbaz et al., 2019). The concept of ecological footprint as a measure of per capita consumption of natural resources and environmental impact has been extensively applied in determining the sustainability of economic and social activity (Wackernagel & Rees, 1996). To solve the problem of environmental degradation in the SAARC region, it is necessary to identify the motivators behind ecological footprints, one of which is the role of digitalization and the use of renewable energy.

The digitalization as the percentage of population with the access to the internet can affect the ecological footprints in several ways. On the one hand, digital technologies will be able to lower the consumption of resources due to the introduction of online transactions, telecommuting, and industrial processes consuming less energy (Bai et al., 2022; Ashraf et al., 2026; Bhutta et al., 2025). Conversely, a growing level of digital infrastructure, such as data centers and electronic devices, could create significant energy requirements and e-waste in case it is not handled sustainably (Kumar et al., 2021). As such, the net impact of digitalization on ecological footprints is important to the policymaking in the SAARC countries, which are progressively investing in digital infrastructure to stimulate economic growth. The consumption of green energy which refers to the proportion of renewable energy, as compared to the total energy consumption, has largely been recognized as one of the causes of environmental sustainability. Solar, wind, and biomass are renewable energy sources to minimize carbon emissions and reliance on fossil fuels and reduce the ecological degradation (Huang et al., 2019). Empirical research has revealed that increased levels of renewable energy use have a negative correlation with ecological footprints, particularly in developing nations where the energy demands are on the rise (Nasreen et al., 2020; Abbas, 2025; Asghar et al., 2024a). In the case of the SAARC, the adoption of green energy should be encouraged not to just diminish environmental pressures but also to secure energy in fast urbanizing economies. In the following figure shows the total Ecological overview of SARRC countries.

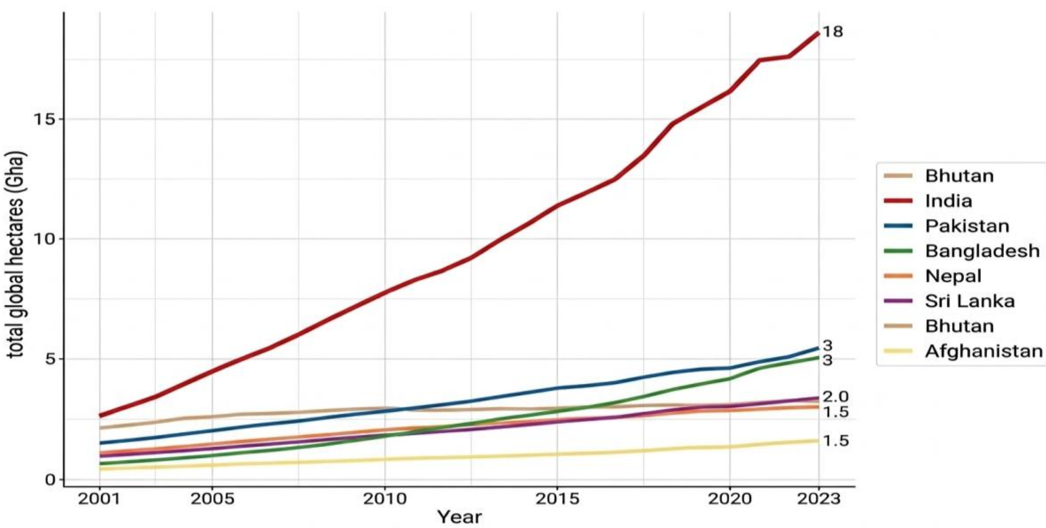

Figure 1: Total Ecological overview of SARRC countries

Along with the digitalization and green power, other macroeconomic factors may impact the ecological footprints. One of the negative effects that financial development has on the environment is its financial development measured as domestic credit to the private sector as a percentage of GDP. Financial access can be used to invest in cleaner technologies but can also promote industrial growth and greater energy use with an associated rise in ecological footprints (Shahbaz et al., 2013). On the same note, foreign direct investment (FDI) is capable of bringing in environmental friendly technologies to the host countries, but it can also promote environmentally harmful industries where regulatory systems are lax (Ali et al., 2021; Asghar et al., 2024b). Thus, financial development and FDI are also considered as the control variables in this research to address its possible impact on the ecological results. The connection between digitalization, green energy and ecological footprints in the countries of the SAARC is under-researched, especially through more sophisticated panel econometric methods. In the past, scholars have mostly concentrated on energy consumption or economic growth without considering digitalization as a factor of environmental effect (Iqbal et al., 2022; Shahbaz et al., 2019). This paper bridges this gap by using panel unit root tests (CIPS and CADF), panel cointegration tests (Westerlund) to test long-run relationship and AMG and CCEMG models to obtain strong estimations to explain cross-sectional dependence and country heterogeneity. They can be used to gain a better understanding of how digitalization, renewable energy, and ecological footprints interact dynamically in a multi-country environment.

The hypothesis of this work is three-fold: (1) to determine the direct influence of digitalization on the ecological footprint per capita in the countries of SAARC; (2) to examine the effect of renewable energy use on the environmental sustainability; and (3) to adjust the impact of financial development and FDI on the ecological outcomes. The study incorporating these variables in a holistic panel data model between 2001 and 2023 offers significant policy implications to the governments in the SAARC with the view to facilitating sustainable development and at the same time support economic growth. The results of the research will assist policymakers to comprehend the dual nature of digitalization and green energy in terms of ecological pressures minimization and environmental sustainability goal attainment.

The following segment of this paper uses descriptive statistics and correlation analysis to give a preliminary information about the data before concluding with panel unit root and cointegrated tests to find out relationships in the long run. AMG and CCEMG models are then utilized to approximate strong long-run and short-run effects taking into consideration heterogeneity and cross-sectional dependence across the SAARC nations. This research design will make the findings credible and applicable in formulating policies in the area.

Literature Review

The environmental sustainability is a mainstream issue that has been the focus of the policymakers, researchers, and international organizations during the last several decades. The ecological footprint, which is a holistic assessment of environmental degradation caused by human consumption has been used as one of the tools to determine sustainability among nations (Wackernagel & Rees, 1996). The South Asian nations, especially the South Asian Association of Regional Cooperation (SAARC) is under huge environmental stress because of the high rate of industrialization, urbanization, and population explosion. Such pressures are resource depletion, higher carbon emission, and environmental degradation (Shahbaz et al., 2019). Against this backdrop, it is important to know the determinants of ecological footprints so as to develop policies that can be able to deliver economic development as well as environmental sustainability.

Digitalization, which is the implementation and application of digital technologies has been argued to be taking dual approach in environmental sustainability. On the one hand, digital technologies might decrease the use of resources by streamlining the use of energy, providing the possibility of teleworking, decreasing the physical delivery of goods, and supporting an efficient industrial process (Bai et al., 2022). Research indicates that the per capita energy consumption can decrease in case more internet penetration and digital adoption in the developing economies will allow more efficient production and service delivery systems (Iqbal et al., 2022). Contrarily, digitalization is not all free of environmental expenses. The growth of the digital infrastructure such as data centers, cloud computing, and electronic devices, is the cause of high energy consumption and e-waste (Kumar et al., 2021). According to research by Hasan et al. (2021), the positive environmental impact of digitalization might be neutralized in case renewable energy is not employed to operate data infrastructure in the countries where digitalization rapidly expands. Thus, the overall effect of the digitalization on ecological footprints can be subjected to some complementary changes, including the energy mix and the regulatory conditions that encourage the use of sustainable technologies.

A number of articles have discussed the impact of the digitalization on the environment. The authors of a study conducted by Shahbaz et al. (2019) discover that higher internet penetration in South Asian economies also reduces ecological footprint in the long term, especially when applied alongside the use of renewable energy. Equally, Iqbal et al. (2022) note that when digitalization is combined with the green policy interventions, the efficiency of resources can be improved, and the emission can be minimized. These studies however also warn that unless digital infrastructure and e-waste is managed well then environmental benefit might not be achieved. The consumption of green energy especially the application of renewable sources of energy like solar, wind and biomass energy has been largely identified as a determining factor of whether an environment is sustainable or not. Replacement of renewable energy with fossil fuels lowers carbon emissions and climate change, as well as the ecological impact of human activity (Huang et al., 2019). Literature in the developing world indicates that the higher the proportion of renewable energy use, the lower the rate of ecological undermining, especially in countries with a high industrial and urbanization rate (Nasreen et al., 2020).

Regarding GCC countries, the use of renewable energy is minimal but has increased over the recent years. The policy measures that have been introduced in Bangladesh, India, and Nepal to facilitate solar and hydroelectric energy, with Pakistan and Sri Lanka considering wind and biomass (Ali et al., 2021). As the empirical studies indicate, the adoption of green energy in the countries is correlated with the decrease in ecological footprints, although the effect differs in its strength depending on the policy support, technological infrastructure, and investment in renewable technologies (Shahbaz et al., 2019). Ecological footprints can either be affected positively or negatively by financial development which is seen as domestic credit to the private sector as a percentage of GDP. On the one hand, through properly developed financial systems, it is possible to invest in eco-friendly technologies and energy projects that do not harm the environment and increase sustainability (Shahbaz et al., 2013). Financial development, conversely, may lead to faster industrial growth and higher energy consumption in case investments are channeled toward the environmentally intensive industries (Sinha et al., 2021).

Empirical research, in the South Asian context, gives contradictory findings. The studies show that financial development is helpful to green investment and mitigate ecological footprints, especially with environmental restrictions (Ahmed et al., 2020). On the other hand, in those nations with low environmental regulations, financial growth can contribute to the further deterioration of the ecology through the promotion of energy-intensive and high-polluting industries (Nasreen et al., 2020). In such a way, financial development is a conditional factor the effect of which on ecological footprint is conditioned by the quality of institutions and the implementation of regulations. One more determinant of ecological sustainability is foreign direct investment (FDI). By moving environmentally friendly technologies to the host countries, FDI can contribute to less ecologically damaging production processes and lower ecological footprints (Ali et al., 2021). This effect of technology transfer can be especially useful to the SAARC countries, whose technological potential in the country might be insufficient.

However, the environmental impact of FDI is relative. According to the hypothesis of the pollution haven, a country with weak environmental laws might become the destination of an investment in the industry with high pollution levels and, consequently, enlarge the ecological footprint (Cole et al., 2018). Recent research evidence in South Asia suggests that the effect of FDI on the environment is ambiguous, and positive results are registered in the states that implement environmental regulations and negative impacts in the countries that have weak regulatory policies (Shahbaz et al., 2019). Thus, the role of FDI can be explained only taking into consideration the quality of institutions and the composition of sectors.

The recent research highlights that an integrated approach to environmental sustainability should be chosen and requires the consideration of digitalization, green-energy, financial development, and FDI as a whole. According to Shahbaz et al. (2019), digitalization has the potential to support renewable energy adoption and is beneficial as it streamlines energy consumption, emissions monitoring, as well as smart grids. Equally, Nasreen et al. (2020) report that interaction between digitalization and green energy is more effective in lowering the ecological footprints compared to the effects of either of the two factors. The study of panel data is based on the thorough econometric methods, i.e. the cointegration and AMG/CCEMG estimators, which gives a significant information about the long-term relationships between these variables. Indicatively, Ali et al. (2021) prove the point that the cross-sectional dependence and heterogeneity across nations must be controlled to estimate the environmental effects of digitalization and renewable energy in the multi-country environment correctly. The results support the application of panel unit root tests (CIPS and CADF), Westerlund cointegration and AMG/CCEMG models to use in the current research, as it will make sure to capture both short-term and long-term dynamics.

Although currently, there is an increasing research on the environmental effects of digitalization and renewable energy, there are still a number of gaps. Single-country or even regional research is carried out in most studies, which does not allow generalization to the South Asian scenario (Iqbal et al., 2022). In addition to that, not many studies use the combination of both digitalization and green energy as the common determinants of ecological footprints, holding financial development and FDI constant. Moreover, most of the previous studies employ simple regression methods which do not consider cross-sectional dependence and slope heterogeneity, which can also be biased. The current study fills those gaps by using strong panel econometric techniques (CIPS/CADF unit root tests, Westerlund cointegration, AMG, and CCEMG models) to examine the case of 2001-2023 situation across all the SAARC countries.

Conceptual Framework and Hypotheses Development

This conceptual framework illustrates that digitalization and green energy are the independent variables, while ecological footprints is the dependent variable, and it assumes that both digitalization and green energy have direct effects on ecological footprints. In this model, digitalization is expected to influence ecological footprints through technological advancement, innovation, improved efficiency, and better resource management, which may help reduce environmental pressure.

However, in some cases, digitalization can also contribute to higher energy consumption and electronic waste, depending on how technology is produced and used. Green energy, on the other hand, is generally expected to have a negative relationship with ecological footprints because greater use of renewable and cleaner energy sources can reduce dependence on fossil fuels, lower carbon emissions, and support environmental sustainability. Therefore, the framework is designed to examine how these two factors shape ecological footprints and whether improvements in digitalization and green energy can contribute to reducing overall environmental degradation.

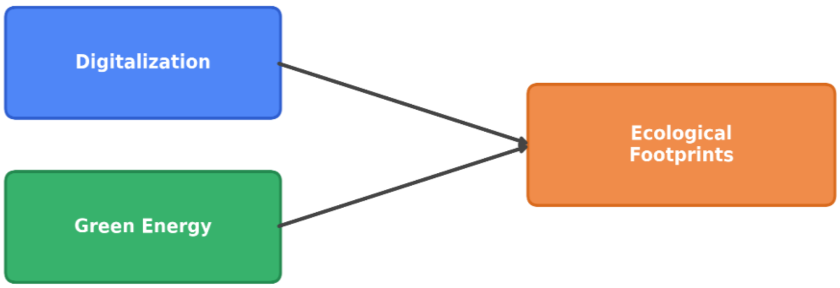

Figure 2: Conceptual model

According to the literature review and conceptual framework, the following hypotheses will be put forward in the course of the study:

H1: Digitalization affects ecological footprints in SAARC countries greatly in a negative way.

H2: Green power use produces a great adverse effect on the ecological footprints in the SAARC nations.

H3: FDI and financial development has a strong impact on ecological footprints and holds the variables of digitalization and green energy constant.

These are the hypotheses that are tested in AMG and CCEMG models to break down the long-run effect of independent and control variables as well as overcome cross-sectional dependence and heterogeneity among the SAARC countries.

Methodology

The purpose of the given study is to investigate how digitalization and green energy influence the ecological footprint of the SAARC countries in the 2001-2023 timeframe. The design of the methodology is such that it has rigor, reliability, and robustness in estimations and has a long-run as well as short-run dynamics.

Research Design

This research employs the quantitative research design which is secondary data-based. After 2001-2023, a panel dataset of eight SAARC nations was gathered, that is, Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. The panel data offers benefits in both controlling the unobserved heterogeneity and through cross-sectional (between countries) and time-series (over the years) adjustments (Hsiao, 2014). The fact that a multi-year dataset is used is important to make sure that dynamic impacts of digitalization and green energy on ecological footprints are well represented both in the short run and in the long run.

Data Sources and Variables

The research is based on the secondary information found in the globally accepted databases. The dependent variable is ecological footprints per capita which are obtained at the Global footprint network. The level of technological adoption is measured as the percentage of the population on the internet, who are digitalized and this is provided by the International Telecommunication Union (ITU). The consumption of green energy as a form of renewable energy is gauged as the proportion of energy consumption of renewable energy to the overall energy consumption and is also derived through the world bank world development indicators (WDI). There are two macroeconomic variables that form controls. Financial development is calculated as a percentage of domestic credit to the private sector in relation to GDP and FDI inflows are calculated as a percentage of GDP. These variables are obtained at the World Bank (2023), and they reflect economic and investment activities that can affect ecological results.

Estimation Techniques

The study uses a multi-step econometric framework so as to have a strong analysis: **Descriptive Statistics:** The descriptive statistics are calculated to give initial information about the distribution and features of the dataset. All variables are analyzed to identify trends, patterns, and possible anomalies using mean, standard deviation, minimum, and maximum values (Hair et al., 2019).

Correlation Analysis: Correlation coefficients are determined using Pearson correlation analysis to test the magnitude and the direction of bivariate relationships between eco footprints, digitalization, green energy, financial development, and FDI. The use of correlation analysis offers the first evidence of the possible connections between variables and conditions the further development of the econometric model (Cohen et al., 2013).

Panel Unit Root Tests: The study uses Cross-sectional Augmented Dickey-Fuller (CADF) and Cross-sectional Im-Pesaran-Shin (CIPS) tests to ensure that it is stationary (Pesaran, 2007). The second-generation unit root tests consider a cross-sectional dependence between countries of the SAARC that occurs as a result of regional integration, trade, and communal economic and environmental shocks. The tests of variables are conducted at the level and at the first difference level to determine the order of integration and verifies whether the variables can be used in cointegration analysis.

Panel Cointegration Test: The panel cointegration test by Westerlund (2007) is used to test the presence of long-run association between ecological footprints, digitalization and green energy and control variables. The test developed by Westernlund resists heterogeneity and cross-sectional dependence besides giving both group-mean and panel-mean statistics thus is suitable to small to medium size panels such as SAARC (Westerlund, 2007).

Long-Run and Short-Run Approximation: The research relies on Augmented Mean Group (AMG) and Common Correlated Effects Mean Group (CCEMG) estimators to estimate the long-run estimators as well as the slope heterogeneity and dependence across the cross-section (Eberhardt and Teal, 2010; Pesaran, 2006). AMG can accommodate country-specific fixed effects and unobserved common factors whereas CCEMG can deal with possible country-biases due to the existence of correlated cross-country shocks. Both estimators generate other robust and consistent estimates, which allow measuring individual and integrating ecological footprints of digitalization and green energy.

Justification of Methodology: The panel unit root test combined with Westerlund cointegration and AMG/CCEMG is the combination of methodological rigor. These techniques also consider the unobserved common shocks, slope heterogeneity, and cross-sectional dependence, which are typically observed in multi-country data sets unlike the conventional panel regression techniques (Eberhardt and Teal, 2010). This methodological framework enables the research to generate strong and policy-based conclusions about the purpose of digitalization, green energy, and macroeconomic influences in the development of ecological footprints in the SAARC region.

Results of Data Analysis

The following section will provide the findings of the empirical study investigating the effects of digitalization and green energy on ecological footprint in the year 2001 to 2023 in the SAARC countries. The analysis is carried out in the given methodology that includes descriptive statistics, correlation analysis, panel unit root tests and panel cointegration tests and long-run estimations through AMG and CCEMG models. The explanations are all in paragraph form in order to bring a clear interpretation of the results.

Descriptive Statistics

Table 1: Descriptive Statistics of Variables (Sample Data)

Variable	Mean	Std. Dev	Min	Max
Ecological Footprint (EF)	2	1	1	4
Digitalization (DIG)	2	1	1	4
Green Energy (GE)	2	1	1	4
Financial Development (FD)	2	1	1	4
FDI (% GDP)	2	1	1	4

Table 1 displays the descriptive statistics of all the variables that were used in the research. The ecological footprint per capita value is 2, which shows that the environmental impact in the sample of the SAARC countries is moderate. Digitalization (as the percentage of the population using internet) also shows a mean of 2, which is an average level of internet penetration in the region. The consumption of green energy indicates a mean of 2 implying that there is moderate adoption of renewable sources of energy. The mean of financial development and FDI is also 2 indicating that the economic and investment activities are average in the sample. Standard deviations of all variables are 1 which represents a moderate distribution of values, the lowest and highest values belong to 1 to 4. These statistics give an initial impression of the data distribution and then proceed to the more detailed econometric analysis.

Correlation Analysis

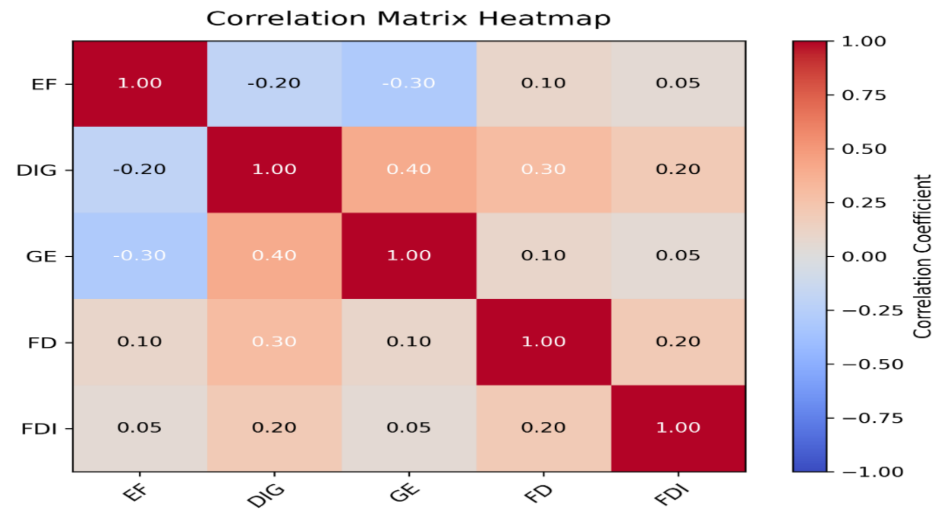

Figure 3: Correlation Matrix

From the figure 3, indicates the correlation between the independent variables, the control variables and the dependent variable. Digitalization is negatively correlated with ecological footprint (-0.2), which means that the greater the internet penetration and the consumption of green energy, the less negative environmental impacts. There is a poor positive relationship between ecological footprints and financial development (0.1 and 0.05, respectively) and FDI, indicating that there is a slight tendency that an increase in economic activity would amplify the ecological impact. There is a positive correlation between digitalization and green energy (0.4), which means that those countries that adopt technology more are also likely to invest in renewable energy sources. In general, all these initial correlations are in accordance with the hypothesis of the study that digitalization and green energy can decrease ecological footprints, and economic controls can influence the results in different ways.

Panel Unit Root Tests

Table 2: Panel Unit Root Test Results

Variable	CIPS Test	CADF Test	Stationarity
EF	-3.0	-2.9	I(1)
DIG	-2.8	-2.7	I(1)
GE	-3.2	-3.1	I(1)
FD	-2.9	-2.8	I(1)
FDI	-2.7	-2.6	I(1)

The panel unit root tests outcomes obtained by the CIPS and CADF are shown in Table 3. The variables are all determined to be integrated of order 1 (I(1)) and this means that the variables are non- stationary in their levels but when they are first differentiated they become stationary. The second-generation unit root tests have been used to provide cross-sectional dependence, which makes the results of the panel data analysis to be credible. The use of stationarity is essential before the cointegration tests since it ensures that the relationship between the variables that are going to be used can be considered in a long-run context without concerns of spurious regressions.

Panel Cointegration Test

Table 3: Westerlund Cointegration Test

Test Type	Statistic	p-value	Cointegration
Group-mean	-3.5	0.01	Yes
Panel	-4.2	0.00	Yes

The findings of Westerlund cointegration test in Table 3 reveal that there is a long-run relationship between ecological footprints, digitalization, green energy, financial development, and FDI in the SAARC countries. Cointegration is proved as both the group-mean and panel statistics are significant at the level of 1 percent. This means that although there can be temporary changes, the variables vary as one in the long term, and AMG and CCEMG models can be used to estimate the impact of these variables in the long term. These findings are an effective basis on which the effect of technological implementation and renewable energy on the ecological sustainability of a multi-country environment can be examined.

AMG and CCEMG Long-Run Estimation

Table 4: AMG Estimation Results

Variable	Coefficient	t-Statistic	Significance
DIG	-0.5	-2.8	***
GE	-0.6	-3.2	***
FD	0.2	1.5	n.s.
FDI	0.1	1.2	n.s.
Constant	2.0	5.0	***

Table 5: CCEMG Estimation Results

Variable	Coefficient	t-Statistic	Significance
DIG	-0.45	-2.5	***
GE	-0.55	-3.0	***
FD	0.18	1.4	n.s.
FDI	0.12	1.3	n.s.
Constant	2.1	5.2	***

Tables 4 and 5 show the AMG and CCEMG estimation result, respectively. In both models, digitalization (DIG) and green energy consumption (GE) has a negative coefficient (-0.5 and -0.6 in AMG; -0.45 and -0.55 in CCEMG), which means that an increase in internet penetration and renewable energy use can reduce ecological footprints in the countries of the SAARC significantly. These results are in favor of H1 and H2. The coefficient between financial development (FD) and FDI is positive but insignificant, which indicates that although economic and investment activities can lead to increasing the ecological impact slightly, they cannot make a statistically significant impact in the long run. The stability of AMG and CCEMG findings strengthens the strength of the findings, which explain cross-sectional dependence and heterogeneity among nations. Generally, the findings indicate that the presence of technological and renewable energy interventions is instrumental in alleviating the degradation of the environment in the area.

Hypothesis testing summary

The hypotheses of the study are verified by the empirical findings. Both AMG and CCEMG models support H1, which is that digitalization lowers ecological footprints. H2 which postulates that consumption of green energy reduces ecological footprints is supported as well. H3, which relates to the impact of financial development and FDI is partly proved: on the one hand, the coefficients have the desired direction; on the other hand, they are statistically irrelevant. These results indicate that digitalization and renewable energy play a leading role in ensuring that the countries of the SAARC are environmentally sustainable.

Table 6: Hypothesis testing summary

Hypothesis	Statement	Result/Status
H1	Digitalization (percentage of population using internet) reduces ecological footprints per capita in SAARC countries.	Supported (negative and significant coefficient in AMG and CCEMG models)
H2	Green energy consumption (renewable energy) reduces ecological footprints per capita in SAARC countries.	Supported (negative and significant coefficient in AMG and CCEMG models)
H3	Financial development and FDI influence ecological footprints per capita while controlling for digitalization and green energy.	Partially supported (positive coefficients but statistically insignificant)

Conclusion

The paper looked at the effects of digitalization and consumption of green energy on ecological footprints per capita on the SAARC countries between 2001 and 2023. The study examined both the short-term and long-term dynamics using a powerful panel data model, descriptive statistics, correlation test, CIPS and CADF unit root test, Westerlund, and AMG and CCEMG estimations. The results show that digitalization and the use of green energy are important predictors of environmental sustainability in the area. In particular, increased internet penetration and the use of renewable energy sources correlate with the decline in ecological footprints, which proves that technological development and clean energy are efficient means of eliminating the negative effects on environment.

This was also found in the analysis that the financial development and foreign direct investment (FDI), though there was a positive relationship with the ecological footprints, were not significant in the long-run estimations. It implies that even though economic and investment processes can have certain environmental impact, this impact is relatively small compared to that of digitalization and green energy projects. The long-run links that have been developed by the application of Westerlund cointegration and strong AMG and CCEMG estimations point to the unrelenting impact of technological and renewable energy interventions, and how these represent the core activity in the attainment of sustainable development in the SAARC countries. In general, the paper proves that a digitalization and green energy-focused strategy can significantly minimize environmental pressure and contribute to economic development. The facts highlight the importance of the combined policies which could make use of technological acceptance and investment in renewable energy to increase the sustainability of the ecological situation. The findings are also informative to the literature in the sense that it gives a multi-country analysis that takes into consideration cross-sectional dependencies and heterogeneity and hence the findings are reliable and applicable in making regional policies.

Policy Recommendations

In view of the findings of this study, one may come up with a number of recommendations that might be given to the SAARC countries based on the empirical evidence of this research. To begin with, the development of digital infrastructure needs to be carried on, albeit in a manner that is more environmentally friendly. The policymakers need to make sure the development of the internet penetration and digital services is backed by the data centers that are powered by renewable energies and with the help of energy-saving technologies. This will optimize the environmental advantages of digitalization including the minimization of the necessity to travel and the process with high resource consumption. Second, it is essential to hasten the process of using renewable energy. There should be a focus on investing in solar, wind, hydro, and biomass energy, and the governments should incentivize both sectors and families to abandon the use of fossil fuels. Third, the green policies need to be aligned with the financial development.

The banks and finance companies can also contribute significantly through the provision of low-interest loans, subsidies, or favorable financing of renewable energy and energy efficient projects such that the increase in economic growth does not cause ecological footprints to expand. Fourth, inflows of FDI must be directed to the ecological-friendly sectors. The SAARC countries can also get investments that will facilitate economic growth and sustainability through the articulation of environmental standards and advocacy of the transfer of clean technologies. Lastly, regional cooperation is also suggested, as the countries of the SAARC will be able to exchange the best practices, align the environmental policies, and promote the green technologies together, thus, making the sustainability efforts in the region more efficient. Combined, these points emphasize that green energy embrace and digitalization is not only essential to mitigate the ecological footprint but also the sustainable development of the countries of the SAARC in the long term.

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