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Improving Natural Resource Utilization: The Role Played by Renewable Energy Consumption, Environmental Sustainability, Energy Innovation, and Fintech: Evidence from an Emerging Economy

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ABSTRACT

Sustainable resource exploitation should be taken into consideration while considering economic growth. As economic activity increases, the significance of identifying novel approaches that prioritize resource efficiency without sacrificing economic success in isolating GDP growth from resource depletion is increasing. The empirical investigation delves into the complex interplay among environmental sustainability, energy innovation, and fintech to improve natural resource utilization in an emerging economy from 1998 to 2022. Using the Autoregressive Distributed Lag (ARDL) technique, we analyze how these factors interact dynamically. Our findings offer valuable insights into emerging economies natural resource utilization. In addition, empirical research elucidates a significant impact of financial technology, natural resource consumption, and environmental sustainability on economic growth, suggesting the significance of sustainable practices in effective natural resource management. This study provides valuable insight into environmental factors and government policies that influence natural resource utilization in emerging countries and the need to reevaluate economic theories and methods of resource management. It underscores the urgency of adopting sustainable practices to insignificant effects of renewable energy, while also leveraging fintech as a powerful driver for the exploitation of natural resources. The insights provided are valuable for policymakers aiming to promote a sustainable environment.

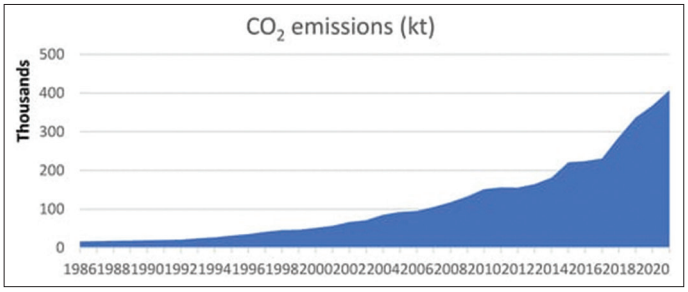
Keywords: Environmental Sustainability, Fintech, Autoregressive Distributed Lag, Natural Resources
JEL Classifications: O3, O4, G0

1. INTRODUCTION

The global economy has grown dramatically over the last few decades, raising concerns about environmental sustainability and resource scarcity. According to estimates, energy production and its usage to fuel future development contributes to around 25% of global CO_2 emissions (Ji et al., 2021; Wang et al., 2020). It indicates the main causes of overall world emissions are rising resource exploitation and energy consumption from diverse human activities. So, there is a need to revise the use of resources so that environmental exploitation can be minimized.

Vietnam is also not exempted from degrading the environment (Figure 1) show the percentage of Carbon Emission from 1986

Figure 1: Carbon emission in Vietnam since 1986



Source: (Li and Qamruzzaman, 2023)

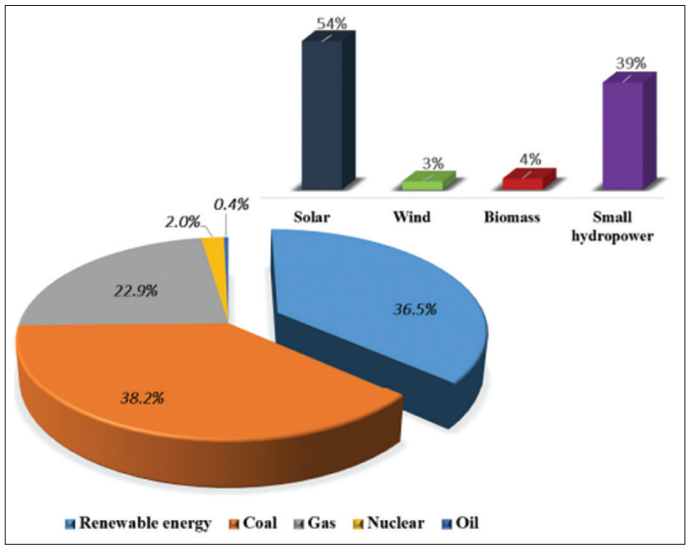
to 2020. In the past few years, the industrial sector of Vietnam has been rapidly growing which in turn significantly grows the economy. Along with this, industrialization poses serious challenges to the environment and the management of resources. Against this background, the combination of innovative energy use, sustainability practices and fintech intervention collectively play its role in effective use of natural resources. These factors interact with each other in a multilayered way and affect technological advancement, behaviors of society, and policy-making that will result in molding sustainable natural resource utilization.

The total amount of investment required globally to meet the SDGs agenda and the climate targets established in the "Paris Climate Agreement" is expected to be one hundred billion dollars. The projected assumptions for energy system investment are expected to oscillate between 1.6 and 3.8 trillion US dollars within the time period ranging from 2020 to 2050. This fiscal pledge highlights the need for higher operational efficacy of energy systems and indispensable urgency of low-carbon energy frameworks (Anser et al., 2024; Liu et al., 2022).

Environmental sustainability initiatives help preserve the ecosystems and improve natural resource utilization. If sustainable management approaches are deeply embedded in production and consumption habits, natural resource depletion may result in a decline; as a result, it is appropriate to allow resource reproduction (Anser et al., 2025; Lisha et al., 2023). Reuse of resources is of great importance as it saves the environment. Moreover, the evolving technology in energy innovation shifts a country towards eco-friendly energy sources i.e., the use of wind, geothermal, solar, and hydroelectric power. These renewable energy sources utilize the energy optimally and also minimize the adverse effects on the environment. Rutkowska et al. (2021) stated that the most growing potential for energy is in solar power. Although wind energy is also widely recognized, its dependence on wind supply makes it less attractive. Hydro energy, a conventional energy source, is becoming less popular due to declining groundwater supplies and water constraints. Geothermal energy offers the most potential for energy generation with advancements in technology. Biomass, an antiquated energy source, is the least desirable renewable energy source due to urbanization. Every one of the five renewable energy sources was well accepted.

Moreover, fintech facilitates sustainable initiatives i.e., investing in firms who produce eco-friendly goods (Figure 2) show the

Figure 2: Vietnamese overall energy structure and renewable energy sources for power production in 2020



Source: (Nguyen et al., 2021)

total Vietnamese energy structure and renewable energy in 2020, which these new energy source makes some improvement in financial services. Ashta (2023) talked about the large fintech and green fintech firms seeking product development or differentiation. They usually employ ecological product differentiation to support higher prices or attract new consumers. Larger financial institutions, such as PayPal and Mastercard, are significantly involved in this. New rivals must improve their offerings to lessen customer risk. Fintech startups are boosting sustainability by delivering financial services that incumbents already provide, driven by a desire to enter new markets or a fear of losing existing ones. Furthermore, fintech, renewable energy usage, and climate policy are suggested as ways to enhance the quality of the climate and save natural resources (Dong et al., 2024; Zhang et al., 2025).

This study aims to examine the role played by environmental sustainability, energy innovation and fintech in improving natural resource utilization in Vietnam. The comprehensive analysis of integrating all these factors of optimal utilization of natural resources will provide useful insights to assist industrial specialists, investors as well as policymakers. This study is significantly helpful for Vietnam to achieve SDGs by balancing economic development and environmental sustainability by using the resources at their optimal level. It not only strengthens Vietnam's economy but also makes them competent all around the world by investing in energy innovation and sustainability. Also, this study helps in aligning their utilization of resources with global commitments. Also, it guides them to invest in technological advancement that promotes energy efficiency to not only save today's environment but also secure future generations. With the help of this study, governmental bodies can design policies to incentivize eco-friendly practices, fintech-driven sustainability, and renewable energy adoption. In essence, this study will surely contribute to the more resilient and sustainable future of Vietnam.

2. LITERATURE REVIEW

2.1. Environmental Sustainability and Natural Resource Utilization

The depletion of natural resources, negative environmental repercussions, unequal wealth distribution, and inadequate working conditions can all contribute to an ecologically, economically, and socially unsustainable consumption pattern (Oláh et al., 2020). Scholars argue that environmental sustainability often comes with various challenges with production system as the goal is to ensure that natural resource are used at a steady rate, restricting the depletion process beyond its capacity. Additionally, it is crucial to acknowledge the environmental capacity to handle and absorb these waste materials. Therefore, it is crucial to focus on renewable resources instead of non-renewable resources (Bian et al., 2020). Production follows a "weak sustainability" framework, wherein natural resources are rationally utilized, and waste is minimized to align with environmental capacity. Nevertheless, despite the aforementioned factors and the acknowledgement of the finite nature and significance of resources, achieving sustainable consumption remains a distant goal. The demand for goods and products far exceeds genuine necessities, resulting in a substantial disparity between sustainable consumption and actual behavior (Bonilla et al., 2019). Considering the present circumstances, the industry prioritizes production and financial gain, disregarding other variables that contribute to the depletion of finite and infinite resources. Consequently, this approach results in climate instability, significant environmental consequences, and the loss of biodiversity (Seddon et al., 2021).

Natural resources, being the primary driver of the global economy, are the focal point of interest for all nations. A fundamental issue regarding natural resources is their significant depletion on the Earth's surface (Ye and Rasoulinezhad, 2023). The imperative of mitigating climate change has made sustainable development the cornerstone policy, to reduce greenhouse gas emissions. Being a 2nd largest economic powerhouse, China experiences significant challenges related to environmental sustainability. For instance, in 2018, China had a 2.2% increase in CO_2 emissions, which constituted 27.8% of the total global CO_2 emissions. Additionally, China's average annual growth rate from 2007 to 2017 was 2.5% (Paraschiv and Paraschiv, 2020). China has made a firm commitment to restrict carbon emissions per unit GDP by 60-65% by 2030, compared to the levels in 2005 (Bekun et al., 2020; Umar et al., 2020). From empirical point of view, various emerging factors have been investigated by scholars in China's context to address environmental challenges, however, the ambiguous outcomes further warrant an exploration related to financial development, globalization and natural resources as the contextual implication of these factors varies based on intertwined situations (Umar et al., 2020).

The efficacy of renewable resources has become a subject of controversy in recent decades due to their consumption resulting from population increase, industrialization, and urbanization. Ye and Rasoulinezhad (2023) has verified that the green bonds have a favorable effect on the efficiency of natural resource utilization. Nevertheless, the long-term context amplifies the extent of the repercussions. On the other hand, Urbanization has a detrimental immediate effect on natural resource utilization, however, in the long-run the effect turns positive (Ye and Rasoulinezhad, 2023).

2.2. Energy Innovation and Natural Resource Utilization

In the competitive landscape, economies often focus on financial development in order to accelerate economic growth and foster progress in energy innovation. However, government officials have been concerned about the environmental consequences of financial development and are taking measures to prevent any negative effects on the environment (Baloch et al., 2021). Studies such as Baloch et al. (2021) argued that the advancement of financial systems encourages energy-related innovations and improves overall state of the environment. Similarly, Li and Shao (2021) revealed that factors such as the installed capacity of renewable electricity, GDP expenditure share on R and D, and Kyoto Protocol implementation all contribute to promoting innovation. Korea demonstrates the most significant number of renewable energy innovation patents, with the US, Germany and Japan following behind. These economies exemplify the significance of renewable innovation capacity within the OECD group (Wang et al., 2022).

There has been much back-and-forth on how natural resources affect the economy. Smith (1776) and Hollander, (1910) are two prominent economists who consider the availability of natural resources-including minerals, gas, and oil-to be a crucial factor in economic growth. (Khan et al., 2020). Nevertheless, in contemporary years, some regions endowed with substantial natural resources, have been experiencing a declining in economic growth compared to the nations with limited natural resources (Khan et al., 2020).

Literature also argues that renewable sources and financial advancement are both proven areas as they substantially diminish the pace of environmental deterioration. Additionally, globalization, economic progress, and the non-renewable energy sources all have a role in hastening environmental degradation. Furthermore, factors such as globalization, natural resources, and energy usage all have a role in the growth of the economy. (Usman et al., 2022). Particularly, China's commitment to innovation in energy conservation technologies is visible in its increased investment in energy sector (Ulucak, 2022). An important point of contention is that advancements in energy technology may lead to a rebound effect in energy use, necessitating careful attention in policy measures. A rebound effect can lead to higher energy consumption and emissions due to the reduction in prices resulting from technical advancements (Ulucak, 2022).

2.3. Fintech in Improving Natural Resource Utilization

Effective natural resource management is essential for achieving sustainable economic development, and it has been a very contentious issue in recent decades. Considerable debate has taken place on technology and its role in maximizing the use of natural resources. Tan et al. (2023) Illustrates the beneficial influence of financial technology (fintech) on the administration of natural resources. The natural resources management index is significantly impacted by renewable energy utilization and

foreign direct investment (FDI). This study also investigated the significance of government effectiveness in natural resource management, including the impact of governance systems. Conversely, urbanization was determined to have a detrimental impact, as it imposed significant strain on the administration of natural resources (Tan et al., 2023).

Natural resources act as a catalyst for economic growth and social development. The rapid industrialization and increasing population have led to a significant rise in the demand for natural resources, necessitating their extensive exploitation (Chen et al., 2023). Nevertheless, the inadequate usage of natural resources presents significant issues for global ecology. Hence, the imperative of ensuring the sustainable exploitation of natural resources is evident to establish equilibrium within the global ecosystem. Likewise, policymakers continued to prioritize the management of natural resources. Xu et al. (2023) suggested that the effectiveness of utilizing natural resources can be enhanced through the implementation of eco-innovation technologies. Chen et al. (2023) highlighted the significance of financial industry in promoting economic growth. They further argued that the financial sector is vital for resource deployment and economic opportunities. Furthermore, it is proposed that the advancement of financial systems has advantageous consequences for the administration of natural resources.

Moreover, the increasing urbanization is driving the need for extracting and utilizing natural resources, posing significant environmental issues (Danish and Ulucak, 2020). Conversely, Tan et al. (2023) suggested that urbanization does not have detrimental effects on the environment. In addition, Danish and Ulucak (2020) contended that urbanization promotes the need for industries and transportation, hence bolstering energy consumption. As a result, the increasing urbanization has placed significant strain on the exploitation and management of natural resources. Balsalobre-Lorente and Leitão (2020) posited that the presence of ample natural resources could serve as a deterrent to the importation of fossil fuels. Nevertheless, from this standpoint, the management and usage of natural resources would assume more importance.

Fintech promotes environmentally friendly financial activities through the utilization of tools like green credit and investment (Awais et al., 2023). This stems from the integration of financial sector with overall economic health and natural resource preservations (Firdousi et al., 2023). Firdousi et al. (2023) also discovered that greater lending rates are associated low carbon emissions, whereas higher credit availability is linked to higher emissions. Arner et al. (2020) noted that fintech can immediately aid in the attainment of sustainable goals by improving financial and regulatory mechanism. In addition, fintech may indirectly contribute to the achievement of the Sustainable Development Goals (SDGs) by enabling the advancement of affordable renewable energy and sustainable technologies. Evidence suggests that fintech significantly contributes to green energy investment and consumption through effective utilization of advanced technologies. Hence, the advancement of fintech is positively correlated with renewable energy use. (Croutzet and Dabbous, 2021). Furthermore, Lisha et al. (2023) indicates that financial technologies and natural resources affect environmental sustainability. In contrast, the implementation of environmentally friendly advancements and the progress of financial systems contribute to the preservation of the environment across a wide range of quantiles, from the lowest to the highest (0.10^{th}-0.90^{th}).

Table 1: Variables measurement and source

Variable	Symbol	Type	Measurement	Source
Total natural resources	TNR	Outcome	TNR rents as % of GDP	WDI
Renewable energy consumption	REC	Predictor	REC as % of total final consumption of energy	WDI
Environmental sustainability	ES	Predictor	CO_2 emissions metric tons per capita	WDI
Fintech	FINT	Predictor	Net financial accounts	WDI
Economic growth	GDP	Control	Gross Domestic product	WDI

WDI: World development indicators

3. METHODOLOGY AND DATA

This research study adopts the "autoregressive distributed lag" (ARDL) testing technique to evaluate the influence exerted by environmental sustainability, energy innovation and fintech on natural resource utilization in Vietnamese context. The selection of the ARDL technique is justified based on significant advantages; for instance, Hatmanu et al. (2022) highlighted that the ARDL technique provides robust estimation in small samples. Secondly, the ARDL approach is free from the requirement of the same order of integration i.e., variables can be integrated in different orders and further analysis can be carried out (Pesaran et al., 2001). Thirdly, according to Rahman and Islam (2020), the ARDL bounds testing approach is suitable for providing unbiased and reliable coefficients of the long-run estimation. This also holds in the case of endogenous variables (Hatmanu et al., 2022; Rahman and Islam, 2020). Another noteworthy feature of the ARDL technique is that it is based on a single equation framework (Hatmanu et al., 2022). This feature allows estimation of short- and long-run associations which enhances the implementation of the model. Hence, the present study makes use of the robustness and reliability of the ARDL approach.

3.1. Variables

Natural resource rents signify the revenue that exceeds the cost associated with resource extraction, such as fossil fuels and minerals (Asiedu et al., 2021). Thus, it serves as a suitable indicator to measure total natural resources. Secondly, energy innovation is assessed by using the proxy of renewable energy consumption while carbon emissions are used as a proxy for environmental sustainability (Xue et al., 2022). Fintech is measured using net financial accounts and in addition, the study accounts for economic growth (Table 1).

3.2. Empirical Model Specification

Generally, the model can be specified as shown in Equation 1.

$$TNR_{it} = \alpha + \alpha_1 REC + \alpha_2 ES + \alpha_3 FINT + \alpha_4 GDP + \varepsilon \quad (1)$$

Table 2: The descriptive analysis results

Variable	TNR	REC	GDP	FINT	ES
Mean	6.7	38.27	166105691890.69	5808686560	164242.52
Max	13.91	59.32	408802378904.83	32215000000	355323.1
Min	1.81	19.11	27209602050.045	180000000	45473.9
Standard deviation	3.62	12.90	125023399498.31	7179914033.80	102880.89
Skewness	0.33	0.10	0.42	2.25	0.71
Kurtosis	1.98	1.94	1.80	8.43	2.27
Obs	25	25	25	25	25

The ARDL specification of the above general model is presented in Equation 2.

$$\Delta TNR_t = \gamma_0 + \sum_{i=1}^{o} \gamma_1 \Delta TNR_{t-i} + \sum_{i=0}^{p} \gamma_2 \Delta REC_{t-i} + \sum_{i=0}^{q} \gamma_3 \Delta ES_{t-i} + \sum_{i=0}^{r} \gamma_4 \Delta FINT_{t-i} + \sum_{i=0}^{s} \gamma_5 \Delta GDP_{t-i} + \vartheta_1 TNR_{mt-1} + \vartheta_2 REC_{mt-1} + \vartheta_3 ES_{mt-1} + \vartheta_4 FINT_{mt-1} + \vartheta_4 GDP_{mt-1} + \varepsilon_1 t \quad (2)$$

where the constant is represented by ; "short-run coefficients" are represented by γ_1 to γ_5.

The long-run coefficients are ϑ_1 to ϑ_5 and lastly, the "white noise error term" is signified by ε_{1t}.

From the general model, the error correction model (ECM) of the ARDL is produced as follows:

$$\Delta TNR_t = \gamma_0 + \sum_{i=1}^{o} \gamma_1 \Delta TNR_{t-i} + \sum_{i=0}^{p} \gamma_2 \Delta REC_{t-i} + \sum_{i=0}^{q} \gamma_3 \Delta ES_{t-i} + \sum_{i=0}^{r} \gamma_4 \Delta FINT_{t-i} + \sum_{i=0}^{s} \gamma_5 \Delta GDP_{t-i} + \varphi_{1i} ECM_{t-1} + \varepsilon_{1t} \quad (3)$$

The validity of the estimation is ensured by employing "unit root tests, including the Levin, Lin and Chu test, ADF, PP and Breitung t-test" (Banday et al., 2021). The tests facilitate researchers in determining the stationarity of the data. The use of multiple tests enhances the accuracy of the stationarity analysis. The null hypothesis of unit root is examined and for reliable regression, variables must not possess a unit root and are stationary (Shrestha and Bhatta, 2018).

3.3. Data Sources

This research work utilizes data for Vietnam by extracting annual time series data from WDI database. Data was gathered from 2000 to 2022, covering 22 years. Thus, a comprehensive dataset was used for the investigation.

4. FINDINGS AND ANALYSIS

4.1. Summary Statistics

The characteristics and value distribution of one or more datasets are summarized using descriptive statistics (Table 2). Analysts may quickly get an understanding of the degree of dispersion and central tendency of values in datasets using classical descriptive statistics. The main features of a dataset may be summed up and described using descriptive statistics. The meaning is the measure of central tendency provides details about the collection's average value. The skewness statistics examine the normality of the data set. It has a threshold range of −1 to +1 for the normalcy concept, and all calculated values fell within this range, suggesting that the data is normal.

Table 3: Unit root (at level)

Method	Statistic	Probability**
Levin, Lin and Chu t*	5.008	0.993
Im, Pesaran and Shin W-stat	5.921	0.999
ADF-Fisher Chi-square	1.415	0.999
PP-Fisher Chi-square	1.491	0.998

Table 4: Unit root (first difference)

Method	Statistic	Probability**
Levin, Lin and Chu t*	−6.249	2.05
Im, Pesaran and Shin W-stat	−5.701	5.949
ADF-fisher Chi-square	46.104	1.373
PP-fisher Chi-square	41.459	9.356

Table 5: Bound test results

Test statistics	Value
F-statistic	6.69
t-statistic	−4.94

Table 6: Critical bound values

Sample Size	10%		5%		1%	
	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
F-Statistic						
30	2.752	3.994	3.354	4.774	4.768	6.67
Asymptotic	2.45	3.52	2.86	4.01	3.74	5.06
Asymptotic	−2.57	−3.66	−2.86	−3.99	−3.43	−4.6

* I (0) and I (1) are respectively the stationary and non-stationary bounds

4.2. ADF test for Unit Root

ADF demonstrates the statistical hypothesis test which is employed to postulate that in what extent the time series dataset exhibits stationarity or non-stationarity. Stationarity constitutes a dominant role in time series analysis, to stimulate further implication regarding various key statistical attributes, mean, variance, and autocorrelation to remain consistent over time. Conversely, non-stationary time series highlights trends, seasonality, or other patterns that alter these statistical properties**.** The null hypothesis of the ADF test highlights the presence of a unit root and non-stationarity. Unit root test results are presented in Tables 3 and 4.

H_0: Data is not stationary/variable has a unit root.

H_1: Data is stationary/variable has a unit root.

Table 5 F-statistics = 6.69 indicates a higher value than the critical value of upper and lower bounds at 10%, 5%, 2.5% and 1%. It

Table 7: Short run effects

Variable	Coefficient	t-Statistic	Probability
COINTEQ*	−0.993	−6.679	0.001
D (GDP)	2.036	6.566	0.001
D (GDP(−1))	1.718	3.171	0.005
D (FINT)	9.289	1.718	0.092
D (FINT(−1))	4.324	3.390	0.003
D (ES)	−4.530	−2.458	0.025
C	17.035	6.783	0.001

Table 8: Long run effects

Variable	Coefficient	Standard error	t-Statistic	Probability*
TNR (−1)	0.006	0.201	0.031	0.975
REC	−0.1357	0.096	−1.408	0.184
GDP	2.036	4.844	4.203	0.001
GDP (−1)	−1.011	6.446	−1.568	0.142
GDP (−2)	−1.718	6.597	−2.604	0.023
FINT	9.289	7.705	1.205	0.251
FINT (−1)	−2.253	1.369	−1.645	0.125
FINT (−2)	−4.324	1.691	−2.556	0.025
ES	−4.530	2.483	−1.824	0.093
ES (−1)	6.413	2.527	2.537	0.026
C	17.035	6.614	2.575	0.024

postulates the long-term association among indicators. It also determines that the results of the long run are reliable because there exists cointegration among indicators. These concluded remarks postulate the long-run responsiveness of Total natural resources, Renewable energy consumption, Gross domestic product, Fintech and Environmental sustainability.

The ARDL approach provides benefits to the researcher to postulate that there is no need to integrate all the variables at first difference (Table 6). It requires the estimation of when some are I (0) and some are I (1), but it specifies that there should be no stationarity at I (2).

4.3. Autoregressive Distributed Lag Model (ARDL)

When some variables indicate the stationarity at the level and some others at 1st difference, ARDL is an appropriate technique to determine the association among the indicators. This transformation to stationarity is a common prerequisite for applying regression-based models like ARDL, which rely on stationary time series data for meaningful analysis.

TNR (−1) has a beta value of 0.006 with a t-statistic of 0.031. Its P = 0.975, indicating that it is not statistically significant at conventional levels. REC has a coefficient of negative beta coefficient with t-statistic of −1.408. The P = 0.184, suggesting that REC is also not statistically significant at conventional levels. GDP exhibits a significant positive impact as its P < 0.05, indicating strong statistical significance.

FINT has a significant positive impact as well, with a coefficient of 9.289 (Table 7). However, its P = 0.251, indicating that this result may not be statistically significant. ES has a negative coefficient value with P = 0.093, suggesting that ES is not statistically significant at conventional levels.

In summary, Table 8 shows the long-run effects of various variables, with GDP and the constant term C having significant impacts. Table 7 highlights the short-run effects, with COINTEQ*, changes in GDP, financial variables (D(FINT) and D(FINT(−1))), changes in economic stability (D(ES)), and the constant term C being significant factors in explaining short-run variations in the dependent variable.

5. DISCUSSION

The findings suggest that the consumption of resources is hardly impacted by the adoption of renewable energy. It is unlikely to have a substantial influence, especially over an extended period. The results indicate that Fintech has a significant and enduring impact on the utilization of natural resources. The dynamic character of this component undeniably exerts a significant influence on the utilization of natural resources. It exhibits both immediate and enduring impacts. The fintech industry has greatly influenced resource management by improving efficiency and introducing innovative approaches. It should be regarded because of its inevitable importance. The influence of environmental stability is significant, both in the short term and in the long term. The utilization of natural resources is impacted by it, rendering it an essential element of resource management strategies. It enables the incorporation of ecological issues, establishing a connection between economic operations and ecological variables. Tan et al. (2023) indicates that the development of financial technology (fintech) has a positive impact on the management of natural resources. The index of natural resources management is highly affected by both renewable energy use and foreign direct investment (FDI). In addition, the consumption of natural resources, which is an important economic metric, is significantly affected by GDP. Increasing GDP and decreasing resource use pose a threat to future economic pathways. This research proves that politicians need to think long and hard about the consequences of decoupling economic development from resource waste.

For the time being, natural resource consumption influences GDP, financial technology, and ecological sustainability. Policymakers must respond swiftly in response to changes in these traits because of the impact on resource usage that they can have. Even while these things might have a short-term impact on resource usage, we need a long-terms and flexible solution.

The findings of Lisha et al. (2023) indicate that FinTech and natural resources negatively affect environmental sustainability. However, in 0.10th-0.90th it can be seen that eco-friendly items and improvements to the finance system aid in environmental preservation. In addition, economic expansion also leads to increased emissions in significant quantiles. The fact that GDP, Fintech, environmental sustainability and use of natural resources are all short-term variables that cointegrate implies that they are interrelated in real-time. The intricate consequences of resource utilization are brought to light by this dynamic interaction. Government initiatives and corporate strategies need to be flexible enough to respond to rapid changes in the economy and the environment, as these variables have a short-term impact on the consumption of natural resources.

The findings also make one wonder why it appears to be a conflict between GDP growth and resource depletion. To address this, we need to reevaluate economic ideas and approaches to managing resources.

6. CONCLUSION

The study contributes to the existing body of knowledge on sustainable development and makes significant advancements by focusing on the utilization of natural resources. The present study focuses on the factors that influence economic activities in major global economies. The findings emphasize the importance of Fintech and environmental stability policies in boosting natural resource management in an area. The study highlights the importance of both financial and non-financial considerations in the management of natural resources, achieved through rigorous policy development. This study extends existing knowledge by focusing on the financial sector's involvement in mitigating the effects of natural resource exploitation and transitioning from conventional methods of economic development. Furthermore, the study provides a noteworthy contribution to the current knowledge on strategies for attaining effective natural resource management. The study has provided a distinct perspective on the significance of research and development (R and D) in the conservation of natural resources for future generations.

This study has far-reaching implications for big economies. According to this research, nations ought to put a lot of money into initiatives that improve ecosystem health. Thanks to technological advancements, these top economies can control the consumption of natural resources, paving the way for more sustainable growth and better management of these resources. Sustainable growth also relies heavily on fintech. Hence, it is imperative to augment the R and D expenditure in Fintech to optimize its efficacy in promoting sustainable economic growth methods. Furthermore, the exhaustion of natural resources might result in a shortage of resources, jeopardizing the welfare of future generations. Hence, nations ought to adopt efficacious strategies to foster advancement and avert the depletion of natural resources. The findings of this study emphasize the importance of addressing policy-level concerns related to the use of natural resources in big economies. Countries should prioritize the implementation of policies that specifically target environmental conservation, enforce resource management plans, and provide equitable access to resources across all sectors of society.

The current study presents numerous interesting findings and consequences; nonetheless, it is unfeasible to overcome its limitations. The primary objective of this study is to examine the exploitation of natural resources in Vietnam. Consequently, the findings may not accurately represent sustainable development in other economies. Subsequent research can prioritize the examination of environmental regulatory policies in different nations and emphasize the factors that influence the exploitation of natural resources in those nations. The current study has examined the influence of energy innovation, Fintech, environmental sustainability, and natural resource utilization. Nevertheless, sustainable development, being a complex and diverse concept, can be influenced by numerous additional elements that cannot be comprehensively evaluated in a single study. Hence, further research might prioritize investigating the influence of other variables, such as green finance and policy uncertainty. Furthermore, future research endeavors may employ an alternative analytical framework to examine the factors that influence sustainable development. Future studies have the option to gather primary data using either qualitative or quantitative research approaches.

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