

Fintech and Sustainable Development: Exploring the Interactive Role of Governance

Madiha Naseem¹ and Wajid Alim²

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Abstract

The Study examines the influential role of governance in the nexus between financial technology and sustainable development. Using statistical techniques such as ordinary least squares, fixed-effects models, and generalized method of moments (GMM) models, the study finds a complex relationship. The findings indicate that, in the absence of governance as a moderating factor, fintech is negatively and significantly associated with the Sustainable Development Goals, reflecting challenges such as weak regulatory frameworks, limited financial literacy, high implementation costs, and inadequate technological infrastructure. However, when governance quality is introduced as a moderating factor, fintech has a strong, significant positive influence on the SDGs. These results suggest that effective governance mitigates fintech-related risks while enhancing its potential to drive inclusive growth, reduce poverty, foster green innovation, and improve energy efficiency. Furthermore, the analysis highlights the critical role of governance in shaping financial and technological systems by strengthening institutional quality, improving regulatory mechanisms, and promoting sustainable economic policies. Policymakers are encouraged to implement robust regulations, incentivize fintech-driven green initiatives, and integrate environmental considerations into financial innovation. By aligning fintech development with sound governance frameworks, countries can accelerate progress toward achieving the SDGs, ensuring that technological and financial advancements contribute to long-term sustainability.

Keywords: Sustainable Development Goals (SDGs), Fintech, Governance, Generalized Method of Moments, Panel Approach.

Introduction

Currently, the term "sustainable development" has become increasingly prevalent globally to address significant issues that influence all communities. To tackle challenging issues such as global warming, poverty, and inequalities, the United Nations established 17 Sustainable Development Goals (SDGs), an innovative and emerging set of objectives that guide political strategies over the next 15 years to combat global issues. These are highly responsible for ecological conservation, social inclusion, and economic growth (Povitkina & Jagers, 2022). The ultimate objective of these goals is to meet present needs without compromising future generations' needs (Emina, 2021). Sustainability has drawn more attention to the financial system's role in facilitating the transformation to sustainable finance, including digital finance and financial technology (Khatib et al., 2025). By rerouting financial resources toward more sustainable purposes and reducing financial exclusion, financial technology can help achieve the SDGs (Hoang et al., 2022).

¹Scholar, Lahore School of Accountancy and Finance, The University of Lahore.

Email: madihanaseem6624@gmail.com

²Assistant Professor, Lahore School of Accountancy and Finance, The University of Lahore.

Corresponding Author Email: wajid@uolcc.edu.pk



Fintech is the use of innovative technology in financial services, assisting customers, investors, and businesses in managing their financial operations by using specialist software and applications, offering highly automated, transparent, effective, and user-friendly services (Agudo, 2021). Fintech acts as an innovator, promoting digitalization, financial inclusion, and convenient access to financial services, especially in low-income areas (Banna & Rana, 2023). It acts as a crucial facilitator by encouraging digital payments, enhancing financial inclusion, and enabling transparent and effective resource allocation (Tay et al., 2022). Its contribution to democratizing access to financial services achieves several SDGs, including SDG 1 (No Poverty), SDG 4 (Quality Education), SDG 5 (Gender Equality), and SDG 8 (Decent Work and Economic Growth) (Danladi et al., 2023). Fintech has the potential to bridge the gap between sustainable development and financial services by promoting innovation, improving the effectiveness of products focused on long-term viability, and enabling crowdfunding for renewable energy initiatives. Fintech can flatten the EKC by the adoption of early green technologies (Liu et al., 2022), further helping to achieve SDG 1 (No Poverty) by providing microloans to low-income individuals (Thakkar & Bhuyan, 2024) and SDG 4 (Quality Education) by facilitating educational access through innovative financial solutions (Alqirem & Al-Smadi, 2025).

Governance plays a prominent role in achieving the SDGs and in enforcing rules, regulations, practices, and policies for environmental protection and sustainability. It is associated with the systems, procedures, and establishments intended to support sustainable development (Salihi et al., 2024). Good governance is a key driver of environmental protection (Jianguo et al., 2022) and long-term green economy growth (Pradhan et al., 2023), leading to the attainment of the SDGs (Barbier & Burgess, 2021). Environmental governance includes governmental and non-governmental efforts to enforce environmental laws and promote sustainability. Strong governance can promote and strengthen the policies to accelerate the EKC transition to the declining phase by supporting green innovations and enhancing environmental regulations, supporting SDG16 (Peace, Justice, and Strong Institutions) (Anwar et al., 2022) and SDG 17 (Partnerships for the Goals) (Yadav et al., 2024). Effective implementation of fintech largely depends on efficient institutional frameworks and strong leadership, including regulatory efficacy, robust governance, and anti-corruption measures (Harsono & Suprpti, 2024). Fintech companies with strong governance strengthen the trust among investors, stakeholders, consumers, and regulatory bodies, promoting sustainability and collaboration. Furthermore, financial conditions and performance can be assessed using an institutional framework (Ferilli et al., 2024). Innovative procedures and strong leadership in the fintech industry provide banks and financial institutions with a competitive advantage by enabling access to innovative services and products and by safeguarding against risks (Katsiampa et al., 2024). Investors should adapt their traditional strategies to facilitate the integration of cryptocurrencies with conventional currencies, while policymakers should ensure the effectiveness of monitoring and regulatory frameworks to promote technological innovation and accelerate financial stability (Nawaz et al., 2025).

Literature Review and Proposed Hypothesis

Fintech and Sustainable Development Goals (SDGs)

Fintech is an emerging and stimulating technology for the financial sector that supports sustainable development by boosting economic growth through technological improvements, entrepreneurial activity, diversity, and innovation. These contributions reduce income disparities and accelerate efforts to eradicate poverty and hunger (Hasan et al., 2024). Numerous researchers (Feng & Li, 2024; Liu et al., 2024) examined the nexus between fintech and environmental sustainability (CO₂ emissions) and concluded that fintech lowers carbon emissions by promoting green finance initiatives, by financing through the funds collected from

taxes, and encourages the green economy by facilitating green loans and green resources. Its development led to a reduction in corporate carbon emissions (CCEs). This reduction was attributed to fintech's role in alleviating financing constraints, promoting green innovation, and improving energy efficiency within companies (Wang et al., 2024). Financial technology initiatives are specifically linked to SDG goals 1 (No Poverty), 2 (Zero Hunger), 5 (Gender Equality), 8 (Decent Work and Economic Growth), and 17 (Partnerships for the Goals), supporting poverty reduction and accelerating sustainable development (Noreen, 2024). Fintech and AI are effective in achieving the SDGs and can be crucial in mitigating the negative impacts of COVID-19 across areas such as the environment, the economy, and social welfare (Farahani et al., 2022). Fintech and financial inclusion can both accelerate the achievement of the SDGs by promoting economic growth (Choudhary et al., 2025). It also influences the real economy through financing constraints, industrial structure, and technical advancement, boosting confidence and promoting financial development (Cheng et al., 2023). Green initiatives encourage the banking sector to incorporate green energy sources and to meet the 2050 carbon-neutrality target (Jiang et al., 2024). Additionally, Fintech, green finance, and green innovation promote ecological improvement and sustainability, supporting the Environmental Kuznets Curve (EKC) hypothesis. Countries must scale up green finance by utilizing green financial instruments and enhancing the financial and banking sectors' capacity (Udeagha & Breitenbach, 2023). Gold, oil, and green bonds are better hedging tools in the current climate for a diversified portfolio, and that diversification analysis should be based on the volatility of individual assets (Le et al., 2021). The government must implement effective rules and regulations to address systemic risks in fintech and promote fintech participation in green consumption to support environmental protection (Muganyi et al., 2021). Organizations must establish a legal framework that promotes innovative technologies, digital services, and private-sector investors to advance financial inclusion and the SDGs (Danladi et al., 2023). Governments and regulators should emphasize the appropriate management and use of resources by striking a balance between economic benefits and environmental harms (Jie et al., 2024). Furthermore, Policymakers should prioritize green initiatives, financial technologies, and impose reasonable environmental taxes to achieve sustainable development goals (Feng & Li, 2024). Regulators should establish effective regulation mechanisms to ensure that the implementation of technological advancement in the financial sector enhances conventional financial institutions' systems (Baig et al., 2025).

H1: Fintech has a significant influence on Sustainable Development Goals (SDGs)

Governance and Sustainable Development Goals (SDGs)

Financial development is a key driver of a country's economic growth, involving technological advancement, technical capabilities, and effective regulatory frameworks within financial systems and institutions (Husain et al., 2025). Long-term development and sustainability performance are linked with effective institutional structure and good governance. Better institutional quality and lower national risk are considered key factors for achieving long-term success toward the SDGs (Barbier & Burgess, 2021). Financial Development and governance are key drivers of long-term green economic growth (Ahmed et al., 2022). Governance plays a crucial role in shaping the performance of financial technologies and their disclosure. Strong governance frameworks lessen fintech risk and enhance financial stability (Ferilli et al., 2024). Corporate governance practices such as board size, meeting frequency, and the role of audit committees strengthen fintech transparency in both conventional and Islamic banks, offering valuable insights to regulatory bodies to transform conventional business models towards fintech-driven approaches (Shehadeh et al., 2024). Conversely, Inadequate governance procedures violate shareholders' rights, resulting in inefficient financial markets, increased legal challenges, and raising the risk of financial instability (Najaf et al., 2021). Board size has

a detrimental effect on fintech services; in contrast, independent board members enhance the quality of fintech, thereby improving overall bank performance (Almubarak & Aljughaiman, 2024). Additionally, governance is essential for directing banks' strategic initiatives towards innovative technologies to enhance economic and sustainability performance (Almaqtari, 2024). Numerous researchers (Azam et al., 2021; Har & Sin, 2023; Hu et al., 2022) affirmed that the existing policies, institutional structures, and strategies can be compatible with sustainable development, economic growth, and institutional quality. Government and corporate entities should enhance governance structures to support sustainable development (Liu & Zhang, 2024). Strengthening governance structures and investment in clean technologies can help balance economic, social, and environmental objectives effectively (Omri & Mabrouk, 2020). Enforcing stringent policies and fostering international cooperation can minimize geopolitical risks and enhance sustainable energy practices (Bakhsh et al., 2024). Better institutional quality, technological innovation, and renewable energy are negatively associated with environmental quality, thereby reducing CO₂ emissions (Anwar et al., 2025). Government and regulatory bodies should emphasize policy measures that blend governance and clean energy initiatives (Murshed, 2024) and enhanced regulations to ensure companies take substantive actions to minimize environmental impact and promote sustainability (Wang et al., 2023). China may successfully achieve climate and sustainability goals by advancing technology through strong institutional structures and implementing policies and regulations in the energy sector (Udamba & Tosun, 2022). Institutional factors, such as financial security, compliance standards, and transparency, greatly reduce income inequality (Kunawotor et al., 2020; Szczepaniak et al., 2022), increase life expectancy (Ouedraogo et al., 2020), and decrease infant mortality rates (Rehmat et al., 2020).

H2: Governance has a moderating role on the nexus between fintech and sustainable development goals (SDGs).

Methodology

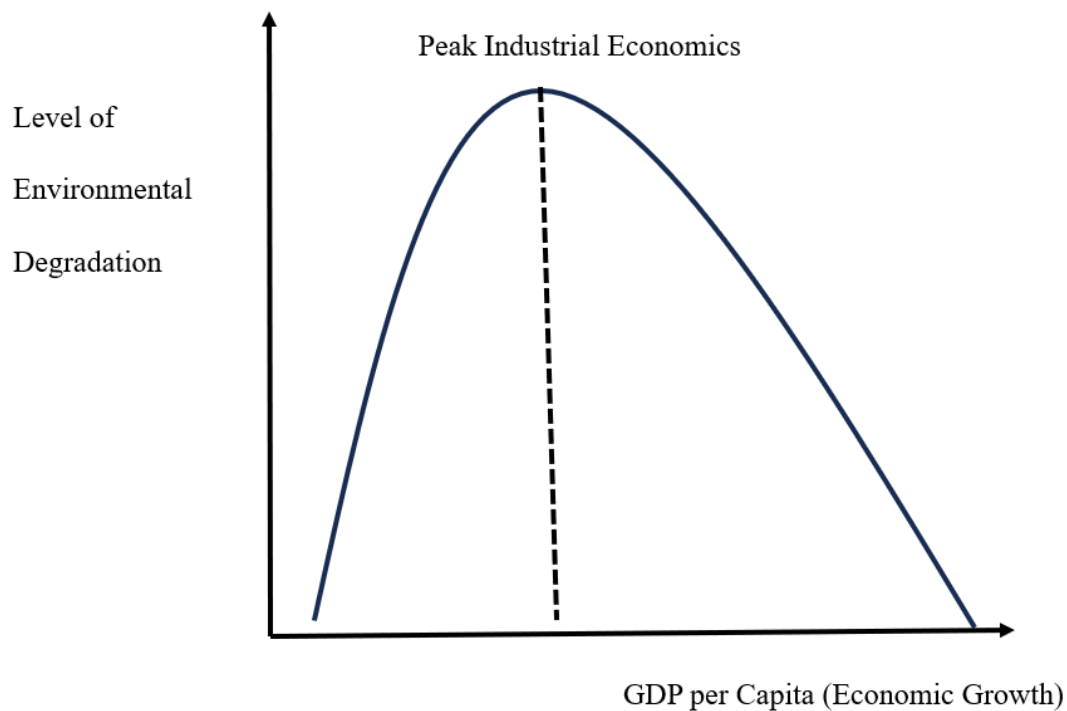
Theoretical Framework

Environmental Kuznets Curve Theory

To evaluate environmental performance, the Environmental Kuznets Curve (EKC) is the predominant analytical framework (Kuznets, 1955). In 1955, Kuznets developed an inverted U-shaped curve that serves as the core of the Environmental Kuznets Curve (Leal & Marques, 2022). Initially, the purpose of this hypothesis was to investigate the nexus between income inequality and per capita income, but later, as the inverted U-shape began to be used in environmental studies, the EKC gained popularity (Voumik et al., 2022). Firstly, in 1993, Grossman G.M. proposed the inverted U-shaped EKC curve (Grossman, 1993; Rothman, 1998). The Environmental Kuznets Curve (EKC), a theoretical framework that raises the possibility of sustainability, posits that there is a U-shaped relationship between economic development and environmental degradation: as economic growth increases, environmental pollution rises (Uchiyama & Uchiyama, 2016). During the early stages of economic growth, environmental quality deteriorates as emissions rise. When the economy expands, consumption of renewable and non-renewable energy sources increases, leading to environmental degradation (Özokcu & Özdemir, 2017). As the industries grow and production increases, more pollutants are emitted into the environment. Developing countries are highly responsible for global warming because they rely heavily on non-renewable sources like fossil fuels for their energy requirements and face additional challenges to their economic growth. To fulfill their energy demands, these countries contribute significantly to environmental degradation (Udeagha & Ngepah, 2023). But at a certain level of per capita income, the trend changes. As income levels rise, economic growth improves the environment and enhances quality of life

(Osuntuyi & Lean, 2022). This indicates an inverted U-shape connection between environmental degradation and income (Stern, 2001; Stern, 2018).

Figure 1: Level of environmental degradation



Model Specification

The current paper examines the moderating role of governance on the nexus between fintech and sustainable development goals (SDGs). The following is the model's regression equation: $SDGs_{it} = \alpha + \beta_1 fintech_{it} + \beta_2 RE_{it} + \beta_3 HD_{it} + \beta_4 EG_{it} + \varepsilon_{it} \dots (i)$

$$SDGs_{it} = \alpha + \beta_1 fintech_{it} + \beta_2 GOV_{it} + \beta_3 fintech * GOV_{it} + \beta_4 RE_{it} + \beta_5 HD_{it} + \beta_6 EG_{it} + \varepsilon_{it} \dots (ii)$$

Where SDGs denotes sustainable development goals, fintech stands for financial technologies, GOV shows governance, RE signifies renewable energy, HD represents human development, and EG designates economic growth.

This study employed panel data from 159 countries from 2000 to 2023. Data sources include Sustainable Development Index, UNCTAD, Worldwide Governance Indicators (WGI), and World Development Indicators (WDI). Sustainable Development Goals (SDGs) are measured through the SDG index, obtained from reputable and credible institutions like the Bertelsmann Stiftung and the "Sustainable Development Solution Network" (SDSN), as delineated by researchers such as (Hunjra et al., 2022). Fintech is measured through the financial development index (FDI) from the International Monetary Fund (IMF), an aggregation of the financial institutions index (FII) and financial markets index (FMI). Governance is captured through a composite governance index. This index is constructed through principal component analysis (PCA) by incorporating six dimensions from the Worldwide Governance Indicators (WGI). This study also employed three control variables: renewable energy, economic growth,

and human development. Renewable energy is measured as renewable energy consumption (% of total final energy consumption; WDI), human development is measured as human development index (UNDP), and economic growth is measured as GDP per capita growth (annual percentage; WDI).

Table 1, therefore, provides a comprehensive picture of the variables, their measurement, and sources for the data collection.

Table 1: Description of Variables

Variables	Measurement	Sources	References
Sustainable Development Goals (SDGs)	SDG index	Bertelsmann Stiftung and the Sustainable Development Solutions Network (SDSN)	(Sun et al., 2025)
Fintech	Financial development index	International Monetary Fund (IMF)	(Coffie et al., 2022)
Governance	Governance index Voice and accountability Political stability and absence of violence Government effectiveness Regulatory quality Rule of law Control of corruption	Worldwide Governance Indicators (WGI)	(Achim et al., 2024)
Renewable Energy	Renewable energy consumption (% of total final energy consumption)	World Development Indicators (WDI)	(Gatto & Drago, 2020)
Human Development	Human development index	United Nations Development Programme (UNDP)	(Kouton et al., 2024)
Economic Growth	GDP per capita growth (annual percentage)	World Development Indicator (WDI)	(Kanwal et al., 2023)

Results and Discussion

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
SDG	3816	64.2293	10.59731	39	86.4
Fintech	3816	0.3200419	0.2340003	0.03	1
GOV	3816	-0.0305146	0.9894616	-1.740861	2.455835
fin*gov	3816	0.1696907	0.5161388	-0.6340287	2.14162
RE	3816	34.38443	29.76266	0	98.3
HD	3816	0.6911847	0.166123	0.26	0.967
EG	3816	2.181872	4.653184	-36.82455	62.11102

Table II highlights statistical information on all the variables employed in this study. SDG exhibits an average of 64.2293, ranging from 39 to 86.4. The standard deviation is 10.59731, indicating a relatively low degree of variability. Fintech has a mean value of 0.3200419, with a minimum of 0.03 and a maximum value of 1, having a standard deviation value of 0.2340003,

showing significant variation. The average value of Gov is -0.0305146, ranging from -1.740861 to 2.455835. The standard deviation is 0.9894616, showing significantly large variability. The mean value of fintech with the moderating role of gov is 0.1696907, deviating 0.5161388% from its mean (high variability), with a minimum value of -0.6340287 and a maximum value of 2.14162. Renewable energy variability is significantly high (29.76266 standard deviation), with minimum and maximum values of 0 and 98.3, respectively, with the mean value of 34.38443. The average value of HD is 0.6911847, ranging from a minimum of 0.26 to 0.967. The value of standard deviation is 0.166123, indicating moderate variability. EG has a significant variation (4.653184 standard deviation). The average EG rate is 2.181872, with a minimum and maximum value of -36.82455 and 62.11102.

Table 3: Correlation Matrix

	SDG	Fintech	Gov	RE	HD	EG
SDG	1.0000					
Fintech	0.6864*	1.0000				
GOV	0.6481*	0.7753*	1.0000			
RE	-0.5995*	-0.5300*	-0.3702*	1.0000		
HD	0.8037*	0.7831*	0.7074*	-0.7153*	1.0000	
EG	0.0334*	-0.0745*	-0.0493*	-0.0032	-0.0188	1.0000

Note: ***, **, * is for significant at 1%, 5% and 10%.

Table 3 illustrates the outcomes of the correlation matrix, which is used to detect multicollinearity among variables. None of the correlations between variables is near 1; the results indicate that there is no multicollinearity among the variables.

Table 4: Unit Root Tests

	Levin-Lin-Chu unit-root (LLC)		Im-Pesaran-Shin unit-root test (IPS)	
	Statistic	p-value	Statistic	p-value
SDG	-26.5792	0.0000***	-41.4088	0.0000***
Fintech	-36.7147	0.0000***	-43.7760	0.0000***
GOV	-33.7869	0.0000***	-39.9834	0.0000***
RE	-30.3471	0.0000***	-44.9470	0.0000***
HD	-30.0635	0.0000***	-41.9221	0.0000***
EG	-36.1446	0.0000***	-44.3186	0.0000***

Note: ***, **, * is for significant at 1%, 5% and 10%.

This study employs the Levin-Lin-Chu (LLC) and Im Pesaran tests to determine the unit root in the data set. Table IV discloses the absence of a unit root, revealing that all variables are stationary at the level.

Table 5: OLS without Moderation

SDG	Coef.	Std. Err.	Z	P> z	[95% Conf. Interval]
Fintech	-2.193509	0.4960849	-4.42	0.000***	-3.165818 -1.221201
RE	0.0340008	0.0034611	9.82	0.000***	0.0272171 0.0407845
HD	64.20346	0.8573741	74.88	0.000***	62.52303 65.88388
EG	0.1310794	0.0161826	8.10	0.000***	0.099362 0.1627968
cons	19.09977	0.5920566	32.26	0.000***	17.93936 20.26018

Note: ***, **, * is for significant at 1%, 5% and 10%.

Table 5 represents the findings of the OLS model, indicating that fintech significantly and negatively influences sustainable development goals (SDGs). Fintech's coefficient is -2.193509; however, it is statistically significant (0.000***), meaning that a 1% increase in fintech leads to a 219% decline in SDGs. This study also used three control variables: for RE, HD, and EG, the corresponding coefficient values are 0.0340008, 64.20346, and 0.1310794. They have a statistically significant (0.000***) effect on SDGs.

Table 6: OLS with Moderation

SDG	Coef.	Std. Err.	Z	P> z	[95% Conf. Interval]
Fintech	25.28699	0.8295026	30.48	0.000***	23.6612 26.91279
GOV	0.7137473	0.1845516	3.87	0.000***	0.3520329 1.075462
fin*gov	-1.133485	0.3590216	-3.16	0.002***	-1.837154 -0.429815
RE	0.0368348	0.0037223	9.90	0.000***	0.0295392 0.0441305
HD	64.03072	0.9127612	70.15	0.000***	62.24174 65.8197
EG	0.1086459	0.0154961	7.01	0.000***	0.0782741 0.1390176
cons	19.40411	0.6817033	28.46	0.000***	18.06799 20.74022

Note: ***, **, * is for significant at 1%, 5% and 10%.

Table 6 shows the result of a simple linear regression with the moderating role of governance on fintech. Fintech has a coefficient value of 25.28699 and is statistically significant (0.000). This means that the SDGs performance increases by 25.2 units for every unit increase in fintech. Similarly, governance, treated as a moderating variable, has a coefficient value of 0.7137473 and is found to be statistically significant (0.000). Moreover, fintech with a moderating role of gov has a coefficient value of -1.133485 and is statistically significant (0.002). In addition, the current study uses three control variables: RE, HD, and EG. As for RE, HD, and EG, their respective coefficient values are 0.0368348, 64.03072, and 0.1086459, indicating that they are statistically significant (0.000) and positively influence SDGs.

Table 7: Hausman Test

chi2(6)	37.40
Prob>chi2	0.0000***

Table 7 shows the findings of the Hausman test; the chi-squared (Chi2) value is 37.40, and the p-value is 0.0000. The probability value is less than the significance value (0.05). The outcomes confirmed that the study's null hypothesis (H0) can be rejected; hence, fixed effects are consistent and efficient in the current study.

Table 8: Fixed Effect Without Moderation

SDG	Coef.	Std. Err.	Z	P> z	[95% Conf. Interval]
Fintech	-1.865522	0.4969277	-3.75	0.000***	-2.839794 -0.891250
RE	0.0318723	0.0034715	9.18	0.000***	0.0250661 0.0386785
HD	63.282	0.8706322	72.69	0.000***	61.57504 64.98895
EG	0.1534532	0.01693	9.06	0.000***	0.1202604 0.1866461
cons	19.65607	0.5951984	33.02	0.000***	18.48913 20.82301

Note: ***, **, * is for significant at 1%, 5% and 10%.

The fixed effects results, represented in Table 8, show that fintech has major and detrimental effects on sustainable development goals (SDGs). A 1% rise in fintech leads to a 186% drop in

SDGs, as the coefficient value is -1.865522, but it is significant (0.000***). This study also incorporates three control variables; the corresponding coefficient values of RE, HD, and EG are 0.0318723, 63.282, and 0.1534532. Their impact on SDGs is statistically significant (0.000***).

Table 9: Hausman Test

chi2(6)	76.12
Prob>chi2	0.0000***

Table 9 shows the findings of the Hausman test; the chi-squared (Chi2) value is 76.12, and the p-value is 0.0000. The probability value is less than the significance value (0.05). The outcomes confirmed that the study's null hypothesis (H0) can be rejected; hence, fixed effects are consistent and efficient in the current study.

Table 10: Fixed Effect with Moderation

SDG	Coef.	Std. Err.	Z	P> z 	[95% Conf. Interval]
Fintech	23.10587	0.8118238	28.46	0.000***	21.51422 24.69752
GOV	0.8196098	0.1834438	4.47	0.000***	0.4599515 1.179268
fin*gov	-0.820343	0.3557432	-2.31	0.021***	-1.51781 -0.122876
RE	0.0294337	0.0037967	7.75	0.000***	0.0219899 0.0368775
HD	61.49128	0.9581963	64.17	0.000***	59.61265 63.36991
EG	0.1533029	0.016935	9.05	0.000***	0.1201002 0.1865056
cons	21.29082	0.7197603	29.58	0.000***	19.87967 22.70198

*Note: ***, **, * is for significant at 1%, 5% and 10%.*

The outcomes of a fixed effect with the moderating role of governance on fintech are presented in Table 10. The results revealed that fintech is statistically significant (0.000) and has a coefficient value of 23.10587. This indicates that for every unit increase in fintech, the SDGs' performance rises by 23.1 units. Governance, which is considered a moderating variable, has a coefficient value of 0.8196098 and is statistically significant (0.000). Furthermore, fintech with a moderating governance role has a coefficient value of -0.820343 and is statistically significant (0.021). In addition, three control variables are used in the current study: RE, HD, and EG. According to their respective coefficient values of 0.0294337, 61.49128, and 0.1533029, RE, HD, and EG are statistically significant (0.000) and positively impact SDGs.

Table 11: Generalized Method of Moments (GMM)

SDG	Coef.	Std. Err.	Z	P> z 	[95% Conf. Interval]
L1.	0.9354112	0.0102384	91.36	0.000***	0.9153442 0.9554781
Fintech	23.14206	.7899876	29.29	0.000***	21.59371 24.69041
GOV	6.440412	.2596685	24.80	0.000***	5.931471 6.949353
fin*gov	-8.079315	.503446	-16.05	0.000***	-9.066051 -7.092579
RE	0.0134778	0.0045522	2.96	0.003***	0.0045556 0.0224
HD	3.546098	0.7741325	4.58	0.000***	2.028826 5.06337
EG	-0.004532	0.0025944	-1.75	0.081*	-0.009617 0.0005529
cons	55.75633	.7481382	74.53	0.000***	54.29 57.22265

*Note: ***, **, * is for significant at 1%, 5% and 10%.*

The findings of the generalized equation model in Table XI indicate that a 1-unit increase in past SDG performance leads to a 93.5% rise in current SDG performance, with a coefficient of 0.9354112, indicating that past SDG performance positively and significantly influences current SDG performance. The findings also showed that fintech has a significant (0.000) and positive (23.14206) impact on sustainable development. Similarly, governance, treated as a moderating variable, has a coefficient of 6.440412 and is statistically insignificant (p -value = 0.000). Moreover, fintech with a moderating role of gov has a coefficient value of -8.079315 and is statistically significant (0.000).

Discussion

This research explored the moderating role of governance in the nexus between fintech and the Sustainable Development Goals (SDGs). Results highlight the findings of the Ordinary Least Squares (OLS) and fixed effect model, proclaiming that fintech has a negative (-2.193509; -1.865522) and significant (0.000; 0.000) association with sustainable development goals (SDGs), largely due to different levels of regulatory capabilities and legislations across different regions (S. Yadav et al., 2024), lack of financial literacy, high implementation cost, and inadequate technological infrastructure (Hasan et al., 2024). Conversely, the outcomes of the Ordinary Least Squares (OLS) and fixed-effect model affirmed that fintech, with the moderating role of governance, positively (25.28699; 23.10587) and significantly (0.000; 0.000) influences the sustainable development goals (SDGs). The Generalized Method of Moments (GMM) also confirmed the findings.

The results indicate that Fintech supports sustainable development by fostering technological advancements, entrepreneurial activities, institutional quality, and innovation, thereby reducing income disparities and accelerating efforts to eradicate poverty and hunger (Hasan et al., 2024). Fintech also alleviates financing constraints, promotes green innovation, and enhances energy efficiency (Wang et al., 2024). Fintech and financial inclusion can both accelerate the achievement of SDGs by promoting economic growth (Choudhary et al., 2025). Governance plays a pivotal role in shaping fintech performance, as strong governance frameworks lessen fintech risk and enhance financial stability (Ferilli et al., 2024). The government must implement effective rules and regulations to address systemic fintech risks and incentivize fintech participation in green consumption (Muganyi et al., 2021). Organizations must establish a legal framework that promotes innovative technologies, digital services, and private-sector investors to advance financial inclusion and the SDGs (Danladi et al., 2023). Governments and regulators should emphasize the appropriate management and use of resources by striking a balance between economic benefits and environmental harms (Jie et al., 2024). Encourage green initiatives, financial technologies, and impose reasonable environmental taxes to achieve sustainable development goals (Feng & Li, 2024).

Conclusion

This study set out to explore the moderating role of governance in the relationship between financial technology (fintech) and the achievement of the Sustainable Development Goals (SDGs). The empirical evidence provided nuanced insights into this nexus. Findings from the Ordinary Least Squares (OLS) and fixed-effect models revealed that, in the absence of effective governance, fintech alone tends to have a negative and significant association with sustainable development. This outcome can be attributed to several constraints, including weak or inconsistent regulatory frameworks, insufficient financial literacy among populations, the high cost of technological adoption, and inadequate digital infrastructure in many regions. These barriers limit the equitable distribution of fintech benefits and, in some cases, exacerbate economic disparities, thereby slowing progress toward the SDGs. However, the analysis also

confirmed that when governance is introduced as a moderating factor, the role of fintech becomes significantly positive. In this context, governance acts as a catalyst, channeling fintech's potential toward sustainable outcomes. Strong governance frameworks help mitigate systemic risks, foster institutional quality, and create enabling environments for financial innovation. The results from both OLS and GMM estimations suggest that good governance amplifies fintech's capacity to drive financial inclusion, enhance entrepreneurial activities, support technological innovation, and promote environmental sustainability. In other words, fintech's effectiveness in advancing the SDGs is not inherent but conditional on the quality of governance structures that regulate and guide its application.

From a policy perspective, the findings highlight the importance of establishing robust regulatory and legal frameworks to oversee fintech development without stifling innovation. Governments should focus on strengthening institutional mechanisms that enhance financial literacy, protect consumers, and create incentives for fintech firms to invest in green technologies and inclusive services. Moreover, regulators need to ensure a balance between economic growth and environmental protection by designing policies that encourage responsible innovation while discouraging practices harmful to sustainability. For instance, implementing environmental taxes, promoting green financing schemes, and integrating digital technologies into energy-efficient solutions could better align fintech with the SDGs.

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