The effect of financial literacy and green innovation technology on green economic sustainability in emerging countries

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C H R O N I C L E	A B S T R A C T
	As battery electric vehicles become more prevalent in emerging markets, it is important that policymakers and the public consider their potential to contribute to the reduction of greenhouse gas emissions. This study explores the link between financial knowledge, attitude and green economic sustainability. The study, which was conducted in Indonesia, collected data about 155 individuals. Through a PLS-SEM analysis, the study revealed that financial knowledge and green innovation were related to the attitude toward sustainability. The study also found that green innovation was associated with the economic sustainability of the country. However, it did not find any significant relationship between financial knowledge and green investment. The study revealed that financial literacy is very important for consumers to adopt sustainable practices. It can help them make informed decisions when it comes to the use of battery electric vehicles. This study was conducted after the Indonesian government stated that it would promote the use of green products. Innovation and green investment can help improve the economic sustainability of a country by increasing people's green attitudes and knowledge.

1. Introduction

Scholars from various countries have been conducting studies on the global ecology crisis (Wang et al., 2021; Mustafa et al. 2023). The global ecology crisis is due to business activities, such as pollution, waste, and the exploitation of natural resources, which harm the health of ecosystems and the planet (Dutta et al., 2023). The awareness of adopting green technology in business activities provides an alternative to avoid environmental damages (Farhi et al. 2023). Green investment in environmentally friendly products provides sustainability for business and economic growth (Zhang et al. 2022). Green investment and green innovation technologies are key indicators of economic growth (Kumari & Harikrishnan, 2021). Hence, green investments (GI) and green innovation technology (GIT) in products are crucial for ensuring future business and economic sustainability (Duréndez et al. 2023). The importance of GI and GIT can also be seen in modern technology as consumers expect institutions and businesses to balance their output with the environment (Marco-Lajara et al., 2022). As Southeast Asia's largest economy, Indonesia is a pivotal country in global electric vehicle production. Indonesia is committed to producing 13 million electric motorcycles and 2.2 million electric cars by 2030. Indonesia has a huge amount of nickel resources (52%), which makes it an important contributor to the global production of batteries (Data Indonesia, 2021). Electric vehicle penetration in the passenger car and motorcycle markets has the potential to reduce greenhouse gas emissions from the transportation sector by 8.4 million tons of CO_2 in 2030 and 49.5 million tons of CO_2 in 2050 under an ambitious scenario, with

an aggressive application of incentive instruments on the demand side. The government sets a target of 2 million electric cars and 13 million electric two-wheeled vehicles by 2030 (Report-Linker, 2022). A relatively new implementation of GI and GTI in Indonesia is battery electric vehicles. In 2021, the sales of battery electric cars have increased significantly by 515,04% from 133 units in 2020 to 685 units and a tremendous growth occurs in 2022 where battery electric vehicles achieved 10.327 units or 1.507,59% increment compared to 2021 (dataindonesia.id, 2023). Green investments (GI) and green innovation technology (GIT) boost Indonesia's financial growth and economic sustainability. Numerous studies have examined green investment (Dutta et al., 2023), green innovation technologies (Ali et al., 2023), and financial literacy (Kumari & Harikrishnan, 2021; Tahir et al., 2021). Shen et al. (2021) and Wang et al. (2021) noted that GIT had little or negative impact on the country's economic growth due to its incompetence when it comes to technological innovation. Yet, studies on how green investment and innovative technologies affect economic sustainability are limited (Lou et al., 2021; Luo & Cheng, 2022; Duréndez et al. 2023). To address the issues, further investigation of the link between financial knowledge (FK), financial attitude (FATT), GI and GIT of battery electric vehicles on green economic sustainability (GES) is needed.

The goal of this study is to investigate the influence of GIT and GI on the link between FATT and FK on GES. Technology and financial literacy are crucial for consumers to make informed decisions and develop economic sustainability. GI and GIT can bring many benefits to consumers, increase consumer understanding of finance for green products, and reduce environmental encroachment (Jia et al., 2021). GI and GIT may solve environmental issues by developing battery electric vehicles and procedures that conserve ecologically friendly products, minimize waste and pollution, and improve environmental management (Jin et al., 2022; Shang et al., 2023). The study recommends the implementation of policies that encourage the use of sustainable products. Its findings could also contribute to environmental and finance literature.

2. Literature review

2.1. The Theory of Diffusion of Innovation (DOI)

The concept of the diffusion of innovation focuses on the characteristics of the technological innovation that has been adopted (García-Avilés et al., 2019a,b). Rogers (2003) proposed a framework that aims to help individuals identify and implement effective decision-making strategies when it comes to adopting new technologies. The knowledge stage is where people learn about an innovation and its operation. At the persuasion stage, they look for information about the innovation to reduce the uncertainty surrounding its potential impact. At the decision stage, they decide whether to adopt or reject the innovation. The extent to which a user changes or alters a technological innovation during its implementation is referred to as reinvention. Individuals with limited knowledge about an innovation might develop their attitude toward it after the decision-making process has completed (Zoubi et al., 2023).

The diffusion innovation constructs of the DOI model are not precisely stated in it (Vargo et al., 2020). Due to the complexity of complex and networked technologies, the model needs to be re-evaluated to provide more effective solutions for addressing the collective behaviors of users (Du et al. 2019). Despite the various advantages of the DOI model, it is still not clear how it can help individuals identify and implement effective decision-making strategies when it comes to adopting new technologies (Dev et al., 2020). For instance, the interaction between the various factors of adoption is still not fully understood (Okur et al., 2021; Zoubi et al., 2023). The complexity of technological innovations and the varying economic and technical aspects of nations can lead to the development of uncertainty in the decision-making process. This study aims to reduce this uncertainty using financial knowledge and attitude.

2.2 Hypotheses Development

Financial Knowledge

According to Khan et al. (2020), financial literacy can help individuals make informed decisions when it comes to investing in low-carbon electric devices and the financial market. Knowledge about green products is very important for consumers to make pro-environment decisions (Pastor et al., 2020). This knowledge can also help raise awareness about eco-friendly products. People with high levels of financial knowledge can make better financial decisions (Ali et al., 2021). Based on the previous studies above, this study proposes hypotheses:

H$_{1a}$: *Financial knowledge has a significant effect on green investment in electric vehicles.*
H$_{1b}$: *Financial attitude has a significant effect on green innovation technology electric vehicles.*

Financial Attitude

The importance of green technology has become a central issue in the social economic development of nations (Gilenko & Chernova, 2021). Technological advancement and green investments can help raise awareness about a country's potential to improve its environmental future (Jin et al., 2022). A previous study revealed that people's pro-environment attitudes could help decrease environmental damage (Hu et al. 2021). Khan et al. (2022) found that financial attitude has a positive effect on the green technology and environmental well-being of nations. Based on the literatures above, this study proposes hypotheses:

H2a: *Financial knowledge has a significant effect on green investment in electric vehicles.*
H2b: *Financial attitude has a significant effect on green innovation technology in electric vehicles.*

Green Innovation technology

The concept of green economic growth is a framework that aims to transform the economic growth model by incorporating technological innovation and emission reduction (Jia et al., 2022). Two of its components are green finance and green innovation. In 2021, a study conducted by Tolliver et al. (2021) revealed that Asian economies prioritize the use of green finance and innovation as they strive for low-carbon growth. Su et al. (2021) concluded that green innovations can help improve the efficiency of social and environmental sustainability. Hence, based on the prior literatures above, this study proposes hypotheses:

H3a: *Green innovation technology has a significant effect on green investment of electric vehicles.*
H3b: *Green innovation technology has a significant effect on green economic sustainability of electric vehicles.*

Green Investment

Razzaq et al. (2021) noted that innovative technology can help implement green investment in the low-carbon sector. Financial and environmental professionals need to develop their skills in green innovation to cater to sustainable industry (Kirikkaleli & Adebayo, 2022). A study conducted by Shen et al. (2020) revealed that green investments can help emerging nations achieve their environmental goals. As a result, technological innovation and green investment are some of the most important factors that can help improve the country's economic sustainability. Based on the prior literatures above, this study proposes hypotheses:

H4: *Green Investment has a significant effect on Green Economic Sustainability of electric vehicles.*

*Mediating effect of green innovation technology and* green investment

Through green innovation, manufacturers can now be assured of being able to offer their customers environmentally friendly products (Wang, 2019). Garca-Machado (2019) stated that industrial development can be achieved with the help of such innovations, which can improve the environment. In a competitive global economy, innovation and green investments can help companies stay competitive. According to a study conducted by Awwad et al. (2022), positive correlations can be found between cooperation and green purchasing. Companies can lower their expenses and increase their efficiency by implementing green manufacturing methods. Doing so can also minimize their resource consumption. Based on the prior literatures above, this study proposes hypotheses:

H5a: *There is a mediating effect of green innovation technology between the link financial knowledge, financial attitude, and green economic sustainability of electric vehicles.*
H5b: *There is a mediating effect of green investment between the link financial knowledge, financial attitude, and green economic sustainability of electric vehicles.*
H5c: There is a mediating effect of green investment between the link green innovation technology and green economic sustainability of electric vehicles.

The suggested associations can be found in Fig. 1.
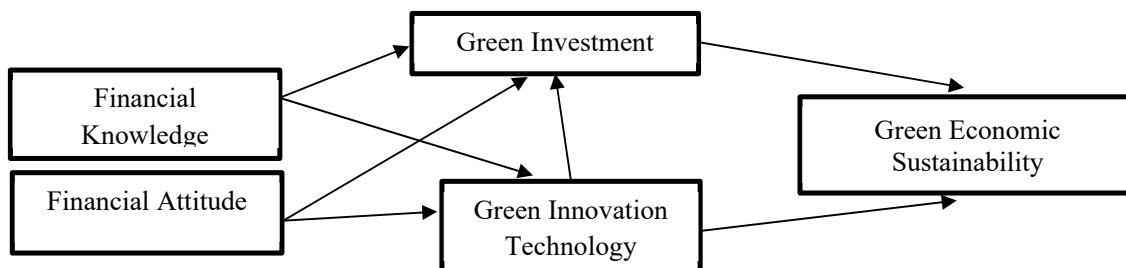
Fig. 1. Research Model

3. Methodology

3.1 Design approach

This study utilized a cross-sectional design and gathered quantitative data using a questionnaire to analyze the influence of green investment and green innovation technologies towards economic sustainability among green goods users in Indonesia.

The convenience sampling approach was used to determine the sample of this study not only of time and cost issues, but this study used convenience sampling as there are no criteria required to be a part of this sample. The respondents who use battery electric vehicles were selected for this study to examine consumers' behavior of green consumption to promote economic sustainability. The study was conducted through a questionnaire that was sent to 155 individuals through social media platforms such as Instagram, WhatsApp, and Twitter.

3.2 Sample size

The estimated sample size of the study was computed using the G-Power method, which was introduced by Faul et al. (2009). After considering the various statistical tests (effect size=0.3; α=0.05 with probability 0.95), it was concluded that the study had a minimum sample of 115. Hair et al. (2021) noted that a minimum of 100 individuals should be included in a study to ensure that the PLS-SEM process is carried out properly. A pilot test was then conducted to analyze the feasibility of the study's measurements. The results of the test revealed that the various item questionnaires were feasible to collect accurate data about the behavior of consumers.

3.3. Research Instrument

The study was conducted to analyze the effects of green technology and financial literacy on the country's economic sustainability. It utilized PLS-SEM to investigate complex causal relationships (Carrion et al., 2019). The Organization for Economic Co-operation Development International Network on Financial Education (OECD, 2013) defines financial literacy as a variable that is formed from constructs including knowledge, attitudes and behaviors needed to make the right financial decisions and ultimately achieve economic sustainability. Stella et al. (2020) measure financial literacy, two financial components that are very important to investigate regarding their financial decision-making. Not only financial knowledge, but also financial attitudes are fundamental in measuring financial literacy. To measure financial knowledge, five items were used from Swiecka et al. (2020) in this research. The five items of financial attitude are adopted from Swiecka et al. (2020). To measure green investment and green innovation technology, four items each were obtained from Le and Ferasso (2022). To measure green economy sustainability, eight items were derived from Sautron et al. (2015) and Verain et al. (2021).

The items used in the study were modified according to the research's requirements. The results of the survey were then analyzed using the Likert scale, using a five-point Likert scale, which ranges from "strongly disagree" (1) to "strongly agree" (5) which measures how strongly an individual believes or disagrees with a certain concept. Studies focused on data collection procedures, such as research objectives, administration of questionnaires, and ethical issues. Confidentiality of all respondents is observed. Participation in this study was strictly voluntary, and respondents could withdraw at any time during the study without fear of victimization or discrimination. The data obtained were analyzed using descriptive statistics, validity and reliability tests, and SEM.

4. Data Analysis

4.1 Demographic characteristics

Table 1 indicated that most vehicle electricity users were dominated by females (59.2%). 26.5% of participants lived in Bali, 21.3% lived in Papua, 17.4% lived in Sulawesi, 14.2% lived in Java, 12.9% lived in Kalimantan and 7.7% lived in Sumatera.

Table 1
Demographic Characteristics

	N	%		N	%
Gender			*Marital Status*		
Male	73	47.1	Single	16	10.3
Female	82	52.9	In relationship	35	22.6
			Married	48	31.0
			Divorces	31	20.0
			Widow	25	16.1
Total	**155**	**100**	**Total**	**155**	**100**
Provinces			*Income*		
Sumatera	12	7.7	1- 5 million	28	18.1
Kalimantan	20	12.9	6-10 million	56	36.1
Java	22	14.2	11-15 million	45	29.0
Sulawesi	27	17.4	above 15 million	26	16.8
Papua	33	21.3			
Bali	41	26.5			
Total	**155**	**100**	**Total**	**155**	**100**
Education			*Age*		
High School	25	16.1	17-26 years old	37	23.9
Bachelor Degree	77	49.7	27-36 years old	54	34.8
Master Degree	29	18.7	37-46 years old	39	25.2
Doctoral Level	24	15.5	above 46 years old	25	16.1
Total	**155**	**100**	**Total**	**155**	**100**

49.7% graduated with bachelor's degree, 18.7% graduated with master's degree, 16.1% graduated from high school, and 15.5 were graduated from doctor level. Participants were married 31%, in relationship 22.6%, 20% were divorced, 16.1% were widow and 10.3% were single. 36.1% earned Rp.6 to 10 million, 29.0% earned Rp.11 to 15 million, 158.1% earned Rp.1 to 5 million and 16.8% earned above Rp.5 million rupiah. The participants in this study were 27 to 36 years old (34.8%), 37 to 46 years old (25.2%), 17 to 26 years old (23.9%) and above 46 years old (16.1%).

4.2 Validity and Reliability

The two components of reliability that are used in testing the constructs are the Cronbach alpha coefficient and the composite reliability. According to Hair et al. (2021), to perform confirmatory research, the construct's critical ratio should be greater than 0.07. Table 3 shows that the Cronbach alpha value of the various constructs exceeds 0.07. The researchers also utilized the composite method to evaluate the indicators' reliability. They had to ensure that the value of the composite construct exceeds 0.06. In addition, the study evaluated the indicators' reliability using the composite method, wherein the value of the study's construct exceeds 0.06.

Table 2
Validity and reliability

Variables	Items	Mean	SD	CA	Dgrho	CR	AVE	VIF
Financial Knowledge	5	4,18	0.44	0.850	0.858	0.893	0.626	2.480
Financial Attitude	5	4.04	0.48	0.856	0.859	0.895	0.631	1,661
Green Investment	4	4.07	0.51	0.903	0.904	0.932	0.775	1.707
Green innovation Technology	4	4.41	0.49	0.811	0.815	0.876	0.638	2.500
Green Economic Sustainability	5	3.98	0.45	0.864	0.864	0.902	0.648	-

Noted: SD: Standard deviation; CA: Cronbach alpha; Dgrho: Delta gamma Rho; Cr: composite reliability; AVE: average variance extracted; VIF: Variance inflation factor.

The study also performed a convergent validity test on the various constructs. This study used the average variance extraction method to determine the validity of these constructs. The results of the study revealed that the average variance of the constructs was greater than the 0.50 threshold. The researchers validated the validity of the constructs by considering the differences between them. They performed the HTMT, and the Fornell-Larcker Criterion. The researchers presented the results of the discriminant and cross-loading tests in Table 3. Illustrated values in Table 3 indicate that the measurements are of adequate validity. The study's findings show that all the constructs have a strong relationship.

Table 3
Discriminant Validity

Fornell-Larcker Criterion					
	FATT	FK	GES	GI	GIT
Financial Attitude	0.795				
Financial Knowledge	0.589	0.792			
Green Economic Sustainability	0.641	0.662	0.805		
Green Investment	0.508	0.568	0.714	0.881	
Green Innovation Technology	0.572	0.743	0.659	0.605	0.799
Heterotrait-Monotrait Ratio (HTMT)					
	FATT	FK	GES	GI	GIT
Financial Attitude	-				
Financial Knowledge	0.685	-			
Green Economic Sustainability	0.731	0.778	-		
Green Investment	0.551	0.648	0.806	-	
Green Innovation Technology	0.668	0.888	0.781	0.696	-

Noted: FK: Financial Knowledge; FATT: Financial Attitude; GI: Green investment; GIT: Green investment Technology; GES: Green Economic Sustainability. Source: Authors' data Analysis.

4.3 Path Analysis

The structural equation modelling process was utilized for the data analysis and the data analysis methods were performed using the Smart-PLS 3.1 software. PLS-SEM is used to work with non-normalized and small data sets. The casual predictive nature of PLS-SEM is beneficial when working with complex models that have composites and without assuming goodness-of-fit estimates (Rigdon et al, 2010). A two-step analysis scheme is suggested for data analysis in PLS-SEM. In the first stage, measurements are performed on the model to test the reliability and validity of the research constructs (Hair et al., 2021). Based on the structural equation model (SEM) analysis on table 5, this study found financial knowledge had a significant effect on green investment (β=0.129; p=0.099) and green innovation technology (β=0.623; p=0.000). This study found a significant impact between the link financial attitude on green investment (β=0.194; p=0.026) and green innovation technology (β=0.205; p=0.001). Also, this study showed that green innovation technology had a positive connection on green investment (β=0.352; p=0.006) and green economic sustainability (β=0.357; p=0.001). Green investment had an influence on green economic sustainability (β=0.498; p=0.000).

The effect sizes (f^2) of this study were calculated on table 4 which ranged from 0.000 to 0.603, showing that all constructs in this study had a high effect size on green economic sustainability. According to Hair et al. (2021) the blindfolding procedure Indicated the parameter's values are well-observed by reconstructing the parameter estimates. The blindfolding procedure was applied only on endogenous constructs with reflective indicators. Predictive relevance of the model was calculated collectively with Q^2, including all factors and at the individual level (single factor). Table 5 presents the results of predictive relevance Q^2. The results of the blindfolding procedure show that the predictive relevance of the model was substantial at 0.360%, thus verifying the integration of predictors towards green economic sustainability. This signified that the green innovation technology was substantial. The results of the study revealed that the various exogenous constructs exhibited significant predictive power.

Table 5

Path coefficients

Hypo(s)		Beta	T	P	r^2	f^2	Q^2	Decision
H1a	FK → GI	0.192	1.651	0.099		0.026		Rejected
H1b	FK → GIT	0.623	7.951	0.000		0.603		Accepted
H2a	FAT → GI	0.194	2.238	0.026		0.040		Accepted
H2b	FAT → GIT	0.205	3.208	0.001		0.063	0.360	Accepted
H3a	GIT → GI	0.352	2.762	0.006	0.580	0.090	0.342	Accepted
H3b	GIT → GES	0.357	4.658	0.000	0.591	0.197		Accepted
H4:	Factor affecting GES GI → GES	0.498	7.364	0.000	0.420	0.383	0.308	Accepted

Noted: FK: Financial Knowledge; FAT: Financial Attitude; GI: Green investment; GIT: Green investment Technology; GES: Green Economic Sustainability. Source: Authors' data Analysis.

4.4. Mediating Effect

In this study, green investment and green innovation technology displayed a significant effect on green economic sustainability on table 6. Green investment had no significant mediating role in the relationship between financial knowledge and green economic sustainability (β=0.095; p=0.123). However, green innovation technology displayed a significant mediating effect between the link financial knowledge and green investment (β=0.0219; p=0.011). Table 5 indicates that green innovation can have a substantial impact on the link between sustainability and financial knowledge (β=0.222; p=0.000). The integration of green innovation and technology significantly enhanced financial comprehension of green economic progress (β=0.109; p=0.014). As can be seen in Table 5, green investment had a significant mediating role between the influence of financial attitude on green economic sustainability (β=0.096; p=0.040). The association of green innovation and technology also had a mediating effect on the relationship between financial knowledge and green economic development (β=0.073; p=0.007). The green innovation technology played a mediating variable between the association financial attitude on green investment (β=0.072; p=0.033). Likewise, green investment and green innovation technology also played significant mediation between the correlation financial attitude on green economic sustainability (β=0.036; p=0.040). Green investment had a significant mediating effect between the association of green innovation technology on economic sustainability (β=0.175; p=0.009).

Table 6

Mediating Effect

	Mediating effect	Beta	T	p	Decision
H5a₁	FK → GI → GES	0.095	1.547	0.123	Rejected
H5a₂	FK → GIT → GI	0.219	2.568	0.011	Accepted
H5a₃	FK → GIT → GES	0.222	3.612	0.000	Accepted
H5a₄	FK → GIT → GI → GES	0.109	2.459	0.014	Accepted
H5b₁	FATT → GI → GES	0.096	2.062	0.040	Accepted
H5b₂	FATT → GIT → GES	0.073	2.710	0.007	Accepted
H5b₃	FATT → GIT → GI	0.072	2.133	0.033	Accepted
H5b₄	FATT → GIT → GI → GES	0.036	2.064	0.040	Accepted
H5c	GIT → GI → GES	0.175	2.610	0.009	Accepted

Noted: FK: Financial Knowledge; FAT: Financial Attitude; GI: Green investment; GIT: Green investment Technology; GES: Green Economic Sustainability. Source: Authors' data Analysis.

5. Discussion

Currently DOI is an approach that is relevant to change consumer attitudes and behavior in making purchasing decisions. DOI is expected to be an effective modelling framework in understanding consumers' financial behavior with a focus on purchasing green products to boost green economic sustainability in a nation. The findings of this study revealed that FK had no significant correlation on GI in using battery electric vehicles (H1a). This outcome is contrary to that of Khan **et al.** (2020) who found that individuals' financial knowledge to invest into green products has strong and positive relationship in financial aspect and green markets. FK can reduce losses and minimize fear of victimization to purchase green items. Hence, the efforts of government and firms are necessary to increase FK through easy access for learning for green products, online advertising, and the role of social media influencers for boosting consumer purchasing decision on green transportation. Despite, FK is

found to have a significant association on GIT in adopting battery electric vehicle (H1b). The findings of the research revealed that financial knowledge is needed to support individuals' acceptance of green innovation. Government and firms may provide a free FK learning platform such as digital financial gamified education to gain FK in emerging countries. This finding also accords with the observation of Gilenko and Chernova (2021) found that FK has significant factor to support the existences of GIT.

Moreover, this study confirmed that FATT plays a significant factor in determining GI and GIT, indicating that the hypothesis (H2a and H2b) are supported. Consistent with the literature (Jin et al. 2022), this research found that participants who reported using green innovation technology have become a crucial element to reduce CO_2, and environmental pollution worldwide. Ajzen and Fishbein (1980) and Ajzen (1991) described that FATT is an important element to influence consumers' behavior to be entrenched throughout their purchasing decision. FATT along with financial behavior can also affect GI and GIT, thereby reducing dependence on chemical products (Ali et al. 2021). Previous studies have indicated that the link between financial knowledge and the GIT can have a significant impact on the development of green economic sustainability (Jin et al. 2022; Ali et al, 2023). This study further supports the findings of Marco-Lajara et al. (2022), who noted that the adoption of GIT could influence the global and national sustainability of green economic growth. GIT is essential to avoid natural damage, the various measures included the establishment of pollution standards, the disclosure of environmental information, and the elimination of implicit subsidies for unsustainable growth. They were also able to improve sector monitoring and governance. GI also exhibited a positive and significant influence on GES which supported the hypothesis (H4). This study supports evidence from previous observations (e.g. Khan et al. 2020; Zahan & Chuanmin, 2021). They pointed out that the adoption of GIT can help mobilize the necessary resources to achieve the goals and objectives of green economic sustainability (GES).

This study confirmed that GIT had no mediating effect on FK on GES ($H5a_1$). The findings of the current study do not support the study of Zahan and Chuanmin (2021) which highlighted GI in the broader framework as an essential approach for attaining environmental protection and economic sustainability in the future. The lack of knowledge of risk and threats of investment on purchasing chemical products may cause consumers to make the wrong choice to prevent the ecosystem and economic sustainability. However, this study showed that GIT played a significant effect between the link FK on GI and GES ($H5a_2$ and $H5a_3$). The finding agrees with those obtained by Dutta et al. (2023). They stated that GIT initiatives not only involve financial investments but also deal with the prevention of greenhouse gas and industrial pollution. This study found that GI and GIT played a significant effect between the link FK and GES ($H5a_4$). Effective financial knowledge creates an awareness for the future of the planet to gain GI and GIT. In Asian economies, the government's support is also needed to influence the decisions of consumers. This finding further supports the idea of Khan et al. (2022) pointed out that GI and GIT are beneficial for the government and producers to promote green activities to achieve a green economy. Moreover, GI and GIT play a significant mediating role between the connection FATT on GES ($H5b_1$ and $H5b_2$). This result confirmed the study of Gilenko and Chernova (20121) stating that the association between GI and GIT in mediating the link between FATT on GES can increase resource efficiency enhancements are the main drivers of economic growth.

This study found that GIT significantly mediated the relationship between FAKK on GI and GES ($H5b_2$ and $H5b_3$). Government intervention is needed to increase individual environmental awareness about clean energy consumption, thereby pushing public and private sectors to invest in battery electric vehicles as one of green technology developments. Hafeez et al. (2022) argued that GI and GIT have become very essential mediators to achieve FK and FATT in minimizing the chances of being misled on adopting green products. Hence, FK and FATT contribute significantly to purchase green products such as battery electric vehicles. The mediating role of GI and GTI has fruitful the link between FATT on GES ($H5b_4$). This finding is consistent with the research finding of Su et al. (2021). They found that a positive role of GI and GTI become efficient instruments to enhance the green economy. In addition, the development of eco-innovation can activate the drivers the capacities of using new technologies in producing goods, electricity production, transportation, urban management, and resource management. Also, this study showed that GI had a mediating effect on GTI and GES ($H5c$). This study is in line with Zahan & Chuanmin (2021) stating that GI is crucial to increase the awareness of investments in the clean energy sectors. The increasing number of green investments has been shown to contribute to the development of efficient energy systems and markets. They can also help developing countries consume more clean energy. In addition, these investments can facilitate the establishment of clean energy infrastructure in developing nations. This is beneficial for global climate change and energy transition initiatives.

6. Conclusions

The concept of DOI is a vital part of consumer decision-making, as it contributes to the achievement of sustainable development objectives. In a study, the study used this concept to analyze the effects of GIT and GI on the link between attitude and knowledge. The researchers found that financial knowledge did not influence green investment. Moreover, GI did not play a significant role in the link between green economic sustainability and financial knowledge. On the other hand, the study revealed that GI and green innovation technology helped in the development of green economic attitudes. The study revealed that the GIT is a crucial factor that influences the attitude and financial knowledge of consumers toward green economic development.

The study demonstrates the significance of the DOI theoretical framework in explaining the relationship between FATT and FK through GTI and GI in the context of green economy. The results of the analysis support the notion that these constructs can influence GES through GIT and GI, especially in developing nations. The findings of the study revealed that the relationship between financial knowledge and green economic development is influenced by the relationship between the factors of GES: FK, FAAT, GI and GTI. It shows that technology and green investment can help drive sustainable growth and reduce carbon emissions.

The findings of the study provide policymakers with valuable information on how consumers can be persuaded to adopt green products. It also shows that financial knowledge is not enough to predict their behavior when it comes to buying electric cars. Despite the presence of financial knowledge, consumers still need to increase their awareness of the importance of green innovation to reduce carbon emissions. This can be done through the development of a comprehensive marketing and promotional strategy for battery electric cars. New technology could help developing nations save more natural resources and lessen their environmental impact.

The findings of this study provide valuable insight into the sustainability of green economic development. Despite the limited sample size, this study was able to provide valuable information on how green economic development can be influenced by financial knowledge. The study was conducted on a quantitative and qualitative approach to collect information about the consumers' attitudes and financial knowledge when it comes to buying electric cars. In addition, the researchers were able to explore the various factors that influence the adoption of green economic development.

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