

-RESEARCH ARTICLE-

THE ROLE OF COMMUNITY PARTICIPATION AND DIGITAL TECHNOLOGIES IN SUSTAINABLE DEVELOPMENT OF COASTAL AREAS IN VIETNAM: ASSESSMENT OF THE NATIONAL TOURISM DEVELOPMENT STRATEGY AND GREEN SOCIAL AWARENESS

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—Abstract—

Sustainable development is a global necessity given the significant economic uncertainties, requiring focus from both recent research and seasoned decision-makers. This article delves into how community participation and digital technologies affect the sustainable development of coastal areas in Vietnam. In addition, the research examines the impact of national tourism development strategies and green social awareness on community participation, digital technologies, and the sustainable development of coastal areas in Vietnam. The article utilised questionnaires to collect primary data from the chosen participants. This research examines the relationship between different factors and constructs, as well as the connections between variables using smart-PLS. The results showed that community involvement and digital technologies are positively linked to the sustainable development of coastal regions in Vietnam. The findings showed that national tourism development strategies and green social awareness play a significant role in moderating community participation, digital technologies, and sustainable development of the coastal area in Vietnam. This study assists policymakers in formulating policies to promote sustainable development through the implementation of national tourism development strategies, fostering green social awareness, encouraging community participation, and utilising digital technologies.

Keywords: National Tourism Development Strategies, Green Social Awareness, Community Participation, Digital Technologies, Sustainable Development.

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INTRODUCTION

Sustainable development strategies embody a vision of balance between social cohesion, environmental protection, and economic growth, ensuring the needs of the present generation are met without sacrificing those of future generations. It is crucial to prioritise sustainability in coastal regions to maintain the environmental well-being that relies on these activities (Silvestre & Țircă, 2019). Coastal areas are impacted by high-intensity activities, leading to the degradation of socio-economic, natural, and cultural resources. Various strategies and policies have been implemented to address these challenges (Ahmad, 2019). An approach known as Integrated Coastal Zone Management (ICZM) has been implemented to address these concerns. ICMZ involves an iterative, multidisciplinary, and dynamic process aimed at promoting sustainable initiatives in coastal zones. An increase in the challenges faced by coastal zones has led to the implementation of indicator-based approaches to measure sustainability progress in these areas. Indicators simplify complex phenomena, provide detailed information, and emphasise comparisons. Indicators are essential tools that have been used for many years to emphasise and track sustainable strategies in coastal areas.

The European Union has emphasised the importance of coordinated, concerted, and strategic actions at regional and local levels in managing coastal regions (Lu et al., 2018). District and coastal municipalities have a crucial role in advancing sustainability. Assessing existing sustainable practices and initiatives is a key responsibility for them. Therefore, it is crucial to implement ICMZ to maintain a balance among the economic, social, and ecological aspects of the coastal area. These strategies involve the coordinated management of water, land, and other resources to promote sustainability. It is crucial to maintain and protect coastal ecosystems like coral reefs, seagrass beds, and mangroves to ensure coastal safety, preserve biodiversity, and support sustainable fishing practices. Implementing habitat restoring initiatives and reducing habitat destruction and pollution are important strategies. Coastal regions face significant challenges due to global changes like sea level rise and erosion. Implementing and developing strategies for climate change measurement (Chow, 2018). Furthermore, it is crucial to engage local communities in the decision-making process and enhance their capacity to participate in sustainable initiatives. Empowering these communities involves implementing awareness programmes, training sessions, and educational initiatives on sustainable practices to guarantee the success of these projects.

It is essential for the community to actively participate in promoting sustainability in the coastal area. Engaging these communities and local departments in the process of developing and implementing these initiatives helps to focus on the knowledge, perspectives, and needs to tackle sustainable issues (Chow, 2018). Working together to plan, develop skills, incorporate traditional knowledge, and promote environmental consciousness are essential elements in engaging the community to improve the

sustainability of Vietnam's coastal area. Digital technologies are essential for creating sustainable strategies for coastal areas. These technologies tackle a range of challenges, empower communities, and improve efficiency to achieve sustainable outcomes. Utilising digital technologies can be beneficial in various areas such as data analysis, marine spatial planning, tourism management, and environmental monitoring or pollution control (Jin, Peng, & Song, 2019). The National Tourism Development Strategy (NTDS) is crucial in promoting sustainability, particularly in the coastal region, considering the social, economic, and environmental factors at play in this area. Discussing coastal zone management, ecosystem conservation, tourism infrastructure, and stakeholder collaboration can contribute to sustainable development (Andersen, Blichfeldt, & Liburd, 2018). Emphasising the importance of recognising and promoting sustainable practices in society, green social awareness is key. It requires taking responsible actions and being aware of environmental issues, as well as cultivating a sense of responsibility for the environment's positive impact.

The coastal region of Vietnam is rich in diverse ecosystems, vibrant communities, and a variety of aspects. In Vietnam, the coastal region is renowned for its cultural heritage, natural beauty, traditional fishing communities, and culinary offerings. Global tourists are drawn to explore the beautiful beaches with water activities and experience the charm of Vietnam's coastal areas (Veetil et al., 2019). Nevertheless, like other coastal regions globally, Vietnam's coastal area encounters several obstacles like pollution, climate change effects, and coastal erosion. Concerns about coastal erosion in the coastline of Vietnam are significant due to various factors like human activities, sea level rise, and sediment depletion causing damage to infrastructure and coastal communities. The coastal region is susceptible to climate change, leading to exposure to storms and variations in rainfall patterns. These effects may lead to salinity intrusion, coastal degradation, and flooding problems (Hai et al., 2020). Development along the coast, like industrial facilities, tourism infrastructure, or aquaculture farms, may disturb the natural equilibrium and strain the ecosystem. Unplanned development can lead to environmental destruction and changes in coastal processes.

In addition, the loss of biodiversity and degradation of habitats are significant issues in the coastal regions of Vietnam. Because of a range of human activities, the coastal ecosystem is facing a threat from climate change. Advocating for sustainable practices can help preserve biodiversity and strengthen the resilience of the ecosystem (Tien et al., 2021). This paper delves into different aspects including community participation, digital technologies, national tourism development strategies, and green social awareness that are crucial in managing sustainability initiatives for coastal regions. In Vietnam, the coastal region has been significantly impacted by climate change, rising pollution levels, and human activities. There has been a lack of research in recent years on examining the impact of community participation, digital technologies, national tourism development strategies, and green social awareness on sustainable

development. To address this deficiency This paper offers a comprehensive analysis of the sustainable development of a coastal region in Vietnam. In a previous study conducted by [Tien et al. \(2021\)](#), the focus was on the sustainability of the coastal regions of Vietnam. The study was analysed by conducting in-depth interviews using qualitative methodology. This paper aims to address the gap by examining the significance of different factors in promoting and enhancing sustainable development in the coastal region of Vietnam.

This paper is structured into different sections, with section 2 focusing on reviewing previous studies in the field. Section 3 covers data collection and methodology, while section 4 includes discussions, theoretical and practical implications, conclusions, and limitations.

LITERATURE REVIEW

The coastal regions' ecosystem includes coral reefs, mangroves, wetlands, and a diverse range of species. Implementing sustainable strategies helps preserve delicate ecosystems, safeguarding marine habitats and biodiversity. Preserving these coastal environments helps to uphold ecosystem networks like climate regulation, water filtration, and coastal protection for the benefit of the planet ([Thanh et al., 2021](#)). Economic regions also offer economic advantages through tourism, aquaculture, and fisheries. Implementing sustainable policies will help ensure that these activities are beneficial for the economy in the long run by effectively managing the ecosystem, preserving natural resources, and minimising negative impacts on the environment. Implementing sustainable practices in the coastal area can create economic opportunities and enhance economic resilience for local communities. In addition, coastal areas are also dealing with challenges related to climate change like rising sea levels, coastal erosion, and more intense storms. Through the development and integration of climate-smart operations, conservation of coastal ecosystems, and implementation of green practices, valuable coastal regions can be safeguarded. The coastal area has distinct livelihoods and cultural heritage that are closely connected to the sea. Emphasising sustainable practices involves engaging local communities in development activities to improve quality of life and boost community resilience.

Further, coastal areas are susceptible to different types of disasters like flooding and storms. These strategies for sustainable development will involve implementing warning systems, building resilient infrastructure, and carefully planning land usage to minimise the impact of disasters on communities in coastal areas. Like other coastal areas globally, Vietnam is encountering sustainability issues in its coastal region ([Voukkali et al., 2021](#)). These challenges arise from socioeconomic, governmental, or environmental factors. The coastal area in Vietnam is prone to storm intensity, flooding, and changes in rainfall patterns, causing significant challenges for coastal and agricultural communities. In addition, plastic pollution, solid waste, and wastewater

discharge pose significant challenges in the coastal region of Vietnam. These problems not only have a negative effect on water quality but also harm human life and the marine ecosystem. In addition, the unsustainable and unplanned development of the coastal region poses a threat to the sustainability of these areas. Infrastructure for tourism, industrial operations, and urban development contribute to the loss of habitat, cultural sites, and land quality. Several factors are crucial in enhancing the sustainability of this coastal region, such as community involvement, digital technologies, national tourism development strategy, and environmental awareness.

Community participation plays a crucial role in enhancing the sustainability of these coastal areas. People residing in the coastal region have the expertise and in-depth knowledge of their local ecosystem, traditional culture, and environment. Their deep understanding of coastal areas can provide practical solutions and assistance to the initiatives of sustainable development. Engaging and involving communities, their information, and knowledge can also assist in the process of decision making which leads to the effective development of the coastal region (Lawrence et al., 2018). Engaging the community in developing, integrating, and monitoring sustainable initiatives fosters empowerment and a sense of ownership among the residents of this region, making them stakeholders. This resulted in a stronger dedication to the success of these initiatives, promoting the upkeep, adherence, and longevity of these measures.

The local communities demonstrate a strong sense of responsibility and dedication to conserving and safeguarding their coastal region. Engaging with the community also fosters inclusivity and social fairness by valuing the input and efforts of community members. It also allows for recognition of inequalities, ensuring that the advantages or disadvantages of the progress in these areas are dealt with equitably. Encouraging the participation of various individuals from the coastal area promotes democratic and inclusive decision-making (Drius et al., 2019). Communities in the coastal region are at the forefront of climate change effects. Engaging in these communities can enhance capacity and resilience by involving communities in implementing disaster risk measures and adopting climate change activities (Gracia et al., 2018). By incorporating traditional and local knowledge and perspectives from communities, we can create green strategies to address vulnerabilities and promote sustainability in managing these challenges. This discussion leads to the following hypothesis:

Hypothesis 1: *The positive role of community participation in enhancing sustainable development of coastal regions.*

In today's world, digital technologies are essential for advancing sustainable development initiatives in coastal regions. Digital tools help streamline the analysis, monitoring, and gathering of data on coastal resources and ecosystems. Remote sensing, satellite imagery, and geographic systems offer up-to-date data on water quality, coastal

habitats, and land use (Ryabinin et al., 2019). This information helps analyse environmental patterns, guide sustainable choices, and evaluate development projects. Digital technologies facilitate the decision-making process in coastal regions by utilising simulations, data visualisation, and computer models. This allows planners, policymakers, and stakeholders to assess the effects of different scenarios and make decisions grounded in scientific evidence. This results in optimising resource allocation and reducing negative impacts on coastal ecosystems. Digital and innovative technologies play a crucial role in enhancing sustainable tourism in coastal regions. They offer digital platforms, online bookings, and mobile applications that improve the overall tourist experience by enhancing communication and planning services. These technologies help reduce overcrowding and promote sustainable tourism, improving visitors' overall experience (Zhao et al., 2020).

Digital technologies play a crucial role in increasing awareness and educating people about environmental issues through different platforms promoting sustainable practices in those areas. Utilising online campaigns, mobile apps, and social media platforms are excellent tools for spreading awareness about biodiversity, conservation, ecosystems, and waste management. These technologies enable and involve coastal communities and other stakeholders to take sustainable actions. Digital technologies play a crucial role in enhancing resilience and facilitating the implementation of climate change strategies in coastal areas. Weather forecasting, early warning systems, and real-time monitoring help authorities and coastal regions respond effectively to hazards like coastal erosion, sea level rise, and storms (Hepburn et al., 2021). This technological platform helps in sharing best practices, climate information, and green strategies adoption to enhance the capacity of coastal communities to address climatic change conditions. Therefore, digital technologies support a range of platforms and tools for planning, data collection, decision-making, and collaboration in enhancing the sustainability of coastal regions. Coastal regions have seen positive outcomes from enhanced decision-making, environmental monitoring, and community involvement, resulting in sustainable and efficient management strategies. This discussion leads to the following hypothesis:

Hypothesis 2: *The positive role of digital technologies in enhancing sustainable development of coastal regions.*

The national tourism development strategy is crucial for improving the sustainability of coastal regions by offering guiding principles and a framework to achieve these goals. The NTDS emphasises the importance of aligning sustainable development goals with community participation to guide the development of tourism with a focus on economic, environmental, and social sustainability. These policies ensure that communities are actively engaged in the decision-making process, allowing them to voice their interests and perspectives while working towards sustainable goals (Tien, Ngoc, & Anh, 2020).

The NTDS plays a crucial role in creating regulations and policies that promote environmentally friendly practices in the tourism industry. They offer guidance and establish benchmarks for various aspects of tourism development, such as cultural preservation, environmental conservation, and community engagement. These methods guarantee that community involvement is directed towards sustainability by following specific guidelines, thereby deterring behaviours that harm the environment. In addition, NTDS also encourages the participation of local agencies, governments, NGOs, and businesses by fostering partnerships and cooperation, which lead to opportunities for consultation, dialogues, and decision-making. These methods guarantee that inclusive processes respect and value community perspectives, promoting empowerment and ownership among the coastal region's residents (Wijaya & Furqan, 2018). The NTDS also backs efforts related to capacity building that not only improve skills but also equip individuals with knowledge to contribute to the advancement of tourism. It promotes workshops, awareness campaigns, and training programmes to provide them with essential tools for decision-making. Therefore, the national tourism development strategy has a crucial moderating function in connecting sustainable development and community participation through policy implementation, goal alignment, and capacity building support. This discussion leads to the formulation of the following hypothesis:

Hypothesis 3: *The moderating role of the National Tourism Development Strategy between community participation and sustainable development.*

NTDS integrates technologies to improve sustainability in the tourism sector, recognising their potential to drive innovation, efficiency, and enhance the tourist experience while minimising environmental impacts. These policies help establish a framework for the responsible and effective use of technologies to achieve sustainable objectives. NTDS created guidelines for incorporating green technologies that support cultural preservation, environmental conservation, and social equity. These strategies promote the integration of technologies that support waste reduction, energy efficiency, and data management, benefiting communities in the coastal region. NTDS also ensures a balance between environmental considerations and economic development supported by digital technologies (Sultan et al., 2020). NTDS ensures that technologies are strategically implemented into sustainable initiatives in the coastal region. Identifies the areas or points where digital technologies can support sustainability efforts. TDNS also promotes community engagement in utilising and embracing technologies, guaranteeing that these communities have a say in decisions about implementing these tools and platforms. These strategies promote capacity building initiatives, empowering communities to leverage digital technologies for sustainable projects. The organisation offers workshops, resources, and training programmes to improve technical skills and digital literacy in coastal communities. These strategies also enable individuals to utilise these technologies for the preservation of the environment and the long-term viability of tourism (Mestanza-Ramón et al., 2019). NTDS also helps with evaluating and monitoring mechanisms to

analyse the impact of digital technologies on the sustainability of the coastal region. It offers metrics and indicators to track the social, economic, and environmental performances of these digitalized initiatives. In brief, TDNS serves as a mediator between sustainable development and digital technologies in the coastal area by implementing regulations and guidelines, providing capacity building support, and encouraging evaluation and monitoring. This discussion leads to the following hypothesis:

Hypothesis 4: *The moderating role of the National Tourism Development Strategy between digital technologies and sustainable development of the coastal region.*

Emphasising the importance of environmentally friendly actions in promoting the sustainable growth of coastal areas. Advocating for green initiatives promotes environmental education and encourages community involvement in sustainability efforts. This initiative raises awareness about biodiversity, climate change, and human activities through workshops, educational campaigns, information sharing, and understanding of green practices, ultimately contributing to sustainability. Green social awareness also promotes the implementation of sustainable practices among coastal communities, emphasising waste management, energy conservation, and preservation of natural heritage. Emphasising the importance of environmental consciousness helps coastal communities come together to share and implement eco-friendly practices (Lin, 2019). Emphasising environmental consciousness enables communities to advocate for policies and strategies that support sustainable development in coastal areas. Being environmentally conscious also gives individuals the ability to voice their goals and issues and engage with governmental bodies and decision-makers. Raising awareness through campaigns can influence policy decisions and increase public concern for environmental issues. Recognising the importance of bridging the gap between policymaking and community involvement is crucial for ensuring that all voices are considered in the creation of sustainable strategies. Encouraging green awareness also promotes the creation of learning and knowledge-sharing networks in coastal regions. It fosters the sharing of experiences, skills, and ideas that contribute to long-term success. It promotes the exchange of ideas, practices, and experiences regarding sustainable development (Andrews et al., 2021). Encouraging social awareness by establishing platforms for collaboration and supporting the exchange of knowledge, traditional practices, and innovative solutions. These educational opportunities empower individuals to enhance their skills in advocating for environmentally friendly practices. Simply put, green social awareness plays a crucial role in bridging sustainable development and community involvement in coastal areas. It promotes responsible practices, environmental education, advocacy, and knowledge sharing to empower and engage coastal communities. This formulates the following hypothesis:

Hypothesis 5: *The moderating role of green social awareness between community participation and sustainable development of the coastal region.*

Emphasising the importance of social and environmental impacts, Green social awareness supports the ethical use of technologies through the implementation and adoption of digital tools. Being mindful of these factors helps encourage the ethical and responsible utilisation of environmentally friendly social awareness and digital technologies that support sustainability. Advocating for environmental consciousness also promotes the evaluation of technologies in coastal areas, focusing on energy efficiency, resource usage, and carbon emissions when implementing digital technologies (Dimitrovski et al., 2021). Emphasising the importance of environmental consciousness, the advantages of technologies like data analytics, remote sensing, and geographic systems are showcased in managing and overseeing the coastal ecosystem. Empowering communities to engage with green social awareness fosters the development of sustainability through training opportunities that enhance technical skills and digital literacy. Equipping individuals with these cutting-edge tools will help foster social awareness and enable them to participate in decision-making processes (Guo et al., 2018). Green awareness recognises the potential of digital technologies to enhance the well-being of this coastal region by facilitating knowledge sharing, community engagement, and access to services. Digital platforms offer the chance for collaboration and communication, facilitating the sharing of cultural heritage and traditional knowledge. Simply put, green social awareness has a crucial moderating effect on the relationship between sustainable development and digital technologies. It does so by promoting ethical use of innovative technologies, supporting digital solutions, and evaluating environmental impact for the benefit of the coastal region. This discussion formulated the following hypothesis:

Hypothesis 6: *The moderating role of green social awareness between digital technologies and sustainable development of coastal regions.*

RESEARCH METHODS

This article delves into the influence of community involvement and digital technologies on sustainable development, while also examining the moderating impact of national tourism development strategies and green social awareness on these factors in coastal areas of Vietnam. The article utilised questionnaires to collect primary data from the chosen participants. The study's variables are measured using items derived from previous literature. For example, the level of community involvement is assessed using five items from a study by Cheng et al. (2019), while the use of digital technologies is evaluated using six items from research by Sailer, Murböck, & Fischer (2021). Sustainable development is measured with ten items from a study by Ttayyab et al. (2020), and national tourism development strategies are assessed using seven items from a study by Liu et al. (2020). Additionally, green social awareness is measured with eight items from a study by Tran et al. (2023).

The government employees involved in economic development activities are the respondents. The participants are chosen using purposive sampling. The surveys were handed out through personal visits to the government officials. Out of the 566 questionnaires sent, only 293 valid responses were received after one month. These legitimate answers boast a response rate of approximately 51.77%. In addition, the study examines the relationship between different factors and constructs, as well as the connections between these factors using smart-PLS. This tool is utilised for analysing primary data and generating optimal results, even when researchers work with intricate frameworks or extensive data sets. It examines the correlation among items and variables using a measurement assessment model and explores the relationship among variables using a structural assessment model. Moreover, the research incorporated two independent variables referred to as community participation (CP) and digital technologies (DT), along with one dependent variable identified as sustainable development (SD) and two moderating variables known as national tourism development strategies (NTDS) and green social awareness (GSA). These variables are given in [Figure 1](#).

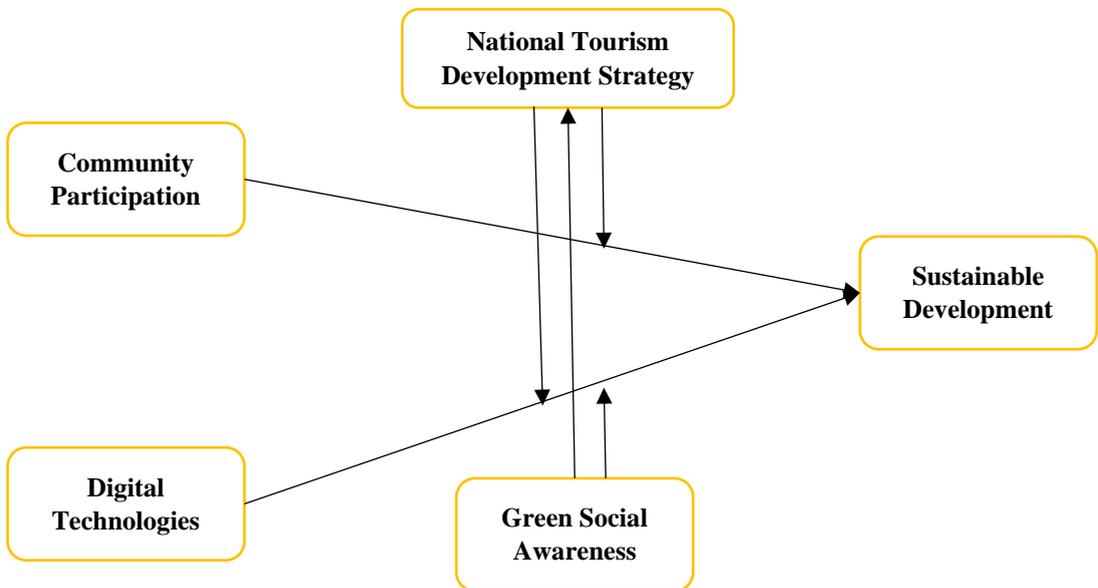


Figure 1: Theoretical Framework.

RESEARCH FINDINGS

The results demonstrate the relationship between the items known as convergent validity. We assessed the convergent validity by utilising Alpha, and the values exceeded 0.70. It is verified through factor loadings, with values exceeding 0.50. The analysis also involves assessing composite reliability (CR), with values exceeding 0.70. Afterward, the data is verified using the average variance extracted (AVE), with values

exceeding 0.50. This data revealed a strong correlation between the items. The values can be found in [Table 1](#).

Table 1: Convergent Validity.

Constructs	Items	Loadings	Alpha	CR	AVE
Community Participation	CP1	0.861	0.902	0.923	0.634
	CP2	0.665			
	CP3	0.791			
	CP4	0.898			
	CP5	0.730			
	CP6	0.857			
	CP7	0.746			
Digital Technologies	DT1	0.934	0.935	0.953	0.836
	DT3	0.915			
	DT4	0.898			
	DT5	0.909			
Green Social Awareness	GSA1	0.871	0.743	0.800	0.560
	GSA2	0.856			
	GSA3	0.057			
	GSA4	0.864			
National Tourism Development Strategy	NTDS1	0.828	0.838	0.888	0.617
	NTDS2	0.865			
	NTDS3	0.703			
	NTDS4	0.877			
	NTDS6	0.623			
Sustainable Development	SD1	0.703	0.853	0.886	0.594
	SD10	0.758			
	SD2	0.805			
	SD4	0.630			
	SD5	0.641			
	SD6	0.630			
	SD8	0.661			
	SD9	0.769			

The results demonstrate the relationship between the variables known as discriminant validity. We verified the discriminant validity by utilising Fornell Larcker and cross-loadings. The results revealed that the coefficients representing the relationship between variables are larger when compared to coefficients representing relationships with other variables. The data revealed a minimal correlation between the variables. The values can be found in [Table 2](#) and [Table 3](#).

Table 2: Fornell Larcker.

	CP	DT	GSA	NTDS	SD
CP	0.796				
DT	0.252	0.914			
GSA	0.409	0.619	0.749		
NTDS	0.704	0.311	0.523	0.786	
SD	0.620	0.427	0.568	0.715	0.703

Table 3: Cross-Loadings.

	CP	DT	GSA	NTDS	SD
CP1	0.861	0.140	0.305	0.514	0.460
CP2	0.665	0.192	0.285	0.537	0.471
CP3	0.791	0.271	0.399	0.685	0.580
CP4	0.898	0.170	0.357	0.544	0.500
CP5	0.730	0.299	0.316	0.444	0.425
CP6	0.857	0.134	0.300	0.509	0.429
CP7	0.746	0.182	0.287	0.619	0.535
DT1	0.196	0.934	0.568	0.236	0.364
DT3	0.274	0.915	0.588	0.345	0.431
DT4	0.249	0.898	0.559	0.292	0.422
DT5	0.186	0.909	0.540	0.248	0.323
GSA1	0.374	0.605	0.871	0.442	0.519
GSA2	0.398	0.452	0.856	0.466	0.478
GSA3	-0.147	0.018	0.057	-0.037	0.077
GSA4	0.312	0.544	0.864	0.459	0.466
NTDS1	0.663	0.197	0.359	0.828	0.539
NTDS2	0.637	0.229	0.426	0.865	0.565
NTDS3	0.425	0.352	0.477	0.703	0.609
NTDS4	0.665	0.193	0.368	0.877	0.571
NTDS6	0.350	0.233	0.407	0.623	0.496
SD1	0.450	0.201	0.331	0.376	0.703
SD10	0.436	0.289	0.372	0.547	0.758
SD2	0.340	0.316	0.395	0.480	0.805
SD4	0.516	0.312	0.506	0.530	0.630
SD5	0.364	0.224	0.356	0.319	0.641
SD6	0.381	0.288	0.390	0.422	0.630
SD8	0.474	0.333	0.395	0.583	0.661
SD9	0.472	0.377	0.408	0.635	0.769

The results demonstrate the relationship between the variables known as discriminant validity. We verified the discriminant validity by utilising the Heterotrait Monotrait (HTMT) ratio. The results revealed that the numbers are below 0.90. The data revealed a weak correlation between the variables. The values can be found in [Table 4](#).

Table 4: Heterotrait Monotrait Ratio.

	CP	DT	GSA	NTDS	SD
CP					
DT	0.267				
GSA	0.559	0.733			
NTDS	0.797	0.344	0.671		
SD	0.688	0.460	0.725	0.818	

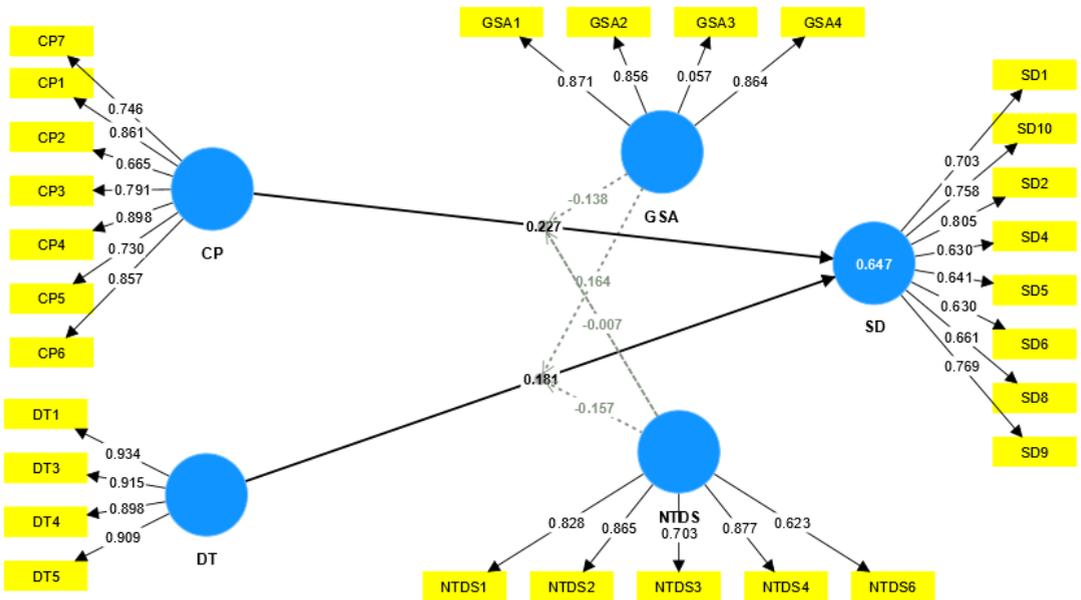


Figure 2: Measurement Model Assessment.

The results also demonstrate the relationship between the variables through path analysis. The results showed that community involvement and digital technologies are positively linked to the sustainable development of the coastal region in Vietnam and support hypotheses 1 and 2. Furthermore, the findings also showed that national tourism development strategies play a significant role in moderating the relationship between digital technologies and sustainable development of the coastal area in Vietnam, supporting hypothesis H3. At last, the findings showed that green social awareness plays a significant role in moderating the relationship between community participation, digital technologies, and sustainable development in the coastal area of Vietnam, supporting H5 and H6. The values can be found in [Table 5](#).

Table 5: Path Analysis.

Relationships	Beta	Standard deviation	T statistics	P values
CP -> SD	0.227	0.043	5.293	0.000
DT -> SD	0.181	0.051	3.569	0.001
GSA -> SD	0.162	0.051	3.193	0.002
NTDS -> SD	0.385	0.054	7.191	0.000
GSA x DT -> SD	0.164	0.051	3.209	0.002
NTDS x DT -> SD	-0.157	0.060	2.621	0.010
NTDS x CP -> SD	-0.007	0.030	0.238	0.812
GSA x CP -> SD	-0.138	0.070	1.978	0.051

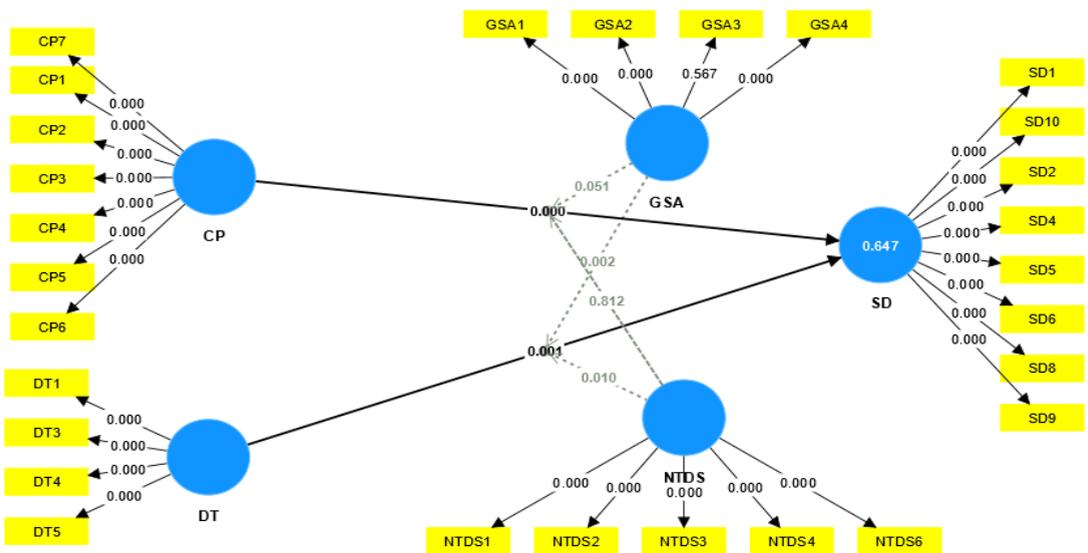


Figure 3: Structural Model Assessment.

DISCUSSIONS

The results indicated that community involvement positively influences the sustainable development of the coastal area. In previous research conducted by [Ferro-Azcona et al. \(2019\)](#), this hypothesis was also corroborated. They have performed a thorough examination of previous research in the field. As per their perspective, the local community holds valuable insights into cultural heritage and traditional values that contribute to the country's sustainable goals. Another study conducted by [Islam & Shamsuddoha \(2018\)](#) further validated this hypothesis. As per their perspective, involving the community in sustainability development fosters fairness and unity by promoting group decision-making, inclusivity, and cooperation, with a focus on meeting the needs of community members. This also promotes fair access to resources and tackles social disparities.

The results indicated that digital technologies play a beneficial role in promoting the sustainable development of coastal areas. Research conducted by [George, Merrill, & Schillebeeckx \(2021\)](#) further validated this hypothesis. Researching data collection analysis, early warning and monitoring systems, and sustainable fisheries management can help advance the sustainable development of coastal regions. [Balogun et al. \(2020\)](#) also provided backing for this hypothesis. They believe that digital technologies, such as social media channels, mobile applications, and information-sharing systems, can help achieve sustainable goals by helping and support. Digital tools facilitate virtual collaboration among specialists, allowing stakeholders and experts to exchange knowledge and creative solutions to improve the sustainability of the coastal area.

The results indicated that the national tourism development strategy acts as a mediator between community involvement and the sustainability of coastal areas. The hypothesis was also backed by a study conducted by [Tan et al. \(2018\)](#). They utilised a system dynamic approach to analyse their findings. The national tourism development strategy outlines a framework for goal alignment, strategy establishment, policy support, capacity building, and knowledge sharing promotion. By combining community involvement with the creation of long-lasting plans, the tourism department will be able to be more inclusive, efficient, and attentive to the specific needs of the coastal area in Vietnam. Another research conducted by [Nitivattananon & Srinonil \(2019\)](#) further validated this hypothesis. As per their findings, the national tourism department has put in place evaluation and monitoring mechanisms to gauge the effects and advancements of tourism development on sustainability. It sets up reporting mechanisms and indicators to guarantee the sustainable development of these regions.

The study revealed that the national tourism development strategy acts as a mediator between sustainable development and digital technologies. The study was further supported by previous research conducted by [Kandrot, Hayes, & Holloway \(2022\)](#). As per their statement, the national tourism department helps with community management, monitoring, and fostering a culture of knowledge sharing among individuals. Through the strategic and sustainable use of technologies, coastal areas can generate positive social, economic, and environmental impacts while minimising negative consequences. Another research conducted by [Chaudhary et al. \(2022\)](#) further validated this hypothesis. As per their statement, the tourism department promotes knowledge sharing and collaboration for sustainable development through digital technology in the coastal region. NGOs, local communities, and government agencies collaborate to develop digital strategies that advance sustainable objectives and foster synergies.

The study revealed that green social awareness plays a moderating role in the relationship between community participation and sustainable development in the coastal region. Previous research conducted by [Gössling, Hall, & Scott \(2018\)](#) further validated this theory. They believe that encouraging responsible practices,

environmental awareness, education, advocacy, collaboration, and knowledge-sharing activities can empower coastal communities to prioritise sustainable development of coastal regions. Encouraging green social awareness inspires communities and individuals to embrace sustainable behaviours, actively engaging in decision-making processes to enhance human well-being. Another research conducted by [Franco & Tracey \(2019\)](#) further backed this hypothesis. They have employed a range of qualitative methods like focus groups, field observations, and focus groups to examine their research. As per their findings, raising social awareness helps local communities in the coastal area to push for policies that promote green development in the region. It not only empowers the community members but also engages them with government agencies, policymakers, and other stakeholders for the benefit of the coastal region. By raising public awareness, community leaders can impact strategic decisions, draw attention to environmental issues, and promote sustainable practices.

The study findings indicated that green social awareness plays a moderating role in the relationship between digital technologies and the sustainable development of the coastal region. Advocating for ethical use of technology, promoting digital solutions, assessing environmental impacts, engaging, and empowering communities, and utilising digital connectivity for the well-being of the planet are all key aspects of green social awareness. Focusing on the use and adoption of digital technologies through green social awareness, coastal regions can maximize the sustainability impacts while reducing the negative aspect of the communities and environment. A past study done by [Wu et al. \(2018\)](#), also supported this hypothesis. According to them, green social awareness acknowledges the potential of these technologies for the well-being of this society in the coastal region which not only promotes digital connectivity for knowledge sharing, community engagement, and providing access to digital services. Digital platforms play a crucial role in fostering collaboration and communication within the local community of coastal regions, allowing for the exchange of cultural heritage, traditional knowledge, and sustainable practices. Supporting green social awareness involves backing initiatives that promote equal access to cutting-edge technologies, enabling everyone to benefit from digital tools.

THEORETICAL IMPLICATIONS

This paper makes a substantial contribution to the literature. The concept of sustainable development has garnered global attention. With the rise in pollution, depletion of natural resources, growing population, and global warming, the challenges of safeguarding the planet and human life become more pressing. Nations and governing bodies are increasingly highlighting the importance of sustainability in addressing environmental challenges to ensure the well-being of both present and future generations. Across various departments, efforts are being made to incorporate sustainable practices to address these challenges. This paper offers valuable information

on the sustainable development of the coastal region of Vietnam. Vietnam's coastal region boasts a distinctive cultural heritage and atmosphere that attracts tourists from around the globe seeking to immerse themselves in nature. Nevertheless, the coastal area of Vietnam is encountering significant sustainability challenges that can be addressed by incorporating these elements to improve eco-friendly practices. Research has not yet explored the effects of community participation, digital technologies, national tourism development strategy, and green social awareness on sustainable development. The paper delves into the significance of utilising digital technologies and community involvement to advance sustainable development.

MANAGERIAL IMPLICATIONS

In recent years, countries worldwide have been making efforts to incorporate green practices to promote environmental sustainability. Vietnam is also making significant efforts to minimise the adverse effects on the environment. This paper offers valuable insights for policymakers, government agencies, and NGOs to develop effective policies and strategies for ensuring environmental sustainability. The coastal region of Vietnam is currently grappling with environmental challenges stemming from sea-level rise, pollution, and significant waste problems. To address these challenges, it is essential to effectively utilise green social awareness and national tourism development strategy to promote and foster sustainable development. This study provides guidance to policymakers for formulating policies aimed at achieving sustainable development through the implementation of effective national tourism development strategies, promoting green social awareness, encouraging community participation, and utilising digital technologies. It is essential for coastal communities to be engaged and utilise digital technologies to facilitate the introduction of sustainable policies in the region. Digital technologies offer a range of tools for predicting weather and gathering real-time data, assisting management in addressing environmental issues in a more sophisticated manner. In addition, social awareness through training and workshops equips local communities with current knowledge on sustainable policies.

CONCLUSIONS

The coastal region of Vietnam boasts a distinctive cultural and traditional heritage that attracts tourists from around the world. Nevertheless, this area is currently experiencing sustainability challenges like land loss and coastal erosion, climate change effects, marine debris, and pollution, and decline in coastal habitats and biodiversity. Addressing these sustainability challenges necessitates a comprehensive approach that not only tackles these issues but also encourages the sustainable development of the coastal region of Vietnam. Examining different elements like community involvement, digital tools, the influence of national tourism strategies, and environmental consciousness on the sustainable growth of Vietnam's coastal area. The results suggest that community involvement plays a crucial role in fostering

sustainability. Engaging the community in implementing green and sustainable practices empowers them to participate in decision-making, enhancing their understanding and promoting sustainability. Digital technologies have a positive influence on the sustainable development of the coastal region of Vietnam. Digital technologies play a crucial role in integrating and implementing innovative solutions using tools that tackle these challenges. In addition, the national tourism development strategy plays a crucial role in promoting sustainable development by aligning strategies with sustainable goals and engaging local communities in their achievement. The national tourism department can also promote the use of digital technologies to improve sustainability. Moreover, promoting green social awareness greatly improves the region's sustainability by offering local communities training, workshops, and knowledge initiatives. These efforts not only involve the communities but also promote the use of digital technologies to tackle sustainability challenges.

LIMITATIONS

Despite its valuable contribution, this paper does have some limitations that researchers can address in the future. The paper thoroughly examines how community involvement and digital tools contribute to the sustainable development of the coastal area. In the future, studying the relationship between green policies, government strategies, and policies with the sustainable development of coastal regions can provide valuable insights. The study utilised the National Tourism Development Strategy and incorporated green social awareness as moderators between community participation and digital technologies to improve the sustainable development of coastal regions. In the future, it is important to consider global cooperation and green education as factors that can help analyse the connection between community involvement and digital technologies to improve the sustainable development of coastal areas. Furthermore, the research was carried out in Vietnam, a developing nation, so its findings may not be relevant to developed countries. In the future, this framework can be utilised in developed countries to analyse the impact of these factors on sustainable development.

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