

Technopreneurship in Pro-Environmental Behavior for Sustainable Carbon Emission Reduction in Central Kalimantan

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ABSTRACT

This study examines the integration of technopreneurship with pro-environmental behavior to achieve sustainable carbon emission reduction in Central Kalimantan. Focusing on the Dayak-Banjar communities, the research aims to develop a model that leverages local wisdom and technopreneurial activities to promote environmental conservation. **The methodology** includes qualitative research through interviews and questionnaires distributed in Baung, Muara Dua, and Kuala Pembuang villages. **Findings** reveal that local communities, deeply affected by environmental degradation, are willing to adopt pro-environmental behaviors. Key factors influencing this change include attitudes, subjective norms, perceived behavioral control, and knowledge. **The study highlights** the potential of technopreneurship in promoting sustainable practices and provides a foundation for designing policies that support pro-environmental behavior through technopreneurship. **By fostering pro-environmental behavior** within local communities, this research demonstrates that it is possible to balance ecological conservation with economic growth, aligning with SDG 13, SDG 15, and SDG 8.

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1. INTRODUCTION

Indonesia's tropical forests are home to a wide variety of habitats, including some threatened species. Kalimantan is home to one of Indonesia's tropical forests, which is known as the "lung of the world." Thus, repairing and It is imperative to preserve the forest ecosystem, particularly in light of Kalimantan's abundance of peatland, another natural resource that is sometimes disregarded [1]. Peatlands are thought of as wetland habitat that greatly sequesters and reduces carbon to stop greenhouse gases, primarily CO₂, from being released into the atmosphere. According to [2], peatland is essential due to its large extent and intricate role in Indonesia. Therefore, forest fire brings considerable concern, especially because peat is highly flammable, causing the fire to localize its spread and making it harder to stop [3].

It becomes imperative to restore and conserve the forest and peatland because of the ongoing risk of potential disruption. The protection of Indonesia's forests, peatlands, and coastal ecology is hampered by illicit

logging, forest fires, and land clearing [4]. Particularly considering that the majority of farming operations continue to practice the slash and burn method of illegal land clearing, which is one of the main contributors to deforestation and carbon emissions provided evidence to support the assertion that the production of agricultural commodities in Indonesia contributes to deforestation and climate change. This is primarily because agricultural development businesses employ fire as a less expensive alternative for unlawful land removal [5]. It becomes imperative to restore and conserve the forest and peatland because of the ongoing risk of potential disruption.

Central Kalimantan lost 317.749,00 ha to forest fires in 2019, according to Sipongi, a website created by the Indonesian Ministry of Forestry (Kementerian Lingkungan Hidup dan Kehutanan) to track forest fires. The figure unequivocally demonstrates how vital it is to save the peatland and woodland [6]. In actuality, the slash-and-burn strategy emits a very harmful quantity of carbon. An understanding of the Indonesian forest fire incident could be achieved through the use of a Geographic Information System, or GIS-based technique. The main concern that a forest fire brings up is how it has affected people and the forest's biodiversity, according to [7]. The spatial map below was produced using five different FIRMS.

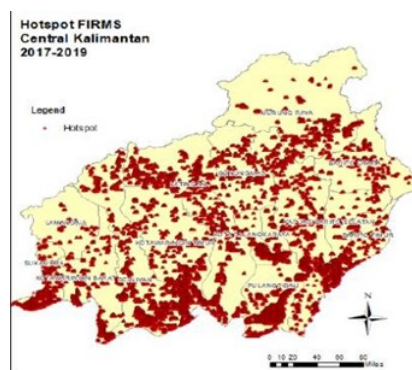


Figure 1. Spatial Map of Central Kalimantan Hotspot Point Map Based On Firms Data, Modis

Figure 1 geographic map displays the data that was collected from the conservation companies in the Seruyan district. The map displayed the hotspot pattern seen in the area between 2007 and 2020 [8]. Despite the abundant hotspots, the spatial map shows the area that has been free of hotspots and fire activity for about 13 years. We are able to examine the hotspot pattern inside the selected area thanks to GIS technology. The information provided by the GIS-based method can be utilized to learn more about local community behavior. The above-mentioned spatial map makes it evident which places have the concerning hotspots that have persisted for a long time [9].



Figure 2. Spatial Map of the Seruyan District South Region from the Year 2007-2020 (Data Taken on September 2020)

In Figure 2, Kalimantan experienced severe flooding from late 2020 to mid-2021, primarily due to deforestation, which significantly impaired the forest's natural ability to absorb heavy rainfall. This resulted in the most extensive damage occurring in South Kalimantan in early 2021, as documented by [10]. The National Institute of Aeronautics and Space (LAPAN) attributed these devastating floods to a decade-long reduction in both primary and secondary forests, emphasizing the dire consequences of deforestation. Immediate and decisive action is required as climate change continues to intensify natural disasters, increasing their frequency and severity. This study, therefore, examines critical factors such as mindset, subjective norms, perceived behavioral control, and awareness, to develop a comprehensive model aimed at sustainable carbon emission reduction through the promotion of pro-environmental behavior, as explored in [11]. The research underscores the urgent need for integrating environmental consciousness into community practices to mitigate the impacts of climate change and prevent future ecological catastrophes.

1.1. The Phenomenon of Pro-Environmental Behavior

Researchers have been diligently examining carbon footprints to determine effective reduction strategies, aligning with the Indonesian government's carbon economic value and tax policies [12]. Sustainable carbon emission reductions can be achieved by investing in renewable energy and implementing energy-efficient technologies, with solar energy conversions being a common technique. Utilizing forests and peatlands to lower carbon emissions requires local community involvement [13]. Despite being a relatively new concept, preserving forests and peatlands to reduce carbon emissions is essential. Local community involvement is crucial for this strategy, as preserving these ecosystems requires adopting environmentally friendly practices. Individuals need a strong sense of place and commitment to engage in pro-environmental behavior, which is vital for maintaining and preserving the environment [14].

Understanding local community behavior is essential to inspire environmentally conscious actions that reduce carbon emissions and improve the community's quality of life [15]. Many residents rely on the forest for wood to build homes and boats, but extensive logging and failed restoration efforts have led to significant forest loss. The local community depends on logging companies for resources, exacerbating forest degradation and associated health issues from forest fires and palm oil waste [16]. The environmental damage impacts both humans and local species, with many species becoming endangered [17]. Pro-environmental behavior is critical to preserving the deteriorating environment. This study explores the intersection of technopreneurship and pro-environmental behavior, focusing on the Dayak-Banjar communities in Central Kalimantan, to develop a model that leverages local wisdom and technopreneurial activities for sustainable carbon emission reduction [18], [19].

2. RESEARCH GAP

The Indonesian government is beginning to recognize the potential of carbon trading to significantly contribute to the nation's GDP [20]. Despite the economic benefits from the palm oil sector, which has reduced poverty and contributed to 14% of the GDP [21], the environmental damage it causes cannot be ignored. Current literature highlights significant challenges in addressing deforestation and peatland degradation in Central Kalimantan [22], [23]. However, there is a research gap in integrating technopreneurship with pro-environmental behavior for sustainable carbon emission reduction. This study aims to fill this gap by involving the Dayak-Banjar communities in technopreneurial activities, promoting sustainable practices [24]. By aligning with SDG 13 (Climate Action), SDG 15 (Life on Land), and SDG 8 (Decent Work and Economic Growth) [25], the research seeks to mitigate climate change and foster economic development through eco-friendly business practices.

Local communities are beginning to realize the impact of their previous environmental conduct, prompting a need for behavioral change to preserve and repair the environment [26]. Previous studies indicate that human behavior is a major contributor to environmental problems, necessitating education on the importance of preserving peatlands and forests [27]. Unfortunately, practices like slash-and-burn and illegal logging continue to cause severe environmental damage [28], [29]. Research shows that understanding the consequences of environmental harm and the necessity of conservation can drive the intention to change [30], [31]. Encouraging pro-environmental behavior, such as reducing air travel, consuming fewer animal products, and using fuel-efficient vehicles, can significantly reduce carbon emissions [32], [33].

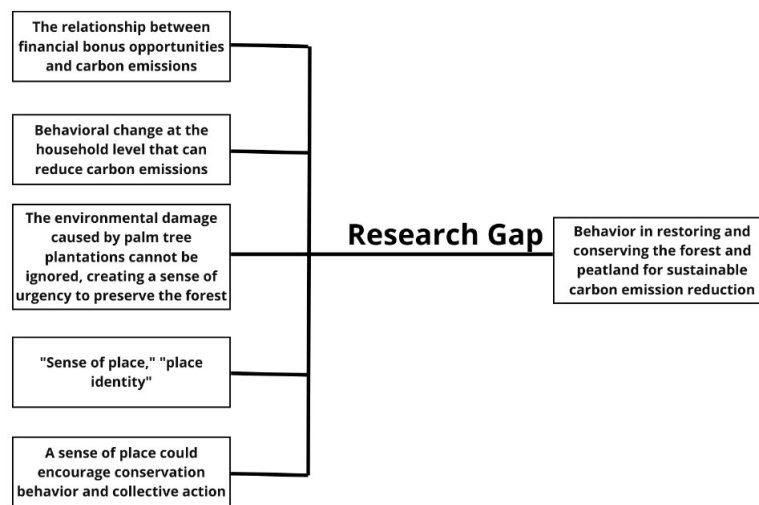


Figure 3. Shows The Flowchart of The AI-based Models and Experimental Methods Applied

Figure 3 The skill and willingness to transmit the beauty of nature is "the greatest achievement in modern human culture". Actions taken to preserve and restore the Peatlands and forests for long-term carbon emission reduction The connection between carbon emissions and cash bonus prospects [34]. household-level behavioral adjustments that can lower carbon emissions. There is an urgent need to protect the forest since palm tree plantations are causing irreversible environmental harm. "Place identity" and "sense of place" A feeling of location may promote communal action and conservation behavior. Research gap 16: From one generation to the next, the next represents justice for all generations" [35].

2.1. Identifying Problem

Deforestation is still rated high in Indonesia as it has been adopted since 1970 under Suharto's regime. It was linked to the industrial development objectives, aiming to accelerate economic growth mainly by exploiting natural resources. The Indonesian government has been at a constant crossroads between extracting its forest for economic development and protecting it through sustainable forest management [36]. Hence within the analytical framework of Indonesian forest policy lies a contradiction between economic growth and environmental sustainability, which resulted in a high deforestation rate in Indonesia [37]. The following research question guides the qualitative research in building the model of the pro-environmental model:

- How does the model of pro-environmental behavior for sustainable carbon emission reduction develop?
- What factors contribute to the intention to change to become pro-environmental?

The initial finding comes from the information gathered from a conservation company in the Seruyan district, Central Kalimantan. Based on the information given, the pre-model of pro-environmental behavior is developed [38]. The above research questions are used to identify further the intention to change toward pro-environmental behavior. The mapping of the final model of pro-environmental behavior is developed using the triangulation method and is supported by the literature review [39].

2.2. Research Objectives

As the Indonesian government begins to prioritize reducing carbon emissions, this research aims to understand the factors supporting sustainable carbon emission reduction, focusing on community behavior [40]. The role of the community in environmental conservation is crucial, making a study of human behavior beneficial. Given that most environmental damage is due to human actions, analyzing these behaviors can help identify factors that support sustainable carbon emission reduction. This research emphasizes the human element, particularly the ability to change behavior, and aims to create a new model of pro-environmental behavior [41], [42]. By studying the Dayak-Banjar communities in the Seruyan district of Central Kalimantan, who are directly affected by climate change, the research seeks to develop a model that leverages local wisdom

and experiences [43], [44]. Participants include local residents, government officials, and conservation company employees [45]. The expected outcome is that sustainable carbon emission reduction can be achieved through behavioral change, with insights from the Dayak-Banjar communities forming the backbone of this pro-environmental behavior model [46].

2.3. Research Benefit

This research aims to strengthen the model of pro-environmental behavior by studying local community behavior, which is essential for maintaining healthy forests and peatlands [47]. The developed pro-environmental behavior model seeks to provide practical benefits for the government, practitioners, and academia in reducing carbon emissions. Additionally, the research will enrich human resource management strategies to support sustainable carbon emission reduction [48]. By understanding local behavior, the research hopes to assist the government in designing policies that promote pro-environmental behavior, aligning with Indonesia's commitment to the Paris Agreement [49], [50], [51].

The research also aims to provide practitioners with insights into effective strategies for reducing carbon emissions, emphasizing the importance of human behavior alongside technological investments. As businesses shift towards green practices, understanding the necessary human resource strategies becomes crucial. The study suggests that hiring individuals with pro-environmental behavior and an understanding of local community dynamics can significantly aid organizations in achieving their carbon reduction goals. For academia, the research is expected to develop a pro-environmental model that can enhance sustainability and forest management studies, supporting the growing trend of Green Human Resource Management and Sustainable Business education. This comprehensive approach will combine technical and management aspects, particularly human resource management, to address environmental challenges effectively.

2.4. Writing System

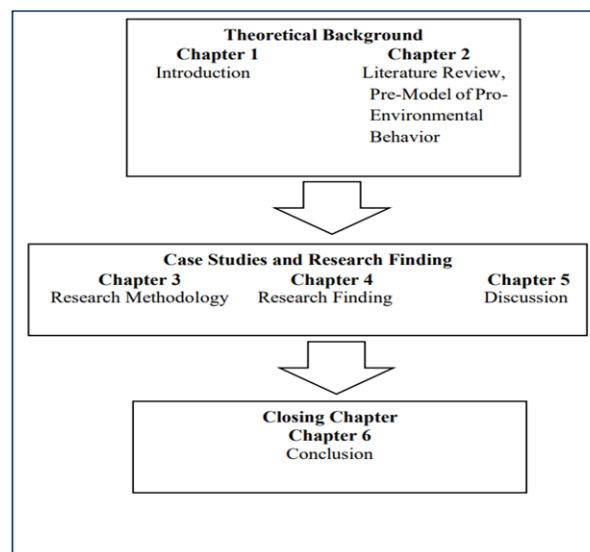


Figure 4. Writing Scheme

The "Writing Scheme" in Figure 4 outlines the structure of the research document. It begins with the Theoretical Background, which includes Chapter 1: Introduction and Chapter 2: Literature Review and Pre-Model of Pro-Environmental Behavior. Next, the Case Studies and Research Findings section contains Chapter 3: Research Methodology, Chapter 4: Research Findings, and Chapter 5: Discussion. The document concludes with the Closing Chapter, Chapter 6: Conclusion. This structured approach ensures a clear and logical flow, guiding the reader through the foundational theories, research methods, findings, and final conclusions of the study on integrating technopreneurship with pro-environmental behavior for sustainable carbon emission reduction in Central Kalimantan.

2.4.1. Literature Review, Pre-Model of Pro-Environmental Behavior

Since humans are the leading cause of environmental damage, a behavior change is needed. Behavioral change from other stakeholders, such as agribusiness, investor, and organization, is desirable in managing peatland in Indonesia. Regarding sustainable carbon emission reduction, finding the appropriate behavior can be done by studying those directly involved and impacting the area that acts as a carbon sink.

2.4.2. Literature Review

The concept of sustainable development emerged in the 1980s, integrating economic, social, and environmental objectives to maintain a quality of life for future generations. This research addresses the gap in understanding the relationship between sustainable development, local economic goals, and local government goals, focusing on carbon emission reduction. Sustainable development can be achieved through efficient management of natural resources, emphasizing economic, ecological, and sociocultural approaches. Key aspects include ecosystem stability, biodiversity protection, and cultural diversity preservation. Successful sustainable development requires balancing social, economic, and environmental objectives, managing natural systems within their limits, and focusing on sustainability rather than growth. Both strategic planning and local community participation are crucial.

Engaging with ecosystems, biodiversity, carbon, community development, and climate change creates a comparative advantage. The relationship between people and nature involves contact with nature, environmental sensitivity, general attitude, and concern for nature. Awareness, knowledge, and skills in environmental management are essential. Research has utilized theories such as "Norm Activation Theory", "Theory of Reasoned Action", and "Theory of Planned Behavior" to study pro-environmental behavior. Additionally, the "Theory of Environmentally Significant Behavior" shows that socio-demographic, attitudinal, habitual, and contextual factors influence pro-environmental behavior. Policies must support the three pillars of sustainable development: economic, environmental, and social, to achieve comprehensive and long-term sustainability.

2.4.3. Theory of Reasoned Action

The figure 5 Theory of Reasoned Action below, states that a person's behavior can be predicted through their intention. This intention is determined by their attitude toward the behavior and the subjective norms surrounding it. The theory explains how exposure to new information can change attitudes. This change in attitude occurs by influencing target beliefs, which may correspond directly through impact effects.

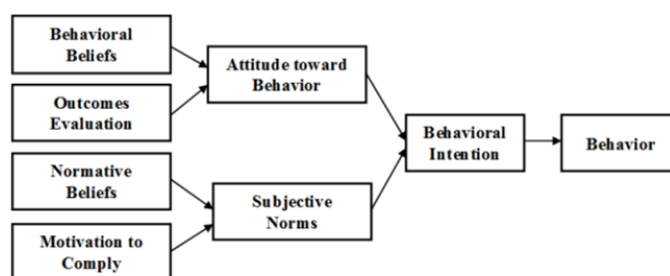


Figure 5. Theory of Reasoned Action

2.4.4. Theory of Planned Behavior

In figure 6 show that Theory of Planned Behavior extends the Theory of Reasoned Action. It includes attitudes toward the behavior, subjective norms, and perceived behavioral control to predict behavioral intention. Attitude toward the behavior refers to individuals assessing the favorable or unfavorable outcomes of the behavior. Subjective norms involve the perceived social pressure to perform or not perform the behavior. Finally, perceived behavioral control refers to the perceived ease or difficulty of performing the behavior, considering past experiences and anticipated obstacles.

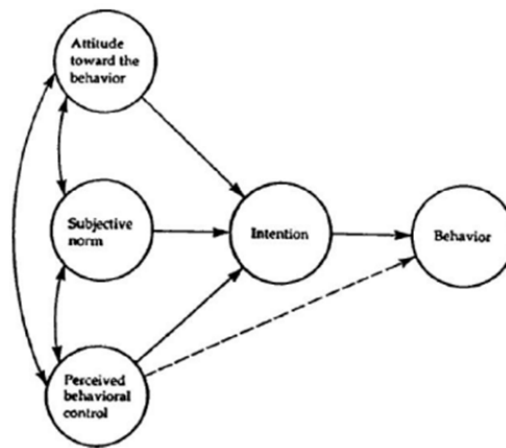


Figure 6. Theory of Planned Behavior

Studied the relationship between climate change issues and the Theory of Planned Behavior. In figure 7 The individual's intention to adapt to climate change might lead to pro-environmental behavior. The finding indicates that such intention is due to the attitude toward climate change, subjective norms, and perceived behavioral control.

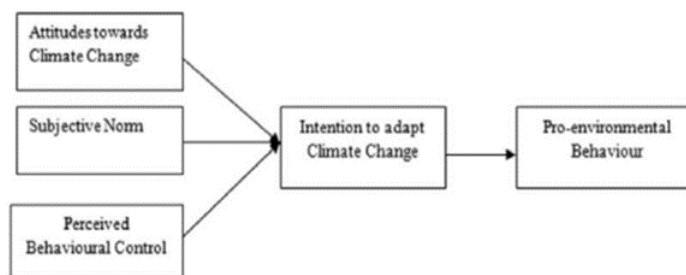


Figure 7. Theoretical Framework of Pro-environmental Behavior

In contrast, the Theory of Planned Behavior and the Theory of Reasoned Action were examined to explain and forecast social behavior. Figure 8 show the Theory of Reasoned Action seeks to explain behavior controlled by one's will and acknowledges social behavior at the level of individual decision-making, implying that the person is in complete control of their behavior. The Theory of Planned Behavior, on the other hand, introduces perceived behavioral control, acknowledging that there can still be intention even when the behavior is not entirely under control. Additionally, awareness was added as a new variable to the model of pro-environmental behavior.

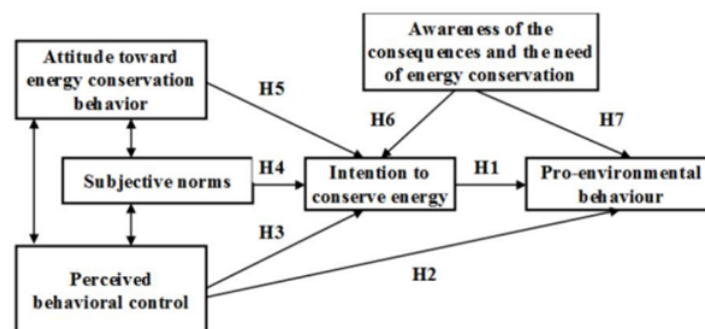


Figure 8. Proposed Research Framework of Pro-environmental Energy Conservation Behaviour

However in figure 9, in the environmental behavior model, knowledge of environmental issues is distinguished from how to act upon such matters. The model also includes situational factors, such as economic constraints, social pressures, and opportunities for different choices of actions, as variables that may lead to responsible environmental behavior.

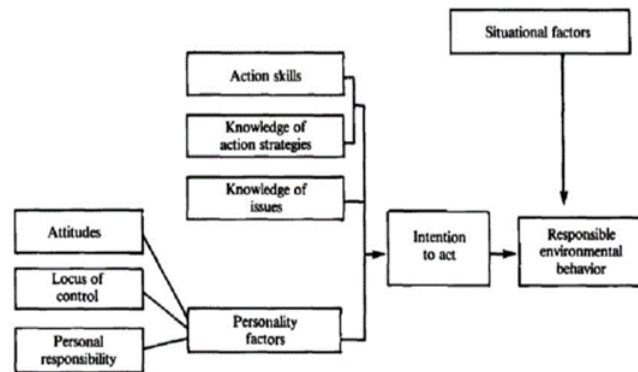


Figure 9. The Proposed Model of Responsible Environmental Behavior

In the "Theory of Reasoned Action" and the "Theory of Planned Behavior" form the backbone for understanding human behavior and local community behavior in this research. Past studies on pro-environmental and responsible environmental behavior have utilized the Theory of Planned Behavior extensively. These theories are particularly applicable given the necessity for behavioral change when addressing environmental issues.

3. RESEARCH METHODOLOGY

Research methodology is used to understand the phenomena that explain the research issue. A theoretical review and past research have been acknowledged and described in the previous section. Hence this section will mainly focus on the research methodology in this study. Qualitative research enables us to thoroughly explain and interpret the phenomenon of its natural setting. Therefore, qualitative research seems appropriate since the topic of pro-environmental behavior for sustainable carbon emission reductions is still relatively new. Through the qualitative method, policymakers, practitioners, and academic institutions could understand the subject based on their personal experiences regarding this issue. To support the validity of the research, it will use multiple data sources or data triangulation.

The first step of a qualitative research method is making a philosophical assumption. The philosophical belief contains ontology, epistemology, axiology, rhetoric, and methodology. The second step is collecting data and data analysis. At the same time, the third step is about presenting the final report that includes the verbal phrase of the participant, the researcher's reflexivity, and the explanation and interpretation of the issue.

A literature review from 2019 to 2024 done shows that quantitative research is the primary methodology used to investigate green 58 human resource management. Additionally, 27 percent of researchers published a conceptual paper. In comparison, 13.19% of it is qualitative research, with a survey as the most popular method. At the same time, the smallest percentage of green human resource management research is through the mixed method. Several studies regarding green or sustainable human resource management have been identified and analyzed using qualitative methodology, as shown in the following table 1:

Table 1. Previous Studies of Green or Sustainable Human Resource Management

Author(s)	Method/Theory(ies)	Population	Purpose
Parng et al. (2021)	Fuzzy Delphi Method, Triple Bottom Line	30 professionals with at least eight years of extensive experience	Construct a hierarchical Sustainable Human Resource Management model

Sathasivam et al. (2021)	phenomenology	10 people with more than 20 years of experience	Finding the role of human resource management in promoting environmental sustainability within the automotive industry.
El-Deeb et al. (2020)	Fuzzy Set Qualitative Comparative Analysis, Theory of Planned Behavior	481 Egyptian respondents	Finding the leading cause of pro-environmental behavior intention and behavior
Quoquab et al. (2020)	Exploratory factor analysis, confirmatory factor analysis	2 focus group discussions, 7 in depth interview	Develop and validate a scale to measure pro-environmental behavior in nutricosmetics purchases that is valid and reliable.

3.1. Research Design

The data collection was through a questionnaire, and the interview method aims to ask open-ended questions. The questionnaire and the interview will be given to the Dayak-Banjar communities in the chosen area to understand the behavioral intention to change supporting the environment. It will also be given 59 to those not Dayak-Banjar yet living in the Seruyan District. The reason is mainly to understand behavioral change among the local community in the Seruyan district, Central Kalimantan. The questionnaire will be distributed in paper forms, and the researcher will also conduct an open-ended one-time interview with the participant for approximately 30 mins. The discussion will be done online/offline and recorded through an appropriate application, which will then be transcribed into 10-20 pages.

3.2. Method of Collecting the Data

The data collection process involved several methods to ensure comprehensive and accurate results. The primary method was the use of structured and semi-structured interviews with local community members, government officials, and employees of the conservation company. These interviews were designed to gather in-depth information about the participants' attitudes, behaviors, and perceptions regarding environmental conservation and technopreneurship.

3.2.1. Site Selections

All participants reside in the Seruyan District, Central Kalimantan. The site was selected based on the previous forest fire accident and the existing conservation company in the area. Furthermore, the site chosen is due to the different conditions of each village. Such diversity would assist the research in understanding local community behavior: the map, population, and public facilities pictures of the three villages can be seen below. The spatial map of the three villages is done using the GIS-based technique. The technique gives us a clearer image of Muara Dua, Baung, and Kuala Pembuang village. There is a big difference in the number of people living in Kuala Pembuang than in the other two villages. The Kuala Pembuang head of family population is 2.534, whereas in Muara Dua, it is 219 people, and in Baung, it is 354 head of family.



Figure 10. Baung Village

The figure 10 GIS map shows that only some of the houses are located along the banks of the river, and the rest are near the forest. The map also shows roads connecting the village with the closed hamlet, yet the road is built along the palm tree plantations area. The reason why this research is conducted in Baung village is 62 that its position is surrounded by forest as well as palm tree plantations area. Understanding the behavior of the local community in this village will enhance the study of community behavior and their intention to change, especially as they are the ones that experience the real impact of climate change and are firsthand to see how the forest is being degraded.

3.2.2. Selection of Participants

The written questionnaire was distributed in three villages: Baung, Muara Dua, and Kuala Pembuang, with a total number of respondents of 77 people. The reason behind the three chosen villages is due to the different situations of each location. The location of Baung Village is far from the city but there is hamlet close to the area. Muara Dua, on the other hand, is far from the city and both are very close to the forest. Kuala Pembuang, on the other hand, is a city. The reason for doing research in those different situations is to show if the respondent from a different environment will provide a different response. The researcher also interviewed eight people from other villages: Palingkau and Pematang Limau [52]. Palingkau and Pematang Limau are the sub-district of Kuala Pembuang. Participants are also chosen based on their current and past occupations. The research participant's occupation varies between working at a conservation company, carpenter, construction workers, homemakers, university students, students, farmers, private-sector workers, palm oil companies' supervisors, wallet farmers, and traders [53].

3.3. Instrumentation

Open-ended questions and interviews were used for this study. Studied through the expression within the statement, such as "I will engage in the behavior, I intend to engage in the behavior, and I expect to engage in the behavior, I plan to engage in the behavior, I will try to engage in the behavior (p. 39)". Therefore, this analysis would adopt a similar statement based on the following questions.

(1) The beginning of the questioning process was done by asking open ended questions to answer the following research questions: How does the model of pre-environmental behavior for sustainable carbon emission reduction develop? (2) What factors contribute to the intention to change to become pro-environmental? The next part is a written response by sending a questionnaire on the factors contributing to change. The next part is a written response by sending a questionnaire on the factors contributing to change [54].

4. RESEARCH FINDING

The research findings indicate that the Dayak-Banjar communities in Seruyan District are heavily impacted by deforestation and peatland damage. Through questionnaires and interviews with 77 local residents, it was found that there is a strong willingness to adopt pro-environmental behaviors. The community recognizes the importance of preserving their environment for future generations and supports behavioral change through increased awareness and education.

4.1. Research Approach

The data collected were written or verbal responses from open-ended questions, interviews, or conversations. As mentioned, the study will use multiple data sources or data triangulation to support the research's validity. The participants are the local community, government officials, and employees at the conservation company [55].

4.2. Place and Time of Research

The questionnaire and the interview were given to the Dayak-Banjar communities living in Seruyan District, Central Kalimantan. The chosen area is based on the GIS analysis showing the peatland and hotspot areas. As the community has a significant role in protecting the peatland, researching there will provide an understanding of their behavior and what is required for behavioral change.

4.3. Population and Sampling Technique

The written questionnaire was distributed in three villages: Baung, Muara Dua, and Kuala Pembuang, with a total number of respondents of 77 people. As for the interview, the total number of respondents is 11

people, which consist of four 74 local community, two people from a government official, and four employees working at the conservation company.

4.4. Questionnaire Result

4.4.1. Attitude

The questionnaire results from table 2 indicated a strong willingness among the Central Kalimantan communities to adopt pro-environmental behaviors. Respondents demonstrated a heightened awareness of the environmental issues affecting their region and expressed a positive attitude towards participating in sustainable practices. The data collected highlighted several key factors influencing this attitudinal shift, including local wisdom, perceived behavioral control, and the influence of subjective norms within the community. The following table summarizes the key findings from the questionnaire responses:

Table 2. Previous Studies of Green or Sustainable Human Resource Management				
Tell me about your current/past behavior that harmed the environment. Give Example	Baung	Muara dua	Kuala Pembuang	Total
Never	4	2		6
Illegal logging, using poison for fishing			1	1
Logger, land clearing			1	1
Past: logger, present: work at palm oil	2			2
Logger in the past but not anymore	3	7		10
Work in oil industry, work in gold mining			1	1
Throwing rubbish not in a proper place		4	8	12
burn the trash			3	3
Use plastic, detergent			2	2
Land Clearing			1	1
Now Tell me about the possibility for you to change (to become pro-environmental)				
I have the will to do it but i still dont fully understand how to	2			2
Yes	7	13	16	35
Not Yet			1	1

The table 2 the past and present behaviors of local communities in Baung, Muara Dua, and Kuala Pembuang that harm the environment, as well as their willingness to adopt pro-environmental behaviors. Most respondents admitted to engaging in environmentally damaging activities such as illegal logging, using poison for fishing, and improper waste disposal. However, there is a significant awareness of the need for behavioral change, with 35 respondents expressing a willingness to become pro-environmental. This underscores the necessity for ongoing education and support to help local communities understand and implement eco-friendly practices. These findings align with the research objective of integrating technopreneurship with pro-environmental behavior to achieve sustainable carbon emission reduction, indicating that local communities have the potential to become change agents if provided with the appropriate knowledge and tools.

4.5. Interview Result

Living near the forest, the local community is directly impacted by environmental damage. A local Dayak advisor highlighted the issues of deforestation and its effects on health, crops, and fish populations.

The community's perspective has shifted due to environmental damage and recent flooding, emphasizing the need for pro-environmental behavior. They recognize the importance of taking care of the forest for future generations, with attitudes built on awareness and ownership. While older generations prioritize environmental responsibility, younger generations often seek convenience. Education and reintroducing local wisdom are crucial for promoting sustainable practices.

4.5.1. Local Community

Living near the forest, the local community is directly impacted by environmental damage. A local Dayak advisor testified to the effects of deforestation: "We take only what we need from the forest, but big companies can easily take hectares of trees with just one signature". (Dayak local advisor #1, 13 February 2022) [56]. He also mentioned health issues like eye soreness and skin irritation, as well as reduced crop yields and fish populations, linking these problems to deforestation. "Without the forest, the fish lose their shelter, disrupting our income". (Dayak local advisor #2, 13 February 2022).

The community's perspective has shifted due to environmental damage and recent flooding, highlighting the need for pro-environmental behavior. "We need to take care of the forest, seeing it as something borrowed from future generations". (Local community interview, 8 February 2022) [57]. The head of the village noted, "Attitude can be built on awareness and ownership, leading to behavior change". (Head of the village interview, 13 February 2022). While older generations have developed a more responsible attitude toward the environment, younger generations tend to prioritize convenience, such as using electrocution for fishing, which harms fish populations. Education and reintroducing local wisdom are crucial for building awareness and promoting pro-environmental behavior.

5. MANAGERIAL IMPLICATION

The findings of this study highlight the critical role that managers and policymakers play in integrating technopreneurship with pro-environmental behavior to achieve sustainable carbon emission reduction. Policymakers should create incentives and support systems, such as grants and subsidies, to encourage eco-friendly technopreneurial activities within local communities. Managers should actively engage with indigenous groups, like the Dayak-Banjar, to leverage their local wisdom in environmental conservation efforts, ensuring community buy-in and support. Additionally, businesses can utilize these insights to develop sustainable business practices that align with environmental goals, promoting both economic growth and ecological sustainability. By fostering a collaborative approach between government, businesses, and local communities, significant progress can be made in reducing carbon emissions and achieving sustainable development goals.

6. CONCLUSION

This research addresses the climate change crisis and environmental damage, emphasizing the importance of sustainability. Focusing on carbon emissions, a major contributor to climate change, the study highlights Indonesia's forest and peatland ecosystems as crucial carbon sinks. Protecting these ecosystems is essential to prevent greenhouse gas emissions, but challenges such as illegal logging, forest fires, and land clearing persist. The research proposes that behavior change within local communities, particularly the Dayak-Banjar in Central Kalimantan, is vital for effective forest and peatland conservation. Using qualitative methods, including interviews and questionnaires distributed across Baung, Muara Dua, and Kuala Pembuang villages, the study analyzes attitudes, subjective norms, perceived behavioral control, and knowledge to develop a model of pro-environmental behavior for sustainable carbon emission reduction.

The findings reveal that the local communities, deeply impacted by environmental degradation, are willing to adopt pro-environmental behaviors. This willingness, driven by a clear understanding of the environmental crisis, suggests significant potential for technopreneurship in promoting sustainable practices. For policymakers and practitioners, the study offers insights into designing policies and strategies that support pro-environmental behavior through technopreneurship. Additionally, businesses can leverage these insights to align their operations with environmental goals, supporting carbon reduction strategies and the carbon tax policy. The research also provides a foundation for future studies on carbon emission reduction and the decarbonized economy, emphasizing the critical role of community engagement and behavior change in achieving sustainable development goals.

7. DECLARATIONS

7.1. About Authors

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7.2. Author Contributions

Conceptualization: SA; Methodology: HD; Software: SA; Validation: MYM and HD; Formal Analysis: HD and SA; Investigation: MYM; Resources: SA; Data Curation: MYM.; Writing Original Draft Preparation: HD and SA; Writing Review and Editing: SA and MYM; Visualization: SA; All authors, SA, HD, and MYM, have read and agreed to the published version of the manuscript.

7.3. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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7.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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