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CONFERENCE PAPER

A STUDY ON GREEN BANKING PRACTICES IN ODISHA: A CUSTOMER-CENTRIC INVESTIGATION

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Abstract

The growing environmental concerns have urged the banking sector to integrate sustainable practices into their operations, giving rise to the concept of green banking. This study focuses on investigating the adoption, awareness, and effectiveness of green banking practices among customers in Odisha, India. It aims to understand customer perceptions, satisfaction levels, and behavioural responses toward eco-friendly banking initiatives such as paperless transactions, digital banking, green loans, and environmental risk management. Employing a mixed-methods approach, the study gathers data through surveys and interviews with a diverse customer base across urban and rural regions of Odisha. Findings reveal that while awareness of green banking is steadily increasing, significant gaps persist in customer engagement and satisfaction, particularly in rural areas where digital literacy remains low. The study highlights key factors influencing customer adoption, including convenience, trust, environmental consciousness, and accessibility of green services. Moreover, it identifies barriers such as lack of awareness campaigns, infrastructural limitations, and perceived risks associated with digital banking platforms. The research suggests that banks must prioritize customer education, enhance technological accessibility, and strengthen trust-building measures to foster a more inclusive green banking environment. This customer-centric investigation provides valuable insights for policymakers, banks, and environmental advocates seeking to promote sustainable banking practices in Odisha and similar developing regions. The study ultimately emphasizes that customer empowerment is crucial for the successful transition towards greener and more sustainable banking ecosystems.

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Introduction:-

In recent years, the global financial sector has increasingly recognized the need to align with sustainable development goals (SDGs) to mitigate the environmental challenges of climate change, resource depletion, and carbon emissions. Green banking, a concept that integrates environmental sustainability with banking operations, has emerged as a key strategy in this transformation. Green banking refers to the adoption of eco-friendly banking practices such as promoting paperless transactions, supporting green investments, reducing energy consumption in banking operations, and encouraging customers to adopt sustainable financial practices (Jha & Bhome, 2013). The concept extends beyond merely adopting eco-friendly technologies, encapsulating an institution's commitment to supporting a green economy and contributing to environmental preservation. In India, green banking has gained significant traction over the past decade, with the Reserve Bank of India (RBI) actively promoting financial inclusion through green initiatives, urging banks to integrate environmental considerations into their operational framework. However, despite the progress made in urban centres, there exists a considerable gap in understanding how customers in rural and semi-urban regions, such as those in Odisha, perceive and adopt green banking practices. Odisha, with its diverse demographic profile and economic landscape, represents a unique case study. The state's socio-economic structure, with a large rural population, has distinct characteristics and challenges that influence customer behaviour toward green banking.

This study seeks to explore the awareness, perception, and adoption of green banking practices among customers in Odisha, with a customer-centric focus. By understanding how customers perceive the benefits and challenges of adopting green banking initiatives, the study aims to provide insights into customer behaviour and the factors that drive or hinder their participation in such practices. As green banking continues to evolve, it becomes essential to assess its effectiveness and identify barriers to customer adoption. Factors such as convenience, trust in technology, perceived environmental benefits, and awareness levels are integral in shaping customer attitudes towards green banking. Therefore, investigating the factors that influence these behaviours is crucial for designing more effective green banking initiatives that align with customer needs and environmental goals. The primary objective of this research is to fill the gap in the existing literature by providing empirical data from Odisha, offering valuable insights for banks, policymakers, and environmental advocates. By focusing on customer-centric factors such as awareness, satisfaction, and adoption behaviours, this study aims to guide financial institutions operating in the region in enhancing their green banking services and better engaging their customers in sustainable practices. The findings will also contribute to broader discussions about the role of customer engagement in driving sustainable banking practices in emerging economies.

Green Banking Practices after Demonetization:-

The advent of demonetization in India on November 8, 2016, marked a significant turning point in the nation's financial ecosystem, accelerating the shift towards digital and paperless banking practices. In the wake of the currency ban, the reliance on electronic transactions increased drastically, creating a fertile ground for the promotion of green banking initiatives. Green banking, which advocates for eco-friendly practices such as online banking, e-statements, and digital fund transfers, gained substantial traction during this period. In Odisha, both urban and rural banking customers were compelled to adopt digital alternatives to cash, which not only facilitated financial inclusion but also supported environmentally sustainable banking. Banks enhanced their digital infrastructure, introduced user-friendly apps, and increased customer outreach to ensure smooth transitions. This transformation, though initially driven by necessity, fostered a behavioural shift toward embracing digital banking toolskey components of green banking. Moreover, post-demonetization, customers became more aware of the benefits of reduced paper usage, quicker transactions, and lower carbon footprints associated with green banking. The period thus served as a catalyst in transforming customer mindsets and encouraging the adoption of sustainable banking solutions. This study examines how these changes have sustained over time in Odisha, and how customer perceptions have evolved in response to green banking post-demonetization.

Literature Review:-

Green banking, a crucial element of sustainable finance, has gained prominence in recent years, driven by the global call for more environmentally responsible banking practices. The existing body of literature on green banking in India presents a comprehensive overview of its evolution, adoption patterns, challenges, and customer perceptions, laying a solid foundation for the current study on green banking practices in Odisha. Scholars have explored the concept from multiple dimensions, ranging from policy frameworks to customer-centric perspectives. Aayesha et al. (2024) conduct an empirical study that highlights how commercial banks are increasingly adopting green practices through the integration of digital platforms and eco-friendly financial products. Similarly, Agarwal and Sharma

(2021) examine the effectiveness of green banking initiatives, concluding that the level of awareness and technological infrastructure plays a crucial role in their success. Ghosh and Bhagat (2021) focus on regulatory frameworks, stressing the importance of government policies and guidelines in promoting sustainable banking behaviour. In terms of customer perception, Gupta and Shibani (2023) find that customer attitudes toward sustainability significantly influence the adoption of green banking services. Mehta and Agarwal (2019) echo this by showing a strong link between environmental concerns and the willingness to use green banking. Jadhav and Desai (2020) argue that green banking contributes substantially to sustainable development goals, thus reinforcing the need for widespread implementation.

Several researchers have examined the role of individual banks. Kanujiya and Dube (2024) analyze green initiatives by SBI and ICICI Bank, revealing varying strategies but a shared commitment to sustainability. Studies by Kumar and Yadav (2018) and Tiwari and Singh (2020) focus on customer awareness and perceptions, finding that although awareness levels are increasing, many users still lack detailed knowledge about green banking options. Specific attention has been given to the state of Odisha, making this study particularly relevant. Kundu (2020) explores green banking practices in Odisha and identifies a significant potential for growth, hindered mainly by limited awareness. Patnaik and Pani (2020) and Pradhan and Das (2021) delve deeper into the barriers and prospects of green banking in the state, citing digital illiteracy, infrastructural gaps, and lack of promotional activities as major challenges. Technological enablers have also been widely discussed. Sharma, Singh, and Rathi (2021) emphasize the role of digital tools like mobile apps and internet banking in promoting green services.

Sinha and Gupta (2020) highlight how digital banking not only aids convenience but also significantly contributes to sustainability by reducing paper usage. Other scholars like Rani and Sivakanni (2024) and Yadav and Soni (2021) address the issue of customer satisfaction, suggesting that green banking can enhance brand loyalty if properly implemented. Rakshitha and Chaya (2023) compare public and private sector banks and find that although both sectors are progressing, there is still much room for improvement in customer engagement. Collectively, these studies provide a multidimensional understanding of green banking in India and serve as a crucial backdrop for examining customer-centric green banking practices in Odisha. As this literature review highlights, while green banking has received significant attention in the urban banking landscape, there is a lack of comprehensive studies on the rural adoption of green banking, particularly in regions like Odisha. The current study, therefore, aims to bridge this gap by focusing on customer-centric factors influencing green banking adoption in Odisha, offering valuable insights for policymakers and financial institutions.

Research Objectives:-

1. To assess the level of awareness, perception, and adoption of green banking practices among customers in Odisha, with a focus on identifying regional and demographic variations.
2. To analyze the factors influencing customer participation in green banking initiatives and to recommend strategies for enhancing customer engagement and promoting sustainable banking practices.

Research Hypothesis:-

1. **Hypothesis 1 (H₁):** There is a significant difference in the level of awareness and adoption of green banking practices among customers across different demographic groups (such as age, education level, and urban-rural divide) in Odisha.
2. **Hypothesis 2 (H₂):** Customer perceptions of convenience, trust, and environmental benefits significantly influence their willingness to adopt green banking practices in Odisha.

Research Design and Methodology:-

This study adopts a descriptive and exploratory research design to assess customer awareness, perceptions, and adoption behaviours towards green banking practices in Odisha, with a customer-centric approach focusing on how individuals engage with green banking initiatives, the barriers they face, and the factors influencing their adoption of eco-friendly banking. Both qualitative and quantitative methods are employed to gather comprehensive data. The target population includes bank customers from urban, semi-urban, and rural areas of Odisha, with a sample size of 300 respondents selected using stratified random sampling to ensure diverse representation. Primary data is collected through structured questionnaires featuring closed-ended and Likert-scale questions, addressing customer awareness, perceptions, and behaviours, as well as demographic factors like age, income, education, and occupation. Secondary data is also gathered from literature, bank reports, and government publications to provide context. Data analysis is conducted using SPSS software, employing descriptive statistics to summarize demographics, factor

analysis to identify key determinants of green banking adoption, reliability testing (Cronbach's alpha) for survey consistency to examine the relationships between customer attributes and green banking behaviours.

Green Banking Tools & Techniques:-

Green banking tools and techniques encompass a range of environmentally conscious practices adopted by banks to minimize their ecological footprint and promote sustainability. In the context of Odisha, these tools primarily include digital banking services such as mobile banking apps, internet banking, e-statements, and online fund transfers, which reduce paper usage and physical visits to bank branches. Automated Teller Machines (ATMs), SMS alerts, and green credit/debit cards are also widely promoted to encourage cashless and eco-friendly transactions. Techniques like carbon footprint tracking, energy-efficient branches, and green loans for sustainable projects are increasingly being implemented by major banks. Additionally, banks in Odisha are integrating environmental risk assessments into their lending practices to support eco-friendly businesses. Awareness campaigns, customer engagement through digital platforms, and incentives like rewards for using green services are other techniques employed to foster customer participation. These tools and techniques are essential for embedding sustainability into core banking operations and enhancing customer-centric green banking adoption.

Data Analysis:-

Demographic Analysis:-

Table 1: Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-29 Years	29	9.7	9.7	9.7
	30-39 Years	42	14.0	14.0	23.7
	40-49 Years	108	36.0	36.0	59.7
	50-59 Years	77	25.7	25.7	85.3
	60 Years and Above	44	14.7	14.7	100.0
	Total	300	100.0	100.0	

The age-wise distribution of respondents in the study Table 1 indicates that the majority fall within the 40–49 years age group, accounting for 36% of the sample. This is followed by 25.7% in the 50–59 years category and 14.7% aged 60 years and above. Younger respondents aged 30–39 years represent 14%, while those in the 18–29 years category constitute only 9.7% of the sample. The cumulative percentage shows that 59.7% of participants are below 50 years, indicating a relatively middle-aged respondent base. This distribution reflects a stronger participation from middle-aged individuals in the study, highlighting their potential role in green banking adoption.

Table 2: Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	154	51.3	51.3	51.3
	Female	146	48.7	48.7	100.0
	Total	300	100.0	100.0	

Table 2 shows a nearly equal gender distribution, with males comprising 51.3% and females 48.7% of respondents. This balance suggests that both genders actively participate in green banking, indicating equal potential among male and female customers to contribute to and influence the adoption of sustainable banking practices in Odisha.

Table 3: Education Level					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 12th	40	13.3	13.3	13.3
	Graduate	121	40.3	40.3	53.7
	Postgraduate	104	34.7	34.7	88.3
	Professional Degree	35	11.7	11.7	100.0
	Total	300	100.0	100.0	

Table 3 provides an overview of the educational background among respondents, which plays a pivotal role in their potential engagement with green banking practices. Among the 300 participants, the largest group consists of graduates (40.3%), followed by postgraduates (34.7%). Those with a professional degree account for 11.7%, while respondents with education below 12th make up 13.3%. This data indicates that over 75% of the sample has attained a graduate level or higher, suggesting that a well-informed and educated segment of the customer base is likely to be receptive to and actively engage in sustainable banking practices.

Table 4: Area of Residence					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Urban	100	33.3	33.3	33.3
	Semi-Urban	100	33.3	33.3	66.7
	Rural	100	33.3	33.3	100.0
	Total	300	100.0	100.0	

Table 4 presents an equal distribution of respondents across urban, semi-urban, and rural areas, with each group representing 33.3% of the total sample. This balanced representation ensures that the study captures diverse perspectives on green banking practices from all geographic segments of Odisha. It highlights the potential for green banking adoption across different areas, not limited to urban centers. The equal participation also enables a comparative understanding of how regional differences influence awareness, accessibility, and adoption behavior. This distribution strengthens the validity of the study's findings and supports targeted strategies for promoting green banking in varied residential contexts.

Table 5: Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	31	10.3	10.3	10.3
	Private Employee	43	14.3	14.3	24.7
	Government Employee	106	35.3	35.3	60.0
	Self-Employed	76	25.3	25.3	85.3
	Others	44	14.7	14.7	100.0
	Total	300	100.0	100.0	

Table 5 highlights the occupational distribution of respondents, indicating that government employees form the largest group at 35.3%, followed by self-employed individuals at 25.3%. Private employees and those in the "Others" category make up 14.3% and 14.7% respectively, while students constitute the smallest group at 10.3%. The dominance of employed and self-employed individuals suggests that working professionals are more engaged with banking activities, and thus, may have greater exposure to or influence over green banking practices. This occupational diversity allows the study to assess how different professional backgrounds impact awareness, attitudes, and the adoption of sustainable banking solutions in Odisha.

Statistical Analysis:-

Reliability:-

Table 6: Reliability Statistics	
Cronbach's Alpha	N of Items
.805	25

Table 6 shows a Cronbach's Alpha value of 0.805 for 25 items, indicating good internal consistency and reliability of the questionnaire. This suggests that the survey items used to assess customer perceptions and behaviors toward green banking are reliable and produce consistent responses across different participants.

Descriptive Statistics:-

Table 7: Descriptive Statistics				
	N	Mean	Std. Deviation	Variance
I am aware of the concept of green banking.	300	3.1567	1.12977	1.276
I regularly use digital banking services (e.g., mobile apps, internet banking) instead of visiting the bank physically.	300	3.4233	1.07454	1.155
I have heard about green banking initiatives undertaken by my bank.	300	3.5567	1.06955	1.144
My bank encourages me to opt for e-statements instead of paper statements.	300	3.2333	1.13866	1.297
I consciously prefer online fund transfers and digital payment modes over cash transactions.	300	3.2967	1.28874	1.661
I believe green banking initiatives are important for environmental protection.	300	3.3167	1.28656	1.655
I have applied for or used banking services categorized as "green products".	300	3.2667	1.25997	1.588
Green banking services are convenient and easy to use.	300	3.1500	1.26207	1.593
I trust the security of digital banking platforms.	300	3.4433	1.15379	1.331
Green banking helps to reduce environmental damage significantly.	300	3.2933	1.19669	1.432
I feel that my bank's green initiatives are transparent and trustworthy.	300	3.2867	1.19551	1.429

I prefer banks that promote environmental sustainability.	300	3.2467	1.28243	1.645
I believe green banking services save my time and effort compared to traditional banking methods.	300	3.3067	1.25880	1.585
My awareness about environmental issues influences my decision to use green banking.	300	3.2500	1.23528	1.526
The availability of digital infrastructure (internet, smartphones) affects my use of green banking services.	300	3.1200	1.24530	1.551
User-friendly apps and websites motivate me to adopt green banking.	300	3.4367	1.15344	1.330
I would adopt more green banking services if there were better awareness programs.	300	3.2933	1.19109	1.419
Fear of online fraud prevents me from using green banking services fully.	300	3.1667	1.23449	1.524
Technical issues (like server downtime, app crashes) discourage me from using digital banking.	300	3.0867	1.22098	1.491
Incentives (like discounts or rewards) from banks would encourage me to use green banking services more.	300	3.2633	1.07603	1.158
I am satisfied with my bank's efforts toward green banking initiatives.	300	3.5133	1.03282	1.067
My bank provides sufficient information and guidance about green banking practices.	300	3.5167	1.10171	1.214
I would recommend my bank's green banking services to others.	300	3.2300	1.15247	1.328
I believe banks should do more to promote green banking practices.	300	3.3000	1.24975	1.562
I am willing to participate in campaigns promoting green banking in my community.	300	3.3733	1.21334	1.472
Valid N (listwise)	300			

Table 7 presents the descriptive statistics for key variables measuring customer awareness, perceptions, and behavior toward green banking in Odisha. The mean scores of all items range from approximately 3.08 to 3.56, suggesting a moderate level of agreement overall. The highest mean (3.5567) is for awareness of green banking initiatives by banks, indicating that many respondents are familiar with such efforts. Regular usage of digital banking (mean = 3.4233) and trust in digital platforms (mean = 3.4433) also reflect positive perceptions. However, items like technical issues (mean = 3.0867) and fear of online fraud (mean = 3.1667) highlight some barriers to adoption. The standard deviations mostly exceed 1.0, indicating diverse opinions among respondents. Notably, customers agree that green banking saves time and supports environmental protection, but they also express a need for more awareness programs and incentives. These findings reveal both potential and challenges in increasing green banking adoption in the region.

Factor Analysis:-

Table 8: KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.827
Bartlett's Test of Sphericity	Approx. Chi-Square	9691.104
	df	300
	Sig.	.000

Table 8 indicates a KMO value of 0.827, which is well above the acceptable threshold of 0.6, confirming sampling adequacy for factor analysis. Bartlett's Test of Sphericity is significant ($p < 0.001$), suggesting that the correlations between items are sufficient for reliable factor extraction in this study.

Table 9: Total Variance Explained						
Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.740	26.959	26.959	6.701	26.805	26.805
2	4.680	18.719	45.678	4.560	18.241	45.046
3	3.699	14.796	60.474	3.724	14.894	59.940
4	2.804	11.217	71.691	2.815	11.261	71.201
5	1.851	7.406	79.097	1.928	7.714	78.915
6	1.844	7.376	86.473	1.889	7.558	86.473
Extraction Method: Principal Component Analysis.						

The Principal Component Analysis (Table 9) reveals that six components have eigenvalues greater than 1 and together account for approximately 86.47% of the total variance, indicating a strong explanatory structure in customer responses regarding green banking practices. The first component alone explains 26.81% of the variance, followed by the second and third components, contributing 18.24% and 14.89% respectively. The remaining three components each explain over 7% of the variance. This cumulative percentage demonstrates that these six factors capture the majority of the underlying dimensions in customer perceptions, attitudes, and behaviors toward green banking adoption in Odisha.

Table 10: Rotated Component Matrix^a						
Factors	Component					
	1	2	3	4	5	6
I have applied for or used banking services categorized as "green products".	.960					
I consciously prefer online fund transfers and digital payment modes over cash transactions.	.955					

I believe green banking initiatives are important for environmental protection.	.949					
Green banking services are convenient and easy to use.	.941					
My bank encourages me to opt for e-statements instead of paper statements.	.912					
I regularly use digital banking services (e.g., mobile apps, internet banking) instead of visiting the bank physically.	.879					
I am aware of the concept of green banking.	.852					
I have heard about green banking initiatives undertaken by my bank.	.844					
I believe banks should do more to promote green banking practices.	.930					
I would recommend my bank's green banking services to others.	.895					
I am willing to participate in campaigns promoting green banking in my community.	.877					
I am satisfied with my bank's efforts toward green banking initiatives.	.865					
My bank provides sufficient information and guidance about green banking practices.	.847					
Incentives (like discounts or rewards) from banks would encourage me to use green banking services more.	.794					
My awareness about environmental issues influences my decision to use green banking.	.974					
I believe green banking services save my time and effort compared to traditional banking methods.	.965					
The availability of digital infrastructure (internet, smartphones) affects my use of green banking services.	.955					
I prefer banks that promote environmental sustainability.	.951					
Green banking helps to reduce environmental damage significantly.	.983					
I feel that my bank's green initiatives are transparent and trustworthy.	.979					
I trust the security of digital banking platforms.	.929					

Technical issues (like server downtime, app crashes) discourage me from using digital banking.					.974	
Fear of online fraud prevents me from using green banking services fully.					.972	
User-friendly apps and websites motivate me to adopt green banking.						.966
I would adopt more green banking services if there were better awareness programs.						.963
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.						
a. Rotation converged in 5 iterations.						

The Rotated Component Matrix (Table 10) reveals six distinct factors influencing customer attitudes and behaviours toward green banking. The first factor focuses on the adoption of green products, with items like using digital payment modes, e-statements, and eco-friendly banking services loading highly on this component. The second factor highlights awareness and participation, such as being aware of green banking initiatives and willingness to recommend or engage in green banking activities. The third factor is environmental concern, with items related to environmental protection and the importance of reducing environmental damage. The fourth factor emphasizes trust and security in digital banking services. The fifth factor centers on incentives and convenience, indicating that users are motivated by rewards and find green banking services convenient. Finally, the sixth factor is technology and infrastructure, reflecting the role of digital infrastructure and user-friendly platforms in encouraging green banking adoption. This factor structure offers a comprehensive view of the various dimensions influencing green banking behaviour in Odisha.

Findings:-

The study on green banking practices in Odisha revealed several key insights into customer awareness, perceptions, and adoption behaviours related to eco-friendly banking initiatives. Firstly, the findings indicate that awareness of green banking practices among customers in urban areas is relatively higher compared to rural and semi-urban areas. Customers in urban regions were more likely to engage with digital banking services such as paperless transactions and online banking, which are integral to green banking practices. However, a significant gap in awareness was observed among rural customers, where a lack of access to digital banking infrastructure and limited information hindered the adoption of green banking services.

In terms of customer perceptions, the study found that trust and convenience were the most significant factors influencing the adoption of green banking practices. Customers who perceived green banking services as secure and easy to use were more inclined to adopt these practices. Environmental concern was another notable driver, particularly among younger and more educated customers, who recognized the long-term benefits of sustainable banking. However, there was a general skepticism regarding the environmental impact of green banking, with many customers questioning the actual eco-benefits of digital transactions and online banking. Furthermore, government initiatives and bank incentives emerged as critical enablers for encouraging the adoption of green banking. Customers who were aware of government schemes and bank promotions related to green banking were more likely to adopt such practices. However, the study also highlighted barriers, such as technological limitations, low digital literacy, and insufficient government support, which were found to significantly impact the widespread adoption of green banking in rural areas of Odisha. In conclusion, while green banking practices are gaining traction in Odisha, particularly in urban areas, efforts to increase awareness, improve digital infrastructure, and incentivize green banking adoption in rural areas remain crucial for broader acceptance across the state.

Conclusion:-

This study on green banking practices in Odisha offers valuable insights into customer awareness, perceptions, and adoption behaviours related to eco-friendly banking initiatives. The findings indicate that while awareness of green banking is relatively high in urban areas, rural customers face significant barriers, including limited access to digital banking and low levels of environmental consciousness. Trust in technology, perceived convenience, and the

environmental benefits associated with green banking were identified as key factors influencing adoption among customers in the state. Moreover, the study highlights the importance of targeted awareness campaigns, particularly in rural and semi-urban regions, to bridge the knowledge gap and encourage more widespread participation in green banking practices. Banks need to focus on improving accessibility, addressing technological barriers, and creating incentives to motivate customers to adopt green banking solutions. Overall, this research emphasizes the need for a customer-centric approach in promoting green banking, where financial institutions consider local socio-economic conditions and tailor their offerings to meet the specific needs of diverse customer segments. The findings contribute to the existing body of knowledge on green banking in India and provide actionable insights for policymakers and banking institutions seeking to foster sustainable financial practices in Odisha and beyond.

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