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Does awareness lead customers to use sustainable banking services? A study using path analysis

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Abstract

With the global transition of the traditional triple bottom line framework of Planet, People, and Profit to the Environmental, Social, and Governance (ESG) paradigm, it has become imperative for banks to incorporate sustainability within their operations and beyond. The disclosure of the ESG framework and responsible lending has significantly impacted banks' financing choices, particularly in environmentally sensitive regions. This study assesses customers' awareness and usage of sustainable banking services. A structured survey was conducted among 200 customers from 10 commercial banks (20 each from 10 banks) in Coimbatore, India. The questionnaire method was adopted to collect the data. Based on the sustainability theory, the study intends to investigate customers' awareness and usage of sustainable banking services using a path analysis approach. The results show that awareness has a significant direct influence on the usage of sustainable banking services, and this understanding will help in designing a future sustainability framework. This is insightful advice on how policymakers, financial organizations, regulators, and bank managers can create and execute successful designs for sustainable banking operations.

Keywords: Sustainable banking, Indian commercial banks, Responsible Banking and UN Initiative, Path analysis

1. Introduction

Banks have gradually incorporated Environmental, Social, and Governance (ESG) norms and the Sustainable Development Goals (SDGs) into their operations in recent decades [1]. To promote sustainable banking activities [2], they are also urged to participate in the expanding global climate change governance [3] [4]. Adopting a sustainable strategy goes beyond being environmentally conscious because it has many other advantages, such as lowering risk and the financial institution's costs, improving bank credibility, customers' faith, and image. In general, sustainable banking fulfils both the financial institution's social responsibilities and its business goals. Therefore, for Indian banking firms to remain relevant and prosper in the international market, they must understand their duties regarding the community and the ecosystem [5]. The current research pertains closely to the awareness and usage of sustainability procedures, which have a noteworthy effect on the nation's economic viability. In India, the RBI and other pertinent agencies have established an individualised regulatory

structure that public and private sector banks must adhere to. Analysing these institutions contributes to a thorough grasp of the regulatory environment in the nation by shedding light on how local governments affect and regulate sustainable methods.

Customers are receptive and willing to embrace the changes introduced by banks' green initiatives. Earlier research highlights that education has a significant positive impact on raising awareness about green banking among the participants [6]. Ordinary people have not yet embraced these services because of a lack of understanding. Consequently, banks should educate their customers on green banking services and adhere to all environmental policies [7]. Acknowledging the need for green banking services and increasing awareness of their significance in society and study is a valuable resource for scholars, policymakers, investors, and regulators when they engage in discussions about green banking services [8].

Banks, as "Socially Responsible Corporate Citizens (SRCC)", have a significant role and obligation in augmenting governmental efforts to reduce carbon emissions significantly [9]. Green banking is a way for banks to participate in sustainable development. The author investigated and contrasted Indian banks' green lending practices regarding their compliance and dedication to environmental protection and environmentally friendly initiatives. Banks in India, it was said, might introduce green financing. Green banking was initially discussed in the early 1990s when the United Nations Environment Program (UNEP) collaborated with the industry to establish environmental management plans after becoming confident that the banking industry's continuous operations could substantially influence the environment [10]. This idea has been discussed for several years.

However, it has yet to be prescriptively characterised by any international organisation, as it depends on specific financial entities distributing capital to specific purposes while including environmental protection. There are also some serious environmental problems. As a result, organisations must give importance to their outcomes to evaluate whether or not they are breaching ecological issues. According to SBI Bank, profit should not be made at the price of the world's most considerable, severe environmental challenges. They support groups ranging from natural food and agricultural businesses to pioneering sustainable energy ventures, recycling firms, and wildlife conservation initiatives. Citizens Bank of Canada has reduced the interest on loans for low-emission vehicles. These initiatives will undoubtedly inspire more banks to adopt green banking, and as a result, environmental challenges may be tackled in the long term.

Banks have made commendable efforts to establish a sustainable banking environment through various banking activities. It highlights the banking industry's financial inclusion, corporate social responsibility, and green banking offerings [11]. Significant financial and environmental effects have resulted from the recent economic crisis, currency instability, and unchecked climate change. To lessen global warming and build a more sustainable future, governments, corporations, and individuals all have a part to play. People need to work with financial institutions, especially banks, which have a crucial role in this by helping to establish a solid and booming low-carbon economy. However, are the customers aware of these sustainable services and use the same? This question must be answered in this study. Banks should incorporate more environmental data in their credit and investment decisions, as they play a crucial role in advancing the UN's Sustainable Development Goals. There is growing demand from consumers, shareholders, employees, and regulators for a solid commitment to environmental, social, and governance (ESG) considerations, which puts pressure on banks to produce positive outcomes.

1.1. Literature review

Green banking is a drive toward sustainability. A study aimed at providing guidelines for sustainable banking products and infrastructure at the branch level also aimed at giving guidelines for bank branches to achieve operational excellence and environmental efficiency [12]. The complications of green banking concerning the Konkan coast of Karnataka also shed light on the importance of “going green” [13]. In a recent study, the authors provided a theoretical framework for assessing the sustainable performance of Indian banks and banks' environmental and social conduct. It also evaluated the impact of environmental and social behaviors on the

sustainability of Indian banks [14]. In a study focused on green banking practices, particularly regarding the State Bank of India, the nature and extent of green banking adoption through environmental management is referred and a framework for its adoption is also suggested [15].

Previously, the finance sector's concern regarding clients' ecologically damaging actions has been equated with intervening or intruding in business affairs [16]. Conversely, it is increasingly realized that dealing with the ecosystem poses a danger to a business. According to the RBI, green banking makes internal bank procedures, physical infrastructure, and IT infrastructural facilities as efficient and productive as feasible while having no or low environmental effects [17]. It introduced green coin ratings and green grading criteria for Indian banks. Under this grading system, banks are rated based on the amount of CO2 emission from their activities and the quantity of recyclable, refurbishing, and reuse materials employed in their building's amenities and systems, such as servers, computers, printing, networking, etc. They are also rated based on the number of green projects they fund and the awards or recognitions they provide to borrowers for making their company more environmentally friendly. Green banking services assist banking institutions in their attempts to develop sustainably. Many experts shared their perspectives on prior and recent advancements and developments in the financial sector linked to green banking in this context.

In terms of sustainable banking, significant disparities between areas, nations, and banks are identified. In this paper, the author established four stages of banking: defensive, preventative, aggressive, and sustained [18]. Research [19] offered ways for the banking industry to deal with changes and concerns. It will be accepted that reform in the traditional focus on sustainable growth is required to comprehend the banking industry's expansion toward sustainable development, emphasizing the need for changes [20].

In a recently published article, the author discovered four major findings: (a) banks are increasingly discussing climate change business opportunities in their annual reports; (b) 28 of the 40 banks have calculated and disclosed their greenhouse gas emissions from operations; (c) growing demand for climate-friendly financial products and services is driving banks into new markets; and (d) investment banks have taken the lead in supporting emissions trading mechanisms and introducing new products. Such approaches also assist banks in providing first-rate service to achieve customer satisfaction, especially when rivalry among the various types of banks, i.e., public, private, foreign, and others, is fierce [21]. While the banking business is being digitized, networking and the availability of online banking are inevitably gaining traction, "going green" has also been gaining increasing interest for years [22].

Green banking combines operational changes, technology, and changing customer behaviors in the marketplace [23]. Greener banking practices will help the environment and increase operational efficiency, lower vulnerability to manual mistakes and fraud, and save on costs in banking activities. He added that sustainable banking will benefit businesses, industries, and the government. Going green would further help green industries, but it would also allow banks to enhance their asset sustainability in the future. He has identified various advantages of going green [24].

Delgado and Bhome surveyed the actions that may be taken to become green in the banking industry. They assessed knowledge of green banking among bank workers, associates, and the public. They conducted this research by gathering information from 12 banking institutions, 50 bank staff, and 50 general clients. According to the writers, some of the initiatives for turning green should include banking online, green loans, energy-saving equipment, green credit cards, the use of wind and solar energy, and phone banking [25].

Many researchers have studied the sustainable banking services that banks have adopted in developed and developing countries. However, the direct effect of awareness and usage of these practices is comparatively low. There is a vast scope to bring sustainable practices among the customers, provided they know about the same. Therefore, current research is considered an attempt to address the gap by addressing the customers' awareness and usage of sustainable services.

1.2. Theoretical framework

The theory given attention and dominance in the previous literature is the social responsibility theory, a UN-initiated strategy with the help of the International Union to limit growth-based corporate development strategies. This provides a foundation and benchmark worldwide for sustainability practices. However, it helps recognise environmental problems that must be adequately addressed and considered in future strategic policy formulation. Socially responsible investment is ethically motivated by the need for investment, which originated in ancient times.

In this regard, Renneboog et al. stated that there is no consensus regarding the definition of SRI theory [26]. Chatzitheodorou et al. argued that different terms like ethical, social, sustainability, and investments have been used behind the logic of the SRI theory [27]. Other articles stated that SRI theory focuses on the values of individuals and the well-being of society as an essential factor in consideration for investment choice evaluation. Ultimately, SRI has the impact of social investments for the enhancement of social benefits from investors of the community investors.

1.3. Research questions

- Are the customers of commercial banks aware of sustainable banking services?
- The extent to which bank customers use sustainable banking services?

1.4. Objectives of the study

- To understand customers' awareness about the sustainable banking services provided by commercial banks.
- To examine the sustainable banking services used by customers.
- To analyse the association between the awareness level and the usage level of sustainable banking services by customers.

1.5. Hypotheses

- H_o1: There is no significant variation between the population value and sample mean value regarding the awareness of customers about sustainable banking services.
- H_o2: The demographic profile of the respondents does not influence their awareness of sustainable banking:
- H_o3: The awareness level of customers does not have a direct effect on the usage of sustainable banking services.

2. Research method

The descriptive research design used in this study is ideal for elucidating the relationship between awareness and usage of sustainable banking practices. The study was conducted in Coimbatore, Tamil Nadu, India. Coimbatore was identified as one of the fastest-developing metros in India and has been included in the list of smart cities. Further, it is the place where all types of banks exist. The study lasted nine months, from December 2023 to August 2024. A standardized questionnaire investigates the association between awareness and usage of sustainable banking services by customers in Coimbatore city through convenience sampling.

Convenience sampling was chosen for this study due to its practicality and efficiency in collecting data directly from bank customers. This non-probability sampling technique allows data collection from respondents who are readily available and willing to participate, at banking premises during operational hours. This will help to gather a large number of accurate responses within in relatively short time and without extensive logistical planning or resources. Convenience sampling will provide diversity within the sample, even though the selection is non-random. A sample size of 20 respondents per bank was selected to ensure a balanced representation across the institutions selected for this study. This standardized approach helps to maintain comparability between banks, rather than over-representation from a single bank.

The convenience sampling technique may affect the reliability of the findings, since the respondents are selected based on availability, rather than randomization. The sample may not accurately represent the broader customer population of bank customers. This can lead to selection bias. Additionally, factors such as time and location of data collection may skew responses, as certain customer segments could be underrepresented. These limitations are considered while interpreting the results.

Customers of commercial banks, viz. Canara Bank, Bank of Baroda, Punjab National Bank, State Bank of India, Indian Bank, HDFC Bank, ICICI Bank, Axis Bank, Kotak Mahindra Bank, and IndusInd Bank were chosen as sample respondents. The banks were selected based on their turnover as of 31st March 2023. Since the population is unknown, a definite number of 200 had been fixed on the sample size, and 20 each were taken from 10 commercial banks. Frequencies and percentages were used to determine the respondents' distribution patterns concerning variables. ANOVA, independent t-test, one-sample t-test, and path analysis were used in the study to bring out meaningful inferences and findings.

3. Results and discussion

Objective 1: To understand customers' awareness about the sustainable banking services provided by commercial banks.

Table 1b. Customers' awareness about the sustainable banking services provided by commercial banks; Weighted Mean Score analysis

Variables	Extremely aware	Very much aware	Moderately aware	slightly aware	Not aware at all	Mean	SD	Rank
I am familiar with sustainable practices in banks	23	69	76	23	9	3.370	.9838	X
Information guides and annual reports as soft copies	23	72	63	33	9	3.335	1.0286	XI
Green channel counter	32	68	64	26	10	3.430	1.0634	IX
Opening a bank account through an online	76	66	35	18	5	3.950	1.0692	IV
Digital wallets	68	70	42	14	6	3.900	1.0467	V
Debit and credit cards	108	46	38	6	2	4.260	.9364	III
Net banking/ mobile banking	122	43	23	10	2	4.365	.9414	I
Cash/cheque deposit machine	110	58	20	10	2	4.320	.9175	II
Digital currencies	41	79	50	23	7	3.620	1.0445	VIII
Green mutual fund	32	43	69	40	16	3.175	1.1624	XIV

Variables	Extremely aware	Very much aware	Moderately aware	slightly aware	Not aware at all	Mean	SD	Rank
Green vehicle loans	29	58	73	30	10	3.330	1.0567	XII
Green home loans	24	51	68	34	23	3.095	1.1674	XV
Offering a waiver on interest on loans	34	56	55	44	11	3.290	1.1500	XIII
Schemes to promote women's/girls' education	62	65	46	15	12	3.750	1.1507	VII
Schemes exclusively for women entrepreneurs	65	60	55	13	7	3.815	1.0708	VI
		Mean				**3.667**		

Source: Primary data

The most recognised sustainable practices:

1. Net/Mobile banking
2. Cash/cheque deposit machines
3. Debit and Credit cards
4. Opening a bank account online
5. Digital wallets

Gender-oriented schemes:

1. Women entrepreneurs' scheme
2. Girls' education promotion scheme

Green and sustainable initiatives (lower awareness):

1. Green home loans (lowest)
2. Green mutual funds
3. Interest waiver offers
4. Green vehicle loans

The awareness level about sustainable banking services among consumers of public and private sector banks is delineated in Table No. 1. The data reveals that awareness of sustainable banking services is generally moderate to high, with an overall mean score of 3.667. Respondents show the highest awareness about net/mobile banking (mean=4.365), cash and cheque deposit machines (4.320), and debit and credit cards (4.260), reflecting their widespread awareness. Moderate to high awareness is also evident for services like opening a bank account online, digital wallets, and SDG-related schemes for women and girls, indicating growing engagement with digital and socially inclusive initiatives. However, awareness significantly drops when it comes to green finance products such as green home loans (3.095) and green mutual funds (3.175), which rank lowest. This suggests that, while digital transformation in banking is well communicated and adopted, sustainable and eco-friendly banking practices remain under-recognized and require more focused awareness campaigns and customer education.

Table 2. The usage of sustainable banking services by customers

Sustainable banking services	Always	Often	Sometime	Rarely	Never	Mean	SD	Rank
Green Channel Counters	25 (12.5%)	47 (23.5%)	82 (41%)	28 (14%)	18 (9%)	3.165	1.101	VI
Opening a bank account through an online	87 (43.5%)	36 (18%)	47 (23.5%)	18 (9%)	12 (6%)	3.840	1.245	III
Digital wallets, payment gateway,	77 (33.5%)	36 (18%)	69 (34.5%)	9 (4.5%)	9 (4.5%)	3.815	1.134	IV
Debit and Credit cards	95 (47.5%)	60 (30%)	37 (18.5%)	7 (3.5%)	1 (5%)	4.205	.898	II
Netbanking/Mobile Banking	108 (54%)	51 (25.5%)	30 (15%)	6 (3%)	5 (2.5%)	4.255	.987	I
Cash /Cheque Deposit machines	64 (32%)	53 (26.5%)	69 (34.5%)	10 (5%)	4 (2%)	3.815	1.007	IV
IVR banking	28 (14%)	41 (20.5%)	70 (35%)	38 (19%)	23 (11.5%)	3.065	1.190	VIII
Green home loan	22 (11%)	37 (18.5%)	57 (28.5%)	35 (17.5%)	49 (24.5%)	2.740	1.311	X
loan to purchase an Electric vehicle	26 (13%)	36 (18%)	60 (30%)	24 (12%)	54 (27%)	2.780	1.364	IX
A loan exclusively for women's empowerment	38 (19%)	43 (21.5%)	60 (30%)	22 (11%)	37 (18.5%)	3.115	1.349	VII

Source: Primary data

The most frequently used sustainable practices:

1. Net/Mobile banking
2. Debit and Credit cards
3. Opening a bank account online

Digital and transactional tools (medium-high use)

1. Digital wallets and Cash/cheque deposit machines

Moderately used services:

1. Green channel counters
2. Women entrepreneurs scheme
3. IVR Banking

Least used sustainable services:

1. Green vehicle loans
2. Green home loans (lowest)

The frequency of use of sustainable banking services is displayed in Table 2. The data on the usage of sustainable banking services indicates that digital banking tools are the most used among respondents. Net banking or mobile banking holds the highest usage (mean of 4.255), followed closely by debit and credit cards (4.205), and opening bank accounts online (3.840), reflecting a strong shift toward digital banking preferences. Services like digital wallets and cash/cheque deposit machines also show high adoption (3.815), indicating their convenience and accessibility. In contrast, services related to sustainable finance, such as green home loans (2.740) and

electric vehicle loans (2.780) show the lowest usage levels, highlighting a lack of engagement or perhaps limited availability and awareness. IVR banking and green channel counters show only moderate use, suggesting that they are either less preferred or not widely promoted. Notably, loans for women's empowerment have a modest uptake (3.115), indicating some interest but also potential barriers. Overall, while digital financial services are well-integrated into users' banking activities, there remains a significant gap in the adoption of green and social-focused banking products.

3.1. Hypothesis testing

Ho1: There is no significant variation between the population value and sample mean value regarding the awareness of customers about sustainable banking services.

Table 3. Awareness of customers about sustainable banking; Results of one-sample t-test

Statements	Test Value = 15					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
I am familiar with sustainable practices in banks	-167.175	199	.000	-11.6300	-11.767	-11.493
Information guides and annual reports as soft copies	-160.378	199	.000	-11.6650	-11.808	-11.522
Green channel counter	-153.874	199	.000	-11.5700	-11.718	-11.422
Opening a bank account through an online	-146.155	199	.000	-11.0500	-11.199	-10.901
Digital wallets	-149.981	199	.000	-11.1000	-11.246	-10.954
Debit and credit cards	-162.208	199	.000	-10.7400	-10.871	-10.609
Net banking/ mobile banking	-159.766	199	.000	-10.6350	-10.766	-10.504
Cash/cheque deposit machine	-164.619	199	.000	-10.6800	-10.808	-10.552
Digital currencies	-154.076	199	.000	-11.3800	-11.526	-11.234
Green mutual fund	-143.869	199	.000	-11.8250	-11.987	-11.663
Green loans	-156.178	199	.000	-11.6700	-11.817	-11.523
Green home loans	-144.222	199	.000	-11.9050	-12.068	-11.742
Offering a waiver on loans	-144.003	199	.000	-11.7100	-11.870	-11.550
Schemes to promote women's/girls' education	-138.262	199	.000	-11.2500	-11.410	-11.090
Schemes exclusively for women entrepreneurs	-147.728	199	.000	-11.1850	-11.334	-11.036

Source: Primary data

The results of the one-sample t-test for customers' awareness level of sustainable banking by commercial banks are shown in Table 3. For all the statements measuring the awareness level of sustainable banking, there is a significant variation between the population value and the sample mean value regarding the awareness of customers about sustainable banking services. For all the listed statements, the p-value (sig.2 tailed) is .000, which is below the threshold of 0.05, indicating a high statistical significance. Moreover, the t-values are strongly negative, and the mean difference across all items is substantially less than the test value of 15, with the confidence intervals not crossing zero. This consistently negative difference suggests that the actual awareness levels are significantly lower than the hypothesized population value. Therefore, we reject the null

hypothesis (H01). This implies that the customers' awareness of sustainable banking services is significantly different from that assumed population mean. This gap can be addressed through targeted awareness campaigns and outreach initiatives.

H_o2: The demographic profile of the respondents does not influence their awareness of sustainable banking.

Table 4. Awareness of customers about sustainable banking across age, education, and occupation; Results of ANOVA

Demographic variables		Sum of Squares	df	Mean Square	F	Sig.
Age	Between Groups	50.502	41	1.232	1.188	.226
	Within Groups	163.853	158	1.037		
	Total	214.355	199			
Educational Qualification	Between Groups	25.716	41	.627	1.106	.324
	Within Groups	89.639	158	.567		
	Total	115.355	199			
Occupation	Between Groups	126.064	41	3.075	1.209	.205
	Within Groups	401.931	158	2.544		
	Total	527.995	199			

Source: Primary data

The results of the ANOVA test in Table 4 show that none of the demographic variables has a statistically significant influence on customers' awareness of sustainability banking services, since the p-values are greater than 0.05. We fail to reject the null hypothesis. Therefore, it can be concluded that all respondents, regardless of age, educational background, or professional profile, are aware of banks' green activities. The use of debit and credit cards, as well as net and mobile banking, is widespread. Thus, the null hypothesis is agreed upon.

Table 5. Awareness of customers about sustainable banking based on gender; Results of an independent t-test

Demographic variable	Levene's Test for Equality of Variances		t-test for Equality of Means						
Gender	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.666	.415	1.489	198	.138	.13167	.08841	-.04267	.30600
Equal variances are not assumed			1.505	194.693	.134	.13167	.08751	-.04093	.30426

Source: Primary data

Table 5 t-test results show that clients' awareness of sustainable banking is not gender- or race-based. The critical values confirm this. Customers of both genders are knowledgeable about green banking. The null hypothesis is, therefore, accepted.

3.2. Validity and reliability test

Cronbach's alpha is a statistic that measures the reliability or internal consistency of a set of items. Here, Cronbach's alpha is measured with an alpha coefficient of.806, the items appear to have a relatively high level of internal consistency. A reliability coefficient of .70 or greater is regarded as "acceptable".

Table 6. Reliability and validity of constructs

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average Variance extracted (AVE)
Awareness	0.870	0.879	0.892	0.360
Usage	0.802	0.814	0.851	0.374

Source: Primary data

Composite reliability is used to evaluate internal consistency in path analysis. The values ranging from 0.6 to 0.7 are "acceptable," and values from 0.7 to 0.9 range from "satisfactory to good." But, the values higher than 0.95 are considered risky and will reduce the validity [28].

The reliability factor of components awareness and usage is observed from Table 6, which says that the composite reliability for awareness is 0.879 and a Cronbach's apha of 0.870. Likewise, the composite reliability for usage is 0.814 and a Cronbach's alpha of 0.802. Hence, it is concluded that all of the items grouped converge entirely to their respective dimensions, and all items are considered for the study.

H_o3: The awareness level of customers does not have a direct effect on the usage of sustainable banking services.

The path analysis was conducted, through which awareness of the usage of sustainable banking services was identified. A thorough multivariate analysis is required to determine the true nature of these correlations, as the link between these components is rarely bivariate. Maximum likelihood estimation and a covariance matrix as input were used to evaluate a structural model that included both latent and manifest variables. This kind of analysis gives a thorough picture of the relationships between the relevant predictor and dependent variables.

Table 7. R-squared (R^2)

	R-square
Usage	0.480

Source: Primary data

R-squared measures how effectively the model's independent variables account for the variability of the dependent variable. The model's independent variables account for 48% of the variation in the dependent variable in this instance, according to an R-squared of 0.480. Typically, R-square values fall between 0 and 1. If the model explains zero, then no variability can be explained. If the model is one, then all of the variability is presented. Thus, the model's R-square of 0.480 shows a moderate explanatory power level.

Table 8. Path coefficient-Mean, STDEV, T Value, P value

	Original sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistic	P values
Awareness->Usage	0.693	0.714	0.066	10.507	0.000

Source: Primary data

The original sample's coefficient or effect size shows how strongly "awareness" and "usage" are related. A value of 0.693 indicates a significant positive correlation, indicating that usage should increase with awareness. This is the coefficient or effect size from the original sample, indicating the strength of the relationship between "awareness" and "usage. The sample mean is the average of the coefficients derived from several bootstrap samples. A value near the initial sample value (0.693 vs. 0.714) suggests that the data is reliable and consistent.

A modest standard deviation suggests that the coefficient is stable across bootstrap samples, while this shows the variability of the coefficient in the bootstrap samples. This represents the variability of the coefficient in the bootstrap samples. A slight standard deviation (0.066) indicates that the coefficient is stable across bootstrap samples. The t-statistic determines if there is a significant difference between the coefficient and zero. The

association is highly significant, as indicated by the extremely high t-statistic of 10.507. The p-value indicates the probability that the observed relationship occurred by chance. A p-value of 0.000 (often reported as < 0.001) indicates strong statistical significance, meaning there is overwhelming evidence to support a relationship between "awareness" and "usage. The data suggests a strong and statistically significant positive relationship between "awareness" and "usage," supported by consistent coefficients, low variability, and a highly significant t-statistic and p-value.

The results of the path analysis with the standardized regression coefficients for awareness and usage are presented in the figure below.

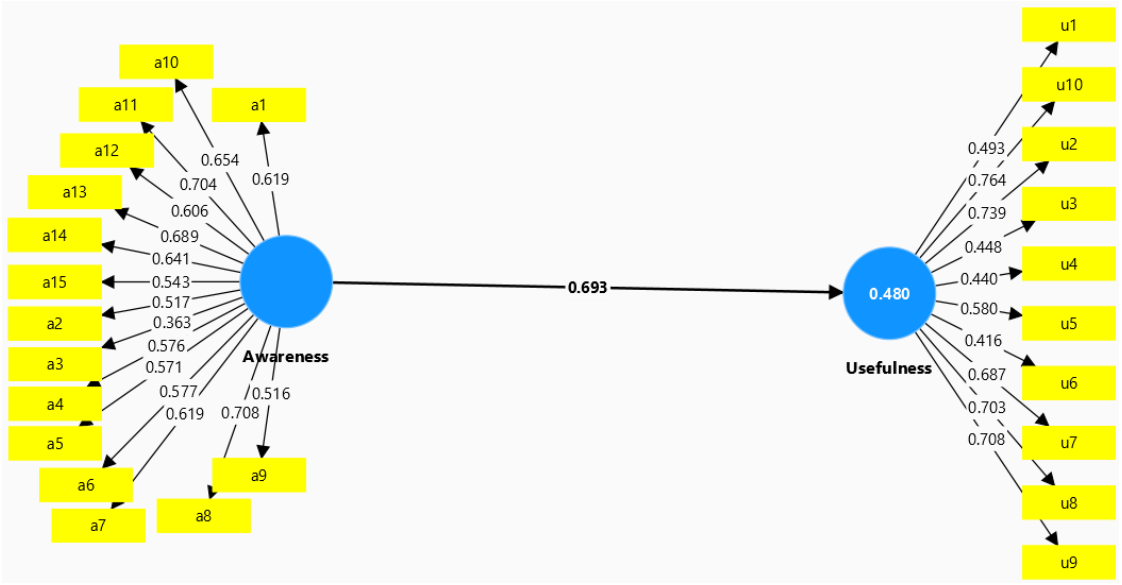

Figure 1. Dependency between awareness and usage of sustainable banking services; Path analysis

The factor loadings, which gauge how strongly each observable variable reflects the latent construct, are shown by the arrows that link indicators to their corresponding latent variables. With a loading of 0.619, indicator a1 represents the awareness construct modestly. Since indicator a12's loading is 0.704, it demonstrates awareness. With a loading of 0.739, the indicator u3 clearly shows usage. With a loading of 0.448, indicator u4 shows a weak reflection of usage. Lower loadings show a weaker association, but higher loadings (around 1) show that the indicator strongly represents the latent variable. The path coefficient (0.693) indicates a strong positive relationship**.** This suggests that as awareness increases, usage also increases significantly. The arrows connecting indicators to their respective latent variables represent the factor loadings**,** which measure how well each observable variable reflects the latent construct. Indicator a1 has a loading of 0.619, which moderately reflects the awareness construct. Indicator a12 has a loading of 0.704, indicating it strongly reflects awareness. Indicator u3 has a loading of 0.739, meaning it strongly reflects usage. Indicator u4 has a loading of 0.448, meaning it weakly reflects usage. Higher loadings (close to 1) indicate that the indicator strongly represents the latent variable, while lower loadings indicate a weaker relationship.

4. Discussion

The findings of this study provide valuable insight into customer awareness and the use of sustainable banking services. The results revealed that customers' awareness level is significantly lower than the expected population mean, indicating a critical knowledge gap ($H_0$1 rejected). However, the demographic factors did not significantly influence the awareness levels ($H_0$2 accepted). Suggesting a uniformly low level of awareness across customer segments. Notably, awareness was found to have a strong, statistically significant positive effect on the usage of sustainable banking services ($H_0$3 rejected), with an R-square value of 0.480 and a path coefficient of 0.693. Moreover, the results align with previous empirical research by Tehseen et al. [29], who demonstrated that latent constructs like awareness can significantly predict behavioral outcomes in financial

decision making, and Najmi and Ahmed [30], who highlighted the importance of channel familiarity in enhancing digital financial service usage.

The one-sample t-test confirmed that customers' awareness is significantly below the assumed average, which indicates that green banking remains a conceptual abstraction for many customers rather than a feasible service [31],[32]. This knowledge gap persists despite banks' visible investment in eco-friendly initiatives, such as paperless transactions, green loans, and energy-efficient infrastructure. According to the diffusion of innovation theory [33], awareness is the first step in the adoption process. When potential adopters are not sufficiently informed, innovators fail to move beyond the early adopters into mainstream adopters. This theory explains why, despite technological readiness, customer adoption of green banking remains limited.

The lack of significant differences in awareness levels across age, gender, and occupation aligns with the studies which emphasized that banks focused more on operational green practices, like green efficient branches, than on customer education outreach [32], [34]. These findings align with Institutional theory, which suggests that organizations may adopt environmental practices for legitimacy or regulatory compliance rather than stakeholder engagement. It implies that organisations that adopt sustainable practices are more responsive to social and institutional pressure. These could be the reasons why sustainable banking services are often promoted internally (within operations) but not effectively outwardly (to customers).

The most critical insight from this study is the strong, statistically significant path relationship between awareness and usage of sustainable banking services ($\beta = 0.693$, $p < 0.001$), which supports the theory of planned behaviour [35]. According to TPB, behaviour is driven by intention, which in turn is influenced by attitudes shaped through awareness and belief systems. Customers who understand the environmental and economic benefits of sustainable banking are more likely to engage in using digital banking, opting for electric vehicle loans, or supporting eco-friendly investments. Similarly, this aligns with the TAM [36], which identifies perceived usefulness as the key determinant of actual usage behaviour. The consistency between awareness and usage also supports empirical evidence from the previous research [37], [38], whose studies showed that awareness and perceived value of services significantly predict usage patterns in digital and green financial contexts.

5. Conclusion

The study states that the awareness of sustainable banking services will lead customers to use them. Most of the respondents were aware of and were using sustainable banking services. However, the study also concluded that more initiatives and exposure by banks to their customers would help increase the use of sustainable services. Customers have a positive attitude towards the actions taken by banks, which bring sustainability and responsibility to banking. Customers have a positive attitude towards banks, which can influence businesses to become more sustainable. The customers are open-minded about sustainable banking services and are willing to adopt them. Many factors affect the customer's sustainability awareness, such as education, age, gender, and occupation. However, the findings also indicate that, despite growing awareness, more robust initiatives are needed to enhance visibility and engagement.

5.1. Implications of the study

Through the analysis, whether the awareness level of bank customers leads to the usage of sustainable banking services or not, this paper aims to provide valuable insights to researchers, policymakers, regulatory authorities, stakeholders, and banking officials to promote sustainable banking. The banks, stakeholders, and policy makers must treat sustainable banking as a strategic imperative, not a peripheral concern.

Banks need to rethink product design, customer engagement, and staff training based on the sustainability initiatives. The banks should go beyond the surface-level corporate social responsibility activities and integrate sustainability principles into everyday banking products, offering lower interest rates for green loans and climate-linked investment options. Banks can take initiative to leverage customer analytics to identify

demographic groups with lower awareness or adoption rates and tailor communication campaigns accordingly. Community outreach programs can be given to the customers in rural, semi-urban, and less digitally connected areas. Banks can provide training about sustainable practices and ESG principles among the staff. Banks should regularly publish their Sustainability report, showcasing the sustainability activities carried out internally and externally to the bank. An eco-friendly strategy can be developed to reduce the carbon footprint and enhance sustainability to attract well-informed customers. Furthermore, the findings may aid technical experts in making more informed decisions about future inventions, market share gains through eco-friendly banking products.

The policymakers must provide the regulatory clarity and economic incentives necessary to guide and accelerate this transformation. They must encourage banks to disclose the percentage of environmentally sustainable investments in their financial disclosures. The regulators can develop and enforce a sustainability reporting framework, reducing ambiguity and ensuring consistency across financial institutions. They can introduce fiscal or regulatory incentives like capital relief, tax benefits, and green funding windows for banks that achieve sustainability performance thresholds, and support environmentally critical sectors. The policymakers can initiate industry and academic collaborations to provide capacity-building programs for banking professionals on environmental risk assessments and green financing mechanisms.

The government and the CSR officials must ensure that environmental responsibility is integrated into both external and internal banking operations. They can align social responsibility efforts with the bank's sustainability agenda by focusing on initiatives that promote financial inclusion, digital literacy, and environmental awareness. They can build partnerships with government bodies, NGOs, and climate experts to design programs that address local environmental and social needs while aligning with the global sustainability framework.

Declaration of competing interest

The authors declare that they have no known financial or non-financial competing interests in any material discussed in this paper.

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Ethical approval statement

This study on "Does awareness lead customers to use sustainable banking services? A study using Path analysis" was conducted as per ethical guidelines and received approval from the Institutional Human Ethics Committee of Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, India, dated 05th January 2023, (Approval No: AUW/IHEC/COM-22-23/XMT-08). All research methodologies adhered to ethical standards, ensuring compliance with confidentiality, data protection, and informed consent protocols.

Informed consent

This study uses questionnaires. All participants have been fully informed that their anonymity is assured, why the research is being undertaken, how their data will be utilized, and if there are any risks associated with their participation.

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