Transition from climate laggards to sustainable consumption: Sustainable Audit a pathway.

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Abstract: The shift from being climate laggards to embracing sustainable consumption presents a significant challenge amid growing environmental issues. This research investigates how Sustainable Audits can serve as a transformative tool for organisations aiming to improve their sustainability efforts. By examining the current practices of climate laggards, those slow to adopt sustainable methods—this study uncovers major obstacles to change. It highlights how Sustainable Audits can encourage a move towards more responsible consumption habits. The study illustrates how Sustainable Audits can offer a thorough framework for assessing environmental impact, enhancing accountability, and driving strategic improvements. The results indicate that adopting Sustainable Audits helps meet regulatory requirements and boosts corporate reputation and consumer confidence. In conclusion, this research enhances our understanding of how structured assessment processes can drive the shift to sustainable consumption, providing valuable insights for policymakers, businesses, and stakeholders dedicated to environmental responsibility.
Keywords: climate laggards, sustainable consumption, sustainable audit, sustainable methods.

I.INTRODUCTION

Unsustainable patterns of production and consumption have been one of the biggest problems in recent years. They pose the greatest threat to human life, and the environment, and the SDG targets as the primary causes of the triple planetary crises of pollution, biodiversity loss, and climate change. The current system of production and consumption increases waste creation and pollution, which strains ecosystems' ability to support life.

Despite making up only 0.01% of all living things by weight, humans are responsible for the extinction of half of all plant species and 83% of wild mammals, according to World Economic Forum research. The rate of extinction today is tens to hundreds of times higher than it was on average through the previous 10 million years.

The urgency of tackling climate change has never been clearer, as the effects of environmental degradation become more apparent worldwide. Even though there is a broad acknowledgement of the necessity for sustainable practices, many organizations still fall behind in their efforts to adopt environmentally friendly behaviours. These climate laggards—entities slow to embrace sustainability—create significant hurdles in reaching our collective climate goals. Transitioning from such laggard behaviour to sustainable consumption is crucial not only for reducing environmental damage but also for building a resilient economy that values long-term ecological health.

Sustainable consumption involves using goods and services that fulfil basic needs while minimizing environmental impact and ensuring resources remain available for future generations. However, the journey toward sustainable consumption is filled with challenges, such as a lack of awareness, inadequate regulatory frameworks, and entrenched corporate practices that favour short-term profits over long-term sustainability. To overcome these obstacles, organizations need to implement comprehensive strategies that encourage a shift in mindset and operational practices.

One effective method for driving this transition is the use of Sustainable Audits. These audits act as systematic assessments of an organization's environmental impact, offering a clear framework for pinpointing inefficiencies, establishing sustainability goals, and monitoring progress over time. By incorporating Sustainable Audits into their operational processes, organizations can improve their accountability and align their practices with broader sustainability objectives.

This research paper seeks to investigate the role of Sustainable Audits as a means for climate laggards to move toward sustainable consumption. By reviewing existing literature, case studies, and empirical data, the study has evaluated the effectiveness of Sustainable Audits in this context.

II.LITERATURE REVIEW

The shift from being climate laggards to embracing sustainable consumption is a complex issue that has gained significant attention in both academic and practical contexts. This literature review brings together key themes and findings from existing research, concentrating on the ideas of climate laggards, sustainable consumption, and the impact of Sustainable Audits as a means of transformation.

"Climate laggards" describe organizations or entities that have been slow to implement sustainable practices, even as the urgency of climate change becomes more pressing. Research by (Delmas and Toffel,2004) indicates that these laggards often encounter substantial obstacles, such as a lack of awareness, limited resources, and resistance to change. Additionally, a study by (Geng et al.,2013) points out that organizational culture and leadership play vital roles in the adoption of sustainable practices. The inertia seen in climate laggards is frequently linked to established business models that favour short-term profits over long-term sustainability.

Sustainable consumption refers to the use of goods and services that fulfil basic needs while reducing environmental harm and ensuring that resources are available for future generations (United Nations, 2015). Research highlights the critical role of sustainable consumption in addressing climate change and fostering social equity. Jackson (2005) argues that sustainable consumption goes beyond simply cutting back on consumption; it necessitates a significant change in consumer behaviour and values. This transformation demands a thorough understanding of the social, economic, and environmental aspects of consumption.

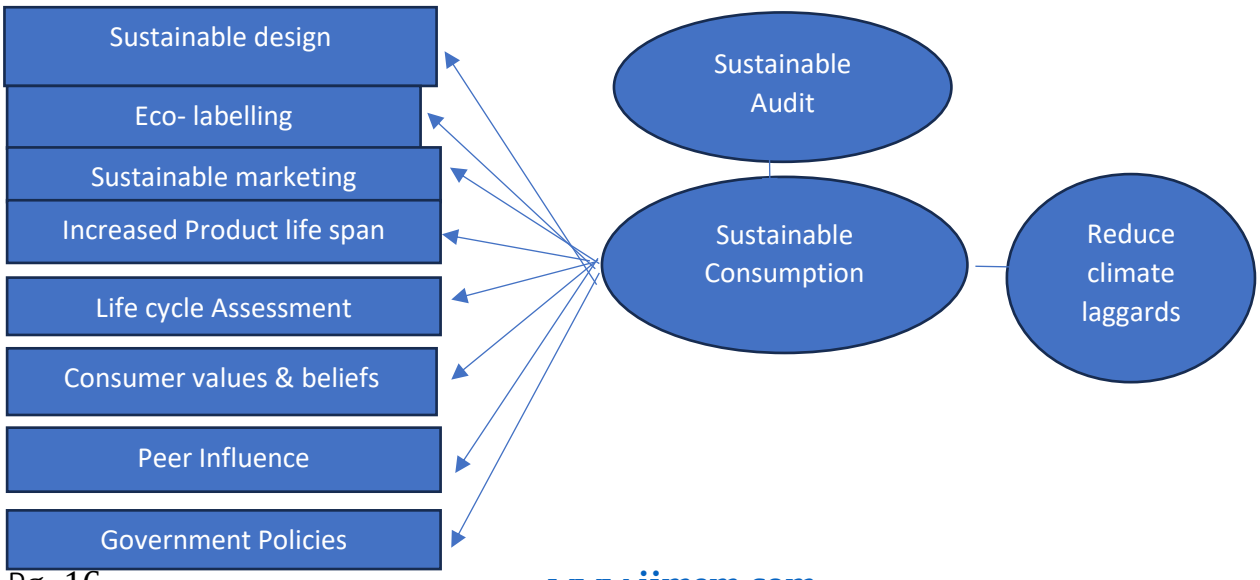
Sustainable Audits have become essential for organizations looking to shift towards sustainable consumption. They offer a structured approach to evaluate an organization's environmental impact, pinpoint inefficiencies, and establish practical sustainability objectives. (Research by Zorio et al.,2013) shows that organizations that adopt Sustainable Audits see better environmental performance and greater stakeholder involvement. Furthermore, a study by (Biondi et al.,2000) indicates that these audits can promote a culture of accountability and transparency, which is crucial for facilitating organizational change.

Several case studies showcase how effective Sustainable Audits can be in helping organizations shift from poor environmental practices to more sustainable ones. For example, a study by(Hsu et al.,2013) focused on a manufacturing company and found that conducting a Sustainable Audit resulted in notable decreases in waste and energy use, which led to cost savings and a better corporate image. Likewise, research by (Testa et al.,2011) emphasizes that Sustainable Audits can drive innovation, prompting companies to create new products and services that support sustainability objectives.

While Sustainable Audits hold great promise, there are still hurdles to overcome for their broader acceptance. (Darnall et al.,2010) emphasize the importance of having standardized methods and metrics to improve the reliability and comparability of audit outcomes. Additionally, incorporating Sustainable Audits into current business practices necessitates a cultural transformation within organizations, as noted (Sroufe,2003). Future studies should aim to establish best practices for the implementation of Sustainable Audits and investigate their lasting effects on organizational behaviour and consumer involvement.

The literature shows that moving from being climate laggards to embracing sustainable consumption is a complicated journey shaped by multiple factors, such as organizational culture, consumer behaviour, and the effectiveness of assessment tools like Sustainable Audits. This review synthesizes existing research to highlight the vital role that Sustainable Audits can have in supporting this transition, while also pinpointing areas that need further exploration and development. As organizations become more aware of the significance of sustainability, the insights from this literature can help guide strategies aimed at promoting meaningful changes in consumption habits and environmental practices.

Figure 1. Conceptual Framework



III. METHODOLOGY

Figure 1 provides a comprehensive view of the various dimensions of the broader Sustainable consumption concept. This serves as a guide for organisations looking to navigate the complexities of Sustainable Consumption (SC) by addressing Sustainable design (SD), Eco-labelling (EL), Sustainable marketing (SM), Increased Product life span (PLS), Life cycle Assessment (LA), consumer values and beliefs (CV), peer influence (PI), and Government policies (GP). Regarding association variables, it can be hypothesised that SC positively impacts the reduction in climate laggards (CL), which is measured through the sustainable audit. SC, as measured by the sustainable audit (SA), drives play a role in decreasing climate laggards (CL).

This research uses structural equation modelling (SEM) to estimate the relationship between Sustainable Audit (SA) and Climate laggards(CL). Each variable is constructed using relevant indicators, as shown in Table 1. Regarding the SC measure, UNEP. (2015) proposed eight dimensions of SC, and climate laggards are proposed to be measured using sustainable audit.

Because the research investigates the relationship between SA and climate laggards, this research conducted a two-round Delphi process to confirm the validity of the indicators that will be included in this research. The panelists who participated in the Delphi process comprised eight people from several companies, professionals, and specialities related to SC. They were asked to fill out a 9-point scale questionnaire with a value of 1 indicating strongly disagreeing with each indicator as part of the respective variable. A value of 9 is interpreted as strongly agreeing that the indicator is part of the respective variable. Following Gnatzy et al. (2011), the interquartile interval (IQR) with a threshold of ≤ 2 was used as the consensus criterion. Indicators with an IQR value >2 are considered to have not reached a consensus by the panelists. The Delphi process was carried out using two rounds. In the first round, only six indicators had a value below eight (agree), the lowest value in the first round was 6 (somewhat agree), and the average value was 7.01. Thus, on average, the panelists agreed with all indicators. The average score increased to 7.08 in the second round. Even though the panelists, on average, agreed on the indicators in the first round, five indicators did not reach consensus (i.e., divergence), meaning that the panelists did not agree with the suitability of these indicators with their respective variables.

However, the number of variables that did not reach consensus was reduced to three in the second round. Thus, overall, all indicators have a value showing the panelists' approval for these indicators to be included. However, three indicators had scores indicating agreement but still needed to reach a consensus after the two-round Delphi process. However, variables with a score indicating agreement do not reach a consensus and are retained because, on average, all panelists agree with all indicators. In addition, the next step of SEM estimation will confirm the significance of the indicator. There are several steps in estimating a structural model using structural equation models (Hair et al., 2019), namely (i) defining individual constructs, (ii) developing overall measurements (path diagrams), (iii) determining the structural model, (iv) designing research to produce empirical results, (v) assess the validity of the measurement model and (vi) assess the validity of the structural model. Defining individual constructs has been applied in Table 1, which describes the dimensions and indicators that build each variable. Figure 2 shows the overall measurement path diagram and the structural model specifications.

IV.DATA AND ANALYSIS

This research used a sample of 427 companies in India. Data was collected using purposive random sampling with a questionnaire via Google Forms sent via direct interviews, LinkedIn, and email, consisting of corporate employees in urban cities in India. This research distributed 500 questionnaires, but only 427 respondents completed the questionnaires with complete and valid answers.

The survey covered Mumbai (21 samples from 4 cities), Kolkata (18 samples from 2 cities), Bengaluru (186 samples from 5 cities), Chennai (118 samples from 9 cities), Jaipur (43 samples from 5 cities) and Ahmedabad (41 samples from 7 cities). The sample meets the minimum sample, as suggested by Hair et al. (2019). Based on this, the minimum sample size is 5-6 times the number of indicators. With a total of 68 indicators, the minimum sample requirement is 340–408. Thus, the sample size of 427 meets the minimum sample requirements.

This study selected respondents based on the following criteria: (i) respondents are employees who work in corporate sectors (ii) have work experience of at least two years, and (iii) respondents who have practical exposure in sustainability. Before the interview, the surveyor explained the research objectives to the respondent and asked several screening questions to suit the respondent's criteria. Respondents who fit the sample criteria were given guidance on

filling out the questionnaire via direct interviews, LinkedIn, or email. The validity of the measurement model and structural validity are shown in Table 1. For example, the measurement model and all structural model estimates are valid if the model has a chi-square p-value <0.10.

Table 1 Evaluating goodness-of-fit criteria.

Criteria	Cut-off value
Chi-square	p-value of chi-square <0.100
Chi-square /df	<5
RMSEA	<0.08
GFI	<0.90
AGFI	<0.90
NFI	<0.90
CFI	<0.90
PGFI	Reliability > 0.70, variance extracted > 0.50

Table 2: Descriptive statistic.

Variable	Indicators	Mean	Median	Std. deviation
Sustainable Audit	SD	4.645	5.000	1.082
	EL	4.585	4.667	1.000
	SM	4.651	4.750	1.018
	PLS	4.420	4.500	1.068
	LA	4.630	5.000	1.110
	CV	4.572	4.667	0.938
	PI	4.501	5.000	1.003
	GP	4.630	5.000	1.110

Study participants generally have a favourable view of the variables affecting sustainable Audit, as evidenced by an average score. The result shows that, on average, respondents view the indicators have positively contributing to overall efforts to move towards sustainable consumption through sustainable audit. The median scores align with the mean value, thus indicating a balanced distribution of responses around the principal value. This result also shows that most participants have quite positive sentiments regarding sustainable consumption, thereby contributing to the overall consistency of perception. However, standard deviations indicate considerable response variability. This variability suggests that despite the overall positive trend, participants had mixed opinions regarding the impact of variables in the context of sustainable consumption. Some respondents may have a more optimistic view, while others may be more cautious or skeptical, contributing to the spread of opinion.

Table 3: Variables measurement and definition

Variable	Dimensions	Definition	Indicators
Sustainable Audit	Sustainable design (KES-SDM,2023)	SD is Designing goods/services to reduce the negative impact on the environmental ecosystem.	• Conscious design • Green design • Reduce carbon footprint
	Eco-labelling (Valeska V, 2024)	EL is the official product marking indicating compliance with the eco-friendly approach.	• Certification system • Green symbol
	Sustainable marketing (Aqsa Khalid, 2023)	SM is the business policy that promotes products/services that are environmentally and socially friendly.	• Society Impact • Sustainable product sale • Role model to other companies
	Increased product life span (Douglas Thomas, 2023)	PLS refers to expanding the product's ability to last long.	• Product longevity

			• Reduced environmental impact • Reusing/ refurbishing
	Life cycle Assessment	LCA measures the environmental impact the product has throughout its life cycle	• Effective use of resource • Waste/emissions management •
	Consumer values & beliefs	CVB is the consumers' perception and convictions in buying behaviour	• Perceived behavioural control • Customer involvement
	Peer influence	PI is the impact friends, family and other individuals have on the decision relating to sustainable consumption.	• Social influence • Collective campaigning • Positive motivation • Negative motivation
	Government policies	GP refers to the policies and programmes that encourage and govern sustainability.	• National Environmental policy • Social responsibility

V. RESULT AND DISCUSSION

Table 4: reliability and validity test.

Variable	Dimensions	Cronbach Alpha	Loading factor	Construct reliability (CR)	Average variance extracted (AVE)	Conclusion
Criteria		>0.7	>0.4	>0.7	>0.5	
Sustainable Audit						Reliable
	SD	0.767	0.83	0.87	0.68	Valid
	EL	0.752	0.82	0.86	0.67	Valid
	SM	0.827	0.77	0.88	0.59	Valid
	PLS	0.788	0.78	0.86	0.61	Valid
	LCA	0.765	0.82	0.87	0.68	Valid
	CVB	0.766	0.82	0.86	0.68	Valid
	PI	0.874	0.75	0.90	0.57	Valid
	GP	0.865	0.77	0.90	0.60	Valid

Table 4 provides the results of the validity and reliability tests for the variable and dimensions related to sustainable audit. Cronbach Alpha measures the internal consistency of items in a construct. Values above 0.7 indicate good reliability, indicating consistent items in each dimension (SD, EL, SM,PLS,LCA, CVB,PI,GP). Factor loadings represent the strength of the relationship between each item and its underlying dimensions. Values above 0.4 indicate that each item significantly contributes to its respective dimensions. Construct reliability assesses the consistency of the measurement model. A CR value above 0.7 indicates good reliability, indicating that the construct (sustainable consumption) is measured consistently. AVE measures the variance a construct captures concerning measurement error. Values above 0.5 indicate satisfactory convergent validity, indicating that the construct adequately measures

what it is intended to measure. This research concludes that all dimensions of sustainable consumption are reliable and valid based on the specified criteria. These results show that the measurement instruments used in this research are appropriate and provide meaningful insight into the variables studied.

Table 5 Path Coefficient

Variable	Original Sample(O)	Sample Mean(M)	T statistics (O/STDEV)	P values
SD → SA	-0.026	-0.026	0.775	0.439
EL → SA	0.044	0.044	1.004	0.316
SM → SA	-0.039	-0.039	0.772	0.440
PLS → SA	0.28	0.282	6.506	0.000*
LCA → SA	0.028	0.027	0.642	0.521
CVB → SA	0.129	0.128	3.47	0.001*
PI → SA	0.337	0.332	9.092	0.000*
GP → SA	0.019	0.022	0.443	0.658

Table 5 presented the path coefficient of 0.28 for the Product life span (PLS) and sustainable audit with the T statistics value of 6.506 and a statistically significant P value, which can be interpreted in the context of the sustainable consumption. This positive path coefficient of 0.28 indicates that through the life span of the product the firm can consistently maintain the sustainable practises by the organisation. P value (0.001) shows the positive connection between the PLS and SA.

The Substantial path coefficient of 0.337 indicates a robust positive relationship between peer influence and sustainable audit. The high T statistics value of 9

VI.CONCLUSION

The journey towards achieving sustainability by transforming from climate laggards to sustainable consumption through Sustainable Audit reports provides learning into the pathway towards sustainability. It has been established that sustainable audit methods enable individuals and organizations alike to control and improve their consumption and in the process, make a more extensive contribution to the environment. Residents and stakeholders of the precinct are urged in the paper to find ways of implementing sustainable practices in their lives and the usage of audits as a tool to achieve that is emphasized. Understanding the many dimensions for sustainable audit illustrates the need to incorporate more sustainable approaches in design practices. It is also stated that through the increasing use of eco-design strategies such as the use of greener materials, energy efficient techniques and reduction of wastes, sustainable consumption patterns can be achieved. The paper contributes to the body of knowledge on sustainable designs as applicable in sectors and industries and persuades stakeholders to adopt a sustainable approach before making any decisions.

The multifactorial framework consisting of sustainable design, eco-labelling, life cycle assessment, government policies, customer values/beliefs, sustainable marketing, and peer influence as dimensions for sustainable consumption provides a lasting impression of the multidimensional approach which is imperative in achieving sustainability goals. The paper, through analysis of the interactions among the said dimensions, addresses the consuming issues of sustainable consumption and emphasizes the factors which can be levers for change.

Policies instructions on sustainable design, eco-labelling, life cycle assessment, government policy and customer values are some of the key determinants of consumption patterns and the environment. With the incorporation of these dimensions, stakeholders can achieve or aspire to fulfil the growing need for environmentally friendly, socially responsible and economically sustainable products and practices.

This paper emphasises the necessity of coordinated actions between different stakeholders: the policymakers, the businesses, the consumers and all other relevant parties towards improving sustainable consumption behaviour. Reducing waste and trash accumulation requires the alignment of designs with standards for eco-labelling, conducting appropriate life cycle assessments, establishing enabling government policies and creating supportive cultures and values. Together, integrating these aspects and seeing them as core features of sustainable consumption will enable societies to make a significant move towards a more prosperous and sustainable direction. These efforts and others are supportive of the Sustainable Audit approach in the quest to advance responsible consumption patterns.

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