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# IBA JOURNAL OF MANAGEMENT & LEADERSHIP

**Theme:**

**Sustainable Marketing: A Conscious Consumerism and  
Public Policy Perspective**

*Guest Editor*

**Prof. Narendra Babu B V,**

*Senior Assistant Professor, IBA Bangalore*

**Dr. Nagendra Hegde,**

*Senior Assistant Professor, IBA Bangalore.*



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## Guest Editor's Note

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We are very pleased to bring out a special edition of 3D journal centred around our 15<sup>th</sup> International conference “MARKCON 2024” held at Indus Business Academy (IBA) , Bangalore campus from January 4-6, 2024. MARKCON 2024 was conceived with the topic “**Sustainable marketing: A Conscious consumerism and Public policy Perspective**”. It intended to bring together academic scholars and practitioners in the area of business management from around the world to discuss contemporary issues that offered to promote and challenge the conventional business ecosystems towards attaining sustainable development goals. The main agenda of this conference was to advance the understanding of sustainable marketing practices from the perspectives of conscious consumerism and public policy perspective.

Research articles that were presented at this conference belonged to various topics ranging from issues related to individual consumers to issues in Public Policy. This special edition is a compendium of few selected articles that were presented at MARKCON 2024. There are six different articles in this edition, dealing with unique topics that include, Micro financing & Self Help Groups, Electronic Vehicles & Consumer Behaviour, Supply Chain Management, Sustainable and Responsible marketing strategies, Sustainability & Fast Fashion and Green Finance.

These articles explore different dimensions of sustainable marketing, conscious consumerism and public policy. This special edition of 3D is also a testimonial for the research

deliberations that took place during MARKCON 2024. This edition of the journal highlights some of the topics that were presented during the conference and thus enable the readers to get the broader understanding and objective of the conference theme.

.We sincerely believe that, MARKCON 2024 special edition would serve the objective of the conference by promoting the ideas of sustainable marketing, conscious consumerism and public policy. We strongly feel that it will benefit the readers in terms of understanding sustainable marketing and the challenges and opportunities associated with it.

**Prof. Narendra Babu**

**Dr. Nagendra Hegde**

## Contributors

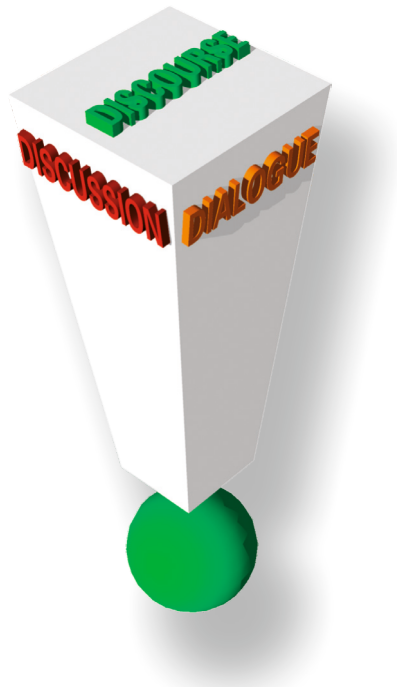
1. **Ms. Sravana Ramesh T**, Student, IBA Bangalore
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8. **Mr. Preetham S**, PG Students , Ramaiah Institute of Management, Bangalore
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10. **Ms. Sheetal Kumari**, PG Students , Ramaiah Institute of Management, Bangalore
11. **Ms. Sakshi Kathane**, Student, IBA Bangalore
12. **Dr. S Ramesh**, Senior Finance Faculty, IBA Bangalore

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## **3D... IBA Journal of Management & Leadership**



# Microfinancing and Self-Help Women Groups in Kerala during Covid-19 : A Qualitative Exploration of Loan Repayment, Challenges and Empowerment

**Ms.Sravana Ramesh T**

Student, IBA Bangalore, Email Id: [fpb2224.006.sravana@iba.ac.in](mailto:fpb2224.006.sravana@iba.ac.in);

**Prof. Narendra Babu**

Faculty in Marketing, IBA Bangalore, Email Id: [narendra.bbv@iba.ac.in](mailto:narendra.bbv@iba.ac.in)

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## **Abstract**

Existing literature on micro financing primarily focuses on its positive outcomes such as poverty alleviation, reduced financial dependency, and women's empowerment within the context of Self-Help Groups (SHGs). However, the existing research has been limited in scope, lacking first-hand accounts from both microfinance service providers and women beneficiaries. The reliance on secondary data and quantitative methodologies has further constrained the depth of understanding. To address this gap, our study employs a telephonic interview approach to gather qualitative insights into the experiences, sentiments, and challenges faced by MFI employees and SHG members during the COVID-19 pandemic.

The research objectives include examining loan schemes and repayment behaviour during COVID-19, understanding challenges and opportunities for service providers and beneficiaries, and exploring the relationship between microfinance and women's empowerment. Employing a phenomenological approach, the study involves 10 microfinance bank employees and 15 Women Self-Help Group (SHG) members from Kerala. Semi-structured telephonic interviews are conducted, covering aspects such as loan disbursement, repayment, operational challenges, and the impact on women's empowerment. Thematic analysis is applied to derive qualitative insights from the interviews, conducted in Malayalam and translated manually.

Thematic analysis of the telephonic interviews reveals the nuanced impact of the COVID-19 pandemic on SHG members and microfinance institutions in Kerala. Approximately 50% of Respondents experienced a significant reduction in their repayment capacity, highlighting the severe financial strain induced by the pandemic. Despite challenges, instances of successful loan repayments indicate resilience amid economic uncertainties.

Financial difficulties during the pandemic led to diverse coping strategies, including savings, microloans, and support from Kudumbashree. Job changes and income loss emerged as significant challenges, emphasizing the vulnerability of livelihoods. Entrepreneurs faced financial challenges, highlighting the need for targeted support for business sustainability.

The majority of Respondents received microloans during the pandemic, with variations in interest rates, loan amounts, and purposes. Government initiatives and support from Kudumbashree played a significant role, but disparities in distribution raised questions about equity. Challenges in accessing microloans due to perceived complexities were identified, emphasizing the need for improved accessibility.

Moratoriums on loans during the COVID-19 period provided temporary relief but faced challenges in implementation, communication, and potential subsidy reductions. Positive responses indicated the benefits of moratoriums, allowing SHG members to stabilize their situations and focus on income generation. However, limitations, such as short durations, were noted.

The study underscores the multifaceted impact of the COVID-19 pandemic on SHG members, influencing repayment behaviours, livelihoods, and the sustainability of microfinancing initiatives. While microloans provided relief, questions about long-term sustainability and accessibility arise. Moratoriums, though offering temporary relief, require improvements in implementation and communication. Addressing these issues is crucial for shaping effective microfinance strategies and fostering women's empowerment in the post-pandemic era.

**Keywords:** Financial Relief, Kudumbashree, Telephonic Interviews, Women's Empowerment, Loan Repayment, microfinancing schemes, financial inclusion, Moratoriums, Challenges and Opportunities, Covid-19, Kerala

## 1. Background of the study

The emergence of Self-Help Groups (SHGs) as a transformative force in empowering economically marginalized women has its roots in the pioneering efforts of the Grameen Bank in Bangladesh, founded by economist Prof. Mohammed Yunus in 1975. In India, the evolution of SHGs gained momentum in 1992 when the National Bank for Agriculture and Rural Development (NABARD) introduced a scheme inspired by the Grameen Bank model to organize hard-core poor individuals, particularly women, into SHGs and connect them with banks (Mathew, 2018). This initiative aimed at enlarging the flow of credit to empower the economically vulnerable, aligning with the global recognition of SHGs for their role in addressing livelihood challenges,

especially during pandemics (Sharma et al., 2021).

A noteworthy example of the impactful implementation of SHGs is the Kudumbashree project initiated in Kerala in 1998. This female-led community organization, focusing on Neighbourhood Teams (NHGs), has been instrumental in empowering women by fostering collective action for their rights and economic upliftment (Venugopalan, 2014). The success of SHGs in contributing to women's economic independence is evident in their substantial role in credit disbursement procedures and economic planning, ultimately leading to women's development and empowerment (Agrawal, 2020)

Microfinance plays a critical role in the growth of self-help groups, particularly in empowering women's groups become financially independent and provide for the welfare of their families. Self-help groups come in a variety of shapes and sizes depending on the local population's financial requirements and area of expertise. Kudumbasree, Sree Narayana Micro Finance, Janasree, and other self-help groups play a significant role in empowering women in the state of Kerala. (Akhildev, P., & Prasad, R, 2023)

This financial inclusion is a test run for giving our country's unemployed citizens more power. Due to their low income, those who are not eligible for standard banking services can obtain micro-loans from these microfinancing firms with minimal paperwork and a short repayment term. This will help those with lesser income can obtain additional income for their daily needs and contribute to ending poverty. A group of 10 to 20 people with lower income apply for this financial aid together. These groups are now commonly referred to as self-help groups (SHGs) (Akhildev, P., & Prasad, R, 2023)

The government of India, recognizing the potential of SHGs, has actively supported these groups through microfinance schemes to alleviate poverty in rural areas (Kumar, 2020). The financial inclusion facilitated by SHGs acts

as a potent instrument in combating poverty by providing access to credit and savings opportunities for the underprivileged (Raihanath & Pavithran, 2019). SHGs have played a pivotal role in the economic and social development of poor women in rural India, offering them opportunities for work, income generation, and community engagement (Sharma et al., 2021).

The impact of SHGs extends beyond economic empowerment. These groups have been influential in creating women entrepreneurs at the village level, fostering leadership skills among rural women, and promoting community development programs (Dhakal & Nepal, 2017; Kalu & Attamah, 2021). The emphasis on thrift and saving within SHGs has not only provided financial independence but has also contributed to the development of micro-enterprises in rural areas (Agrawal, 2020). This multifaceted approach to empowerment is reflected in the significant role played by SHGs in poverty alleviation, women's empowerment, and the realization of women's identities, power, and potential (Sharma et al., 2021).

In addition to financial inclusion, SHGs place a strong emphasis on skill development and capacity building among their members. Through training programs and workshops, women gain valuable skills in various fields such as agriculture, handicrafts, food processing, and tailoring, leading to increased incomes and enhanced self-reliance. The increased access to financial services through SHG linkages with formal banking institutions and microfinance organizations has been a key factor in empowering women to manage their finances effectively and invest in income-generating activities. Additionally, SHGs facilitate exposure to decision-making processes and leadership opportunities, contributing to increased representation of women in local governance and the formulation of gender-sensitive policies (Gayathry, 2023).

The COVID-19 pandemic has undeniably

presented formidable challenges to the microfinance sector, particularly in Kerala, where a substantial number of microfinance institutions cater to the financial needs of low-income individuals and small businesses. The widespread economic disarray caused by the pandemic has significantly affected the primary clients of microfinance institutions, leading to business closures, loss of income, and increased difficulty in loan repayments. The confluence of these challenges has strained the financial health of microfinance institutions, exacerbating their ability to provide essential financial services during these trying times.

The pandemic-induced shifts in priorities among transnational benefactors and investors have resulted in reduced financial backing for microfinance institutions. This diminished support has, in turn, hampered the institutions' capacity to continue offering loans and financial services to their clientele. The resultant increase in interest rates on microfinance loans, intended to counter the heightened risk of defaults, has further hindered the accessibility of affordable credit for low-income individuals and small businesses, compounding the economic impact of the pandemic on these vulnerable groups. Despite these challenges, micro-finance institutions in Kerala have exhibited resilience by adapting to the circumstances. The adoption of new technologies, such as mobile banking services and online loan operations, reflects an innovative response to the limitations imposed by social distancing measures and lockdowns. Some institutions have implemented pragmatic measures like placing moratoriums on loan disbursements or extending loan terms to alleviate the financial burden on their clients, demonstrating a commitment to supporting their community during these challenging times (Gayathry, 2023).

In light of these observations, this research aims to provide valuable insights into the nuance challenges and opportunities that have emerged in the microfinance sector in Kerala during the COVID-19 pandemic.

## 2. Literature Review

The pandemic significantly impacted Kerala's economy, particularly affecting sectors like MFIs, SHGs. Literature acknowledges the challenges faced by SHGs, including loan defaults due to business disruptions (Malik, 2020) and operational difficulties resulting from lockdown restrictions (Arunachalam & Crentsil, 2021). However, studies like those by Roy and Joseph (2020) and Zachariah et al. (2021) highlight the remarkable resilience of SHGs in Kerala. Further more, research by Jayanarayanan et al. (2022) reveals how SHGs in Kerala played a crucial role in mitigating the pandemic's impact by providing essential supplies, financial assistance, and emotional support to their members and communities. Sharma. R, Mishra.S, Raj.S (2021) sayingthat after joining an SHG, family income, expenses, and savings mean scores rise significantly, demonstrating the economic empowerment of women SHG members through the effective use of microfinance. Arunachalam & Crentsil (2021) highlight the resilience of rural SHGs compared to urban counterparts during the pandemic. Studies by Raj and Padmanabhan (2021) and George (2022) specifically analyze the positive impact of government interventions on SHGs in Kerala, highlighting their timely support and crucial role in facilitating post-pandemic recovery.

Studies by Mathew and Joseph (2021) and Nair and Krishnan (2022) provide evidence of this resilience in Kerala, attributing it to factors like strong community networks, agricultural activities that continued despite lockdowns, and government support programs specifically targeted towards rural areas.

These studies also highlight the adaptability of rural SHGs, diversifying their activities to include production of essential goods and providing agricultural support to their members.

Financial inclusion, empowering individuals with access to essential financial services, stands as a corner stone for poverty reduction

and economic empowerment. SHGs, women-led collectives, play a unique role in achieving this by providing microfinance services to marginalized communities without collateral, leveraging social capital and trust (Maclean, 2010). This empowers women and fosters financial inclusion, leading to increased income and economic well-being (Murshid 2020)., Studies from Kerala by Padam and Paul (2014) further emphasize the positive impact of SHGs on women's empowerment, highlighting their increased decision-making power and participation in community activities.

(Swain ranjula, 2006) demonstrates a significant influence on SHG (Self Help Group) households in terms of control, management skills, self-assurance, behavior shifts, and decision-making. The SHG households demonstrated a greater awareness of and involvement in local politics in addition to social empowerment. Miniature money gave them the capacity to carry on with the existing monetary security. Nadeera-ranabahu, Farzanaaman Tanima, 2011) saying that Women's agencies' ability to access and utilize loans and engage in entrepreneurial activities is shaped by structures at the individual, household, institutional, and community levels, resulting in economic empowerment.

(Dubey, P., & Sirohi, G. (2021). According to the findings, national income only affects MFIs' loan penetration efficiency, while interest rates and inflation impact every MFI performance criterion. Additionally, the moratorium was found to have a negative impact on MFI loan penetration while significantly assisting borrowers. Lastly, it is demonstrated that MFIs remained resistant to COVID-19 cases, with the exception of cases involving fewer borrowers.

### 3. Research Gap

The extant literature predominantly emphasizes the impact of microfinancing institutions on women's empowerment and

financial inclusion, particularly within the context of Self-Help Groups (SHGs). However, these studies have been somewhat limited in scope, often providing a general overview without delving into the perspectives of both microfinance institutions and the women beneficiaries. Moreover, a significant portion of the existing research relies heavily on secondary data and quantitative methodologies.

While acknowledging the positive outcomes of microfinancing, such as poverty alleviation, reduced financial dependency, women's empowerment, entrepreneurial development, and gender equality, it becomes evident that a critical research gap exists. Prior studies lack the firsthand accounts of individuals directly involved in the microfinance process—both the service providers and the women within SHGs. The absence of qualitative insights from telephonic interviews with these stakeholders has left a void in understanding their experiences, sentiments, and challenges.

To address this research gap, the current study employs a telephonic interview approach to gather individual responses from both microfinance service providers and women members of SHGs. By allowing these key stakeholders to narrate their personal experiences, feelings, and perspectives, this research aims to offer a more nuanced understanding of the impact of microfinancing. The data collected will be analyzed through thematic analysis, providing a qualitative dimension that goes beyond the quantitative metrics commonly found in earlier studies.

In particular, this study zooms in on the repayment status of microloans disbursed to women SHGs during the challenging period of the COVID-19 pandemic. By exploring the effects on both the service providers and recipients, the research strives to present a comprehensive and balanced assessment of the dynamics at play during this critical time concerning the “Kudumbhasree” units in Kerala.

## 4. Theoretical discussion

To enhance the capabilities of self-help groups, microfinancing has been very impactful (Yunus, 1976) Muhammad Yunus, the founder of the Grameen Bank in Bangladesh, introduced microfinancing as a tool for poverty alleviation and empowerment. Yunus's model is predicated on the belief that access to financial resources, even in small amounts, can empower the poorest individuals particularly women—to make significant strides in economic self-sufficiency (Morduch, J., & Haley, B. (2002). Microfinancing involves providing loans, savings, and other financial services to individuals who lack access to traditional banking services (Banerjee, A. V., Duflo, E., Glennerster, R., & Kinnan, C. (2015). Yunus's theory underscores the potential of microfinancing to influence repayment behavior positively by fostering a sense of ownership and responsibility among borrowers. The model provides a framework for understanding how microfinance institutions (MFIs) can innovate to meet the needs of their clients, especially during crises like COVID-19. The model provides a framework for understanding how microfinance institutions (MFIs) can innovate to meet the needs of their clients, especially during crises like COVID-19.

Another concept that provides enough direction towards empowering the underprivileged is that of “Fortune at the bottom of the pyramid” (Prahalad, C.K., 2004). The Bottom of the Pyramid theory, popularized by C. K. Prahalad, posits that businesses can drive sustainable growth and innovation by targeting the vast but often overlooked market of the world's poorest people. This approach suggests that creating products and services for the Bop market not only addresses poverty but also represents a viable business strategy (Prahalad, C.K., 2004). The Bop framework is instrumental in identifying the unique challenges and opportunities faced by microfinance services in reaching and serving the poorest segments in Kerala, particularly balance economic

viability with social responsibility, especially in addressing the challenges posed by COVID-19. By applying the TBL framework, the research can explore how microfinance initiatives contribute not only to the economic empowerment of women but also to broader social and environmental benefits.

## 5. Methodology

### 5.1 Objectives of the study

- To Examine the loan schemes, and repayment behaviour during covid 19
- To understand Challenges and opportunities for both service providers and beneficiaries during covid 19. To Explore the Relationship Between Microfinance and Women's Empowerment

### 5.2 Research Design:

The study adopts qualitative research explore the lived experiences and perceptions of both microfinance bank employees and Women Self-Help Group (SHG) members in Kerala regarding microloan schemes, repayment behaviour, challenges, and opportunities during the COVID-19 pandemic

### 5.3 Participants:

- a. Microfinance Bank Employees (Service Providers): 10 employees from various microfinance institutions in Kerala were purposively selected based on their roles in loan disbursement and management.
- b. **Women Self-Help Group (SHG) Members (Beneficiaries): 15 women** actively involved in SHGs and recipients of microloans from cooperative banks during the COVID-19 pandemic in Kerala.

## 6. Data Collection:

- a. Semi-Structured Telephonic Interviews:
  - I. Bank Employees: Conducted interviews with bank employees using a semi-structured questionnaire covering loan disbursement, repayment, operational

challenges, and the impact on women's empowerment.

- ii. SHG Members: Conducted interviews with SHG members using a semi-structured questionnaire addressing financial difficulties, microloan experiences, and the perceived impact of microfinance on family dynamics and women empowerment. of microfinance on family dynamics and women empowerment.

## 7. Data Analysis:

Thematic analysis will be employed to identify themes, and subthemes within the responses from both bank employees and SHG members. The interviews in Malayalam translated in in to Malayalam manually. Transcripts will be coded, and themes will be derived from the interview data manually by the researcher.

### 7.1 Discussion on data analysis

Thematic analysis was employed for data analysis, beginning with an iterative coding process. The analysis involved manually forming themes and subthemes and categorised each response under various themes and subthemes. The recorded interviews served as the primary data source for this analytical phase.

The thematic analysis of responses related to repayment status revealed a stark economic impact on SHG members during the COVID-19 period. Approximately 50% of Respondents reported a significant reduction in their repayment capacity, underlining the severe financial strain induced by the pandemic. Additionally, a notable proportion of clients struggled to repay loans, indicating widespread challenges in meeting financial commitments.

While challenges were prevalent, some Respondents noted a degree of normalcy in loan repayments. Instances were mentioned where individuals successfully repaid loans, suggesting resilience amid the economic uncertainties caused by the pandemic.

Concerns were raised about individuals

resistant to loan repayment, attributing it to the lingering effects of COVID-19. Multiple Respondents highlighted a significant number of clients failing to repay loans, suggesting a potential increase in the loan default rate during the pandemic.

The analysis of responses under this theme indicated a widespread decline in income, with clients facing challenges in loan repayment due to income disruptions. The government's support and loans provided temporary relief but were insufficient to counteract the overall economic downturn.

The thematic analysis of financial difficulties during the pandemic revealed various coping strategies employed by SHG members. Savings, access to microloans, and support from Kudumbashree played crucial roles in mitigating financial challenges.

Job changes and loss of income emerged as significant challenges faced by SHG members. The responses highlighted the vulnerability of livelihoods during the pandemic, with job transitions and income loss impacting financial stability.

The impact on businesses, both small and medium-sized enterprises, was evident. Entrepreneurs faced financial challenges due to disruptions caused by the pandemic, emphasizing the need for targeted support for business sustainability.

Individuals demonstrated adaptive coping strategies, such as borrowing money, exploring alternative income sources, and adjusting financial habits. These strategies reflected the resilience and resourcefulness of SHG members in navigating economic hardships.

Some Respondents compared their financial struggles to others, indicating a sense of relative resilience and optimism. Personal savings were emphasized as a critical factor in overcoming financial difficulties.

The majority of Respondents received microloans during the pandemic, indicating a collective effort from various sources,

including cooperative banks, government initiatives, and SHG loans. However, some individuals did not access microloans due to alternative financial resources or challenges in the application process.

Responses revealed variations in interest rates, loan amounts, and purposes for which microloans were utilized. Understanding these aspects is crucial for evaluating the terms and conditions of financial support.

Government initiatives, such as the Corona loan and subsidies, along with support from Kudumbashree, played a significant role in providing financial relief. However, disparities in the amount received suggested the need for more equitable distribution. While microloans were acknowledged as relief, questions were raised about their sustainability and adequacy for sustaining families in the long run. This emphasizes the importance of evaluating the long-term impact of micro-financing initiatives.

Some Respondents faced challenges in accessing microloans due to perceived complex and time-consuming processes. Addressing these barriers is essential for enhancing the accessibility of financial support.

The majority of Respondents reported the availability of moratoriums on their loans during the COVID-19 period. This reflects an understanding by microfinance banks of the financial challenges faced by SHG members and an attempt to provide temporary relief.

However, challenges were highlighted in the implementation of moratoriums, including incomplete or improper execution, additional interest levied during the moratorium period, and situations where moratoriums were initially offered but later revoked.

Positive responses indicated that moratoriums provided temporary financial relief, allowing SHG members to stabilize their situations and focus on income generation. However, limitations and challenges, such as short durations and potential subsidy reductions, were also noted.

Issues related to communication about

moratoriums were raised, indicating instances where SHG members were initially informed about the moratorium but later found out it was not available or that their property loans did not qualify.

We have found that after establishing their own business, women became more confident and empowered due to microfinance. They have developed a true belief in their entrepreneurial skills and independent decisions. These women are highly efficient as they not only make a business investment but also save some amount of money for future needs at the same time. Women use their amount of loans in smart investments in some entrepreneurial activities and in providing financial support to their families. But after becoming financially stable, they start saving money for future needs. This indicates the smart and strategic planning of women. After this phase, women are very confident in developing a strong position in their family and taking financial responsibility on their shoulders

A few Respondents did not avail themselves of the moratorium, providing insights into individual choices and circumstances surrounding moratorium avilment. The thematic analysis revealed a multifaceted impact of the COVID-19 pandemic on SHG members, with economic challenges affecting repayment behaviors and livelihoods. Microfinancing initiatives, while providing relief, raised questions about their long-term sustainability and accessibility. Moratoriums, though offering temporary relief, faced challenges in implementation and communication. Addressing these issues is crucial for shaping effective microfinance strategies and fostering women's empowerment in the post-pandemic era.

## 8. Discussion

1. "Kudumbhasree" is a financial plan set to bring about the inclusion and empower women by engaging through self-help groups and social entrepreneurship.
2. The growth story of Self-help groups on



Kerala got significantly impacted because of COVID 19. Many Women SHGs had to face significant challenges dealing with the crisis situation posed by COVID 19. The SHGs who were basically involved in small time convenience shop, bakery, hotels etc. had to face significant challenges during COVID 19 pandemic. The basic livelihood of these women were also challenged.

3. Although micro financing companies did study the feasibility to offer loans to the self-help groups, the issue of the entire economic activity coming to a grinding halt was not envisaged.
4. In order to bring the livelihoods of these women and their family back to normal, the additional loans and credits were given to them in accordance with the government direction under various relief measures. The relief measures that included extension of time for loan repayment (Moratorium from the micro financing companies) , financial support to help the children of the SHG members to meet the requirements of online education (Vidhyatarangini scheme) and financial help to rejuvenate the business and towards recreating the stream of revenue and thus help the livelihoods of SHG members (Meta-template). These schemes have acted as additional support for the women to take care of their businesses and their children's education when there was almost no source of income because of COVID 19.
5. The relief measures brought about resilience among the SHGs to withstand the difficult times and succeeded with their business activities. They were able to repay the loans subsequently.

## 9. Findings

1. In a crisis situation like COVID 19 pandemic, governmental intervention is very much essential to bring status quo in the economic sense. Governmental relief measures like moratorium to delay the collection of loans, loan waivers, and additional funds to revive the businesses in

trouble are some of the notable ones.

2. Post COVID 19 pandemics, because of the additional relief and the moratorium, some SHGs which were into businesses like small hotel, convenience store, tailoring etc. could survive the pandemic shock and were able to flourish in their business. However, businesses who were involved in covid protection related products like facial masks had to change to other types of business activities as the demand reduced for such products post COVID 19 pandemic.
3. The finance organizations will have to strategically look at the loan disbursement and recovery situation when they are dealing with economically under developed section. The basic agenda of economic inclusion should be served and at the same time the loan recovery should be also be one of the primary agenda. In this direction, the financial organizations in this had to adopt strategies to engage with the loan beneficiaries. During COVID 19 times, they have to engage with the SHGs and council them to stay with the business and try to repay the loan. It was very crucial to council the SHGs as they were in a shock because of no business activity because of COVID 19 pandemic
4. As moratorium, they offered time extension for the loan repayment without interest. Also, as part of moratorium, they also offered additional load to save the businesses and also to facilitate the financial well being of the SHGs.

## 10. Conclusion

This case study provides information as to how micro-financing organizations have been helping women SHGs to become economically independent. The case also brings to fore, how moratorium in terms of extended time of loan repayment, additional loan to restart the business and loan waivers in case of extreme distress. These inclusive measures taken up by the micro-financing institutions had significant impact on the survival and revival

of the SHGs. The case also presents the struggles and difficulties encountered by the SHGs during the COVID 19 pandemic. The case also presents the fact that, SHGs became resilient because of their own efforts and the support offered by the relief measures were able to bring back to economic recovery mode. Many of the SHGs were able to repay the loans successfully. This case highlights the fact that, economic inclusion programs are successful with strong institutional will backed with adequate strategic measures to reinforce the inclusive programs. In this direction, governmental policy and regulatory measures also play an important role.

## 11. Implications

### Researchers:

1. The design and implementation of financial inclusion instruments to bring about financial inclusion of economically backward sections. there are research gaps which needs to be taken up by future researchers as their research agenda
2. Future researchers can study the effectiveness of moratorium in creating the conducive situation for loan recovery and business resilience during distress situations like COVID 19 pandemic
3. Researchers can also study the behavior of the loan beneficiaries. They can study the attitude, motivation and behavior of the loan beneficiaries towards loan repayment during the distress situation like COVID 19 pandemic
4. The financial institutions need to communicate and counsel the loaners to repay the loans. Future researchers can take this as a research agenda to understand the effectiveness of the communication and counselling measures to convince the loaners towards repayment of the loan.
5. Researchers can take up various aspects of micro financing to understand the loan disbursement and recovery Researchers can take up phenomenological study

towards understanding the factors influencing the loan repayment considering the cultural dimensions.

6. Future researchers can adopt a mixed research approach to understand the cause and effect relationship between the factors influencing loan repayment in micro-financing scenario.

**Academicians:** This study was concerning social sustainability and gender equality. This is in line with the Sustainable Development Goals (SDGs). Academicians in higher education sector can evolve topical discussions on financial inclusion, social capital, and moratorium by micro financing institutions towards loan recovery etc. in their courses.

**Practitioners:** The practitioners who are involved in micro-financing in private sector & public sector banks and NBFCs should take cognizance of the factors influencing the criteria for loan disbursement and the factors influencing the loan recovery. They can also take into account the moratorium measures and their implementation challenges. This study details the challenges related to loan recovery and also the subsequent moratorium to bail out the distressed business by providing temporary relief and making them resilient to come back to normal.

### Policy Makers:

This article presents a broader picture of how governmental regulations prompt the financial institutions towards taking up additional measures to facilitate the economically poorer sections to cope with the challenges during distress times like COVID 19 pandemic. Policy makers will have to bring about governmental policies that facilitates for the empowerment of women and thus bring about gender equality towards attaining Sustainable Development Goals (SDGs). Regulators should evolve regulatory mechanisms which help in enhancing the reach of the financial inclusion measures and thus bring about economic development.

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# FASHIONING CHANGE : A Corporate Approach to Sustainable Production in Fast Fashion

**Mr. Shivam Patro**, Student of PGDM, IBA, Bangalore ,

**Ritu** Student of PGDM, IBA, Bangalore

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## 1. ABSTRACT

The fast fashion industry, fueled by a relentless desire for continuous growth, is a major factor in environmental damage and the triple planetary crisis. In response to the rising threat of 'anti-consumerist washing,' a type of greenwashing, resulting in overproduction and overconsumption, and the need to understand the consequences of the desire for endless growth, this research paper highlights the essential shift needed—reducing dependency on constant producing & selling new items to promote sustainability. A walkthrough of existing research, the study introduces a simple quadrilateral sustainability model for fashion companies. This framework aims to guide them toward more responsible practices, benefiting for businesses. The pillars include designing clothes to last longer, exploring alternative product and service systems, and ensuring fair promotion and information practices. Additionally, the study suggests a vital fourth pillar, "Circular Product Life Cycle Management," to specifically address the environmental impact of the fast fashion model. To underline the importance of the fourth pillar, the paper examines leading fashion companies through cases. This research also introduces a 'pyramid of business strategies to streamline the production process.' This proposed framework aims to assist companies in decisively adopting and combining strategies, fully embracing circular economy principles and holistic sustainability approaches.

The paper wraps up by discussing the scope and limitations of its findings, underscoring the urgency for fashion companies to adopt more responsible consumption practices. By aligning with the principles of the quadrilateral framework, fashion companies have the potential to make a significant impact, lessening the environmental footprint of the fast fashion industry and fostering a more sustainable and responsible future.

**KEYWORDS:** Fast Fashion, Sustainability, Circular Economy, Quadrilateral Sustainability Model, Greenwashing, Triple Planetary Crisis

## 2. INTRODUCTION

### 2.1 BACKGROUND

Fast fashion is a term coined in the early 2000s that refers to the rapid production of clothing and accessories to meet the latest trends. The fashion industry has damaged the environment and caused a triple planetary problem. According to a recent report by the United Nations, the fashion industry is responsible for 10% of CO<sub>2</sub> emissions worldwide. ([biologicaldiversity.org](http://biologicaldiversity.org)) Clothing production uses numerous natural resources and produces carbon monoxide emissions that contribute to climate change. According to the United Nations, the fashion industry accounts for 8-10% of global emissions; This figure is more than the aviation and maritime industries combined. ([bbc.com](http://bbc.com)) Fashion's rapid growth has resulted in approximately 80 billion garments being used each year, and approximately 85% of used clothing in the United States is sent to landfills. Industry also uses a lot of water. Cotton production for the fashion industry uses approximately 2.5% of world agriculture, and synthetic products such as polyester require approximately 342 million tonnes of oil annually. The fast-paced business model is based on the development of resources and human resources to provide customers with clothes based on the latest unprecedented trends. Rapid production of clothing requires a large number of raw materials to quickly enter the industry; This results in massive amounts of waste, pollution, and degradation of air, water, and wildlife. ([biologicaldiversity.org](http://biologicaldiversity.org)) Pollution from the fashion industry has had a significant impact on land and water areas, as well as problems related to the demolition of buildings, the spread of chemicals and microplastics in water, and the impact of climate change. Anthropogenic greenhouse emissions. The fast fashion industry is a significant contributor to the climate crisis, responsible for as much as 10% of global carbon dioxide emissions. ([biologicaldiversity.org](http://biologicaldiversity.org))

### 2.2. OBJECTIVE

Illuminate the detrimental environmental impact of the fast fashion industry and its role in the triple planetary crisis.

- Propose a solution-oriented approach by introducing a quadrilateral sustainability model tailored for fashion companies and proposing a hierarchical pyramid model.
- To illustrate the feasibility of the proposed approach by highlighting real-life examples, such as Patagonia, that successfully implement a circular economy model in the fashion industry.

## 3. Literature Review

### 3.1 Environmental Impacts of Fast Fashion

[Niinimäki et al. \(2020\)](#) highlights the environmental costs associated with fast fashion. The production and disposal of flash clothing leads to significant carbon emissions, water pollution and waste generation. This study highlights the need for sustainable production to reduce environmental impacts.

### 3.2 Sustainable Supply Chain Management in Fast Fashion

[Turker and Altuntas \(2014\)](#) research examines company reporting to understand supply chain management in a fast-developing economy. Research results show that although some companies are implementing sustainable practices, there is still room for improvement. Research shows the importance of sustainable integration at all stages of the supply chain, from raw materials to production and distribution.

### 3.3 Consumer Attitudes Towards Sustainable Fashion Consumption

[McNeill and Moore \(2015\)](#) divide fashion consumers into "personal", "social" and "altruistic" consumers. This group has fashion conflict, which causes a different impact on the fashion industry. Research shows that understanding these consumer groups is critical to encouraging the right

fashion choices. The research also highlights that while security awareness is increasing among UK consumers, this does not always translate into purchases. Policy interventions such as taxes and subsidies are necessary to encourage a fast-moving economy.

Despite the existing research on sustainable production and consumption in the fast fashion industry, several knowledge gaps remain. Future research should focus on identifying effective strategies for promoting sustainable fashion consumption among different consumer segments. This could involve exploring the role of marketing campaigns, social influence, and education in changing consumer attitudes and behaviors.

#### **4. Fast Fashion and its Environmental Effect**

Fast fashion has emerged as a dominant trend in the fashion industry, characterized by the rapid production and consumption of inexpensive clothing items. This phenomenon has raised concerns about its environmental impact and contribution to the triple planetary crisis. Additionally, the fast fashion industry has been accused of green washing, where companies falsely claim to be sustainable or environmentally friendly.

Fast fashion refers to the rapid production and sale of inexpensive clothing inspired by new fashion trends. It stands out with short cycle times, low costs, and growing products (Turker & Aluntas, 2014). The fast fashion industry has adopted a business model focussed on speed and performance, aiming to deliver new models to customers quickly and resource depletion. (Cook & Yurchisin, 2017).

##### **4.1 Contribution to the Triple Planetary Crisis**

Fast clothing production brings with it high costs of electricity, water usage, and greenhouse gas emissions. (Peters, Li, &

Lenzen, 2021). Extraction of raw materials such as cotton and synthetic fibers causes deforestation and destruction of habitats. (Zamani, Sandin, & Peters, 2017). Additionally, waste from fashion quickly creates waste material, causing more problems. (Perino et al., (Perino et al., 2019) Moreover, the disposal of fast fashion items leads to textile waste, which further exacerbates environmental issues (Stanescu, 2021).

##### **4.2 Greenwashing in the the Fast Green washing in the Fast Fashion Industry**

Greenwashing is the practice of misleading consumers about the environmental sustainability of a product or company. In the fast fashion industry, "greenwashing" is a common problem as companies make false statements about their sustainability efforts. (Garcia-Torres, Rey-Garcia, & Albareda-Vivo, 2017). While many businesses are rapidly joining sustainable business initiatives, such as launching environmentally friendly products or promoting recycling programs, their practices as a whole are still unsafe. (Woodside & Fine, 2019).

##### **5. The Need for a Paradigm Shift**

In recent years, there has been a growing recognition of the need for a paradigm shift in our approach to production and consumption.

Overproduction in the fashion industry creates serious problems, causing environmental damage and economic losses. This phenomenon occurs when production exceeds actual demand. A report by the UK NGO Waste and Recycling Program (WRAP) highlights the environmental crisis linked to the increase in clothing production and consumption. The average person in the UK buys 28 new fashion items every year, with more than 500,000 tonnes of these purchased nationwide.

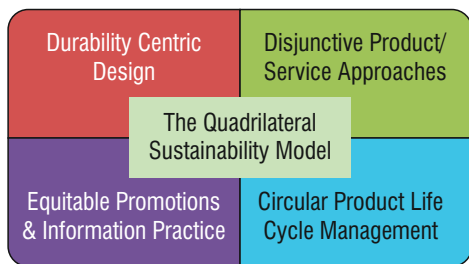
The effects of mass production are far-reaching because fast-moving products

often produce waste, resulting in a lot of waste. The fashion industry is considered the world's second-largest polluter, and overproduction is believed to be a major cause. Clothing production requires many resources, including water, energy, and raw materials. Overproduction leads to inappropriate use of these resources, exacerbating environmental degradation.

The emergence of the concept of "anti-consumerist washing" in fashion is a recent development in response to increasing awareness of the environment and the social effects of overproduction. This term refers to the fraud committed by the companies, i.e. they encourage consumption at a lower level than it is, and represents the latest version of "green washing" created by the company contrary to its environmental friendliness.

The consequences of "anti-consumerist washing" are enormous. It threatens companies' efforts to promote sustainability and disrupts the fashion industry's progress towards more sustainable practices. Garcia-Ortega et al. (2023) consider this marketing concept as a form of green washing

## 6. The Quadrilateral Sustainability Model



## 6.1 Durability centric design

This concept (Table 1.1) emphasizes the importance of designing products that are durable and reliable, with a focus on longevity and extended use. It involves creating fashion items that are built to last, reducing the need for frequent replacements, and contributing to a more sustainable approach to consumption. Adopting a philosophy is a recommendation for companies that want to take part in the market as a reputable and responsible supplier. By focusing on creating quality products, companies can increase the lifespan and usability of their products and combat inefficiencies in all aspects, including physical, emotional, and relationships. Products are designed to maintain their physical and functional quality over time; This makes the company a reliable and durable service provider. Producing seasonal products that have long-term ties or that vary with changing tastes not only manages demands but also appeals to changing people's preferences. Additionally, creating products that are easy to maintain, repair, or renew can extend their lifespan and follow sustainable practices. The customer's active participation in the design process creates a sense of unity and ensures that the product meets customer needs. Patagonia's "Worn Clothing" program, for example, embodies this approach by encouraging consumers to repair and replace used clothing, promoting sustainability and responsible consumption. Finally, this commitment to sustainable design not only improves the company's image as a responsible employee but also opens new markets independent of sales.



<b>DURABILITY CENTRIC DESIGN</b>	
Craft environmentally efficient products to enhance their longevity and utility, combating various forms of obsolescence — be it physical, emotional, or social.	
Engineer robust and dependable products that retain their physical and functional characteristics over an extended period.	Devise timeless products with enduring emotional connections or adaptability to evolving preferences, ensuring sustained appeal.
Develop products that are easy to maintain, repair, or refurbish, preserving their physical and functional attributes over time.	Engage users in the design process, fostering collaboration and ensuring products align with user needs.
<b>BENEFITS TO PRODUCERS</b>	
Perceived Responsibility	
Enhanced Perception as a High Quality Supplier	
Expansion of Business Opportunities	

*Table 1.1: Quadrilateral Sustainability Model Section A- Durability Centric Design*

## 6.2 Disjunctive product/service approaches

This concept (Table 1.2) involves exploring alternative systems for providing products and services that align with principles of sustainability and sufficient consumption. It may include initiatives such as offering repair and maintenance services for fashion items, implementing product take-back programs, or introducing innovative business models that prioritize longevity and reuse. By using alternative products and services, companies can change consumption patterns, reduce the environmental impact of waste, and reduce interest in new products. Providing repair, renewal, or overhaul services not only extends the life of your products but also supports a culture of sustainability. Counseling programs on how to stop substance use help create a responsible and responsive consumer mindset. Encourage the collection of waste products for sale or donation, actively solve waste problems, and follow circular economy principles. Additionally, the adoption of access-based service models through collaborative consumption, such as rental, leasing, pay-per-use, wardrobe-sharing, or swapping, introduces innovative avenues for business. A key example of this is the success

of platforms such as Rent the Runway, which has transformed the fashion industry by offering the best clothing that reduces revenue from traditional sales. The use of such methods not only creates new revenue but also serves to make the company an innovator and pioneer in the sustainable market.

## 6.3 Equitable promotion and information practices

Fair promotion and information (Table 1.3) encompass transparent and ethical communication about products, including their impact, durability, and care. It involves providing consumers with accurate and comprehensive information to make informed purchasing decisions, as well as promoting the value of extending product use and adopting more sustainable lifestyle choices. Promote ethical reporting and corporate information practices and advocate for smarter consumer decisions and responsible practices. This involves moderating sales and promotion of new items, steering clear of aggressive marketing campaigns based on successive trends, and promoting the product's value proposition and extended use to maximize return on investment. Promote responsible

DISJUNCTIVE PRODUCT/SERVICE APPROACHES	
Alternative product and service systems to extend the life of products, steering away from disposal and promoting a more moderate acquisition of new items.	
Offering repair, refurbishment, or customization services	Facilitating the collection of discarded products for a second life
Spreading awareness on product continuance	Adopting access-based service models through collaborative consumption
BENEFITS TO PRODUCERS	
Diversified Revenue Streams	
Perceived Innovation	

Table 1.2: Quadrilateral Sustainability Model Section B-Disjunctive Product/Service Approaches

production and use by emphasizing health, convenience, and satisfaction with the use of products. Provide transparent information about relevant products, durability, and repair through registration and plan to raise awareness that the products are a sustainable investment rather than equipment. These practices are designed to make companies more accountable, increase product profitability, and reduce dependence on high inventory levels, thus ensuring business stability and integrity. An example of a company that uses ethical advertising and information practices is Patagonia, which is known for its transparency in providing information about sustainable products and encouraging the repair and reuse of clothing to consumers.

EQUITABLE PROMOTION AND INFORMATION PRACTICES	
Contribute to enhancing consumer awareness and promoting responsible practices. Shape and support consumer attitudes, education, and behaviors against physical, social, and emotional obsolescence.	
Regulate sales and promotion of new items by avoiding aggressive marketing campaigns based on successive collections, trends, or low prices. Discourage the promotion of shopping solely for recreational purposes or to display social status.	Emphasize the product's value proposition, highlight the convenience of extending its use to maximize return on investment, and underscore the savings achieved by avoiding new purchases, potentially allowing for a higher selling price.
Advocate for the convenience and satisfaction derived from responsible consumption through a more sufficient lifestyle. Encourage the prioritization of needs over desires, employing the logic of eco-efficient use to maximize resources involved in the product.	Disseminate information on product impact, durability, use and care, and reparability through labeling and information campaigns, utilizing tools like the Higg Index. These initiatives aim to position the company as more responsible, enhancing its reputation.
BENEFITS TO PRODUCERS	
Be recognized as a more responsible entity within the industry, potentially leading to increased consumer trust and loyalty.	

Table 1.3 : Quadrilateral Sustainability Model  
Section C- Equitable Promotion & Information Practices

### 6.4 Circular product life cycle management

Product life cycle management (Table 1.4) represents an integrated approach within the framework of sustainable production. Taking a holistic approach to the product lifecycle revolves around prioritizing sustainability and minimizing the environment. First, designers focused on creating recyclable materials, using materials that encourage recycling and contribute to a loop-closed system. Second, establish a recycling system that will ensure the disposal and recycling of end-of-life products and promote consumer responsibility. Third, the importance of using recycled materials in the production process is based on circular economy principles. Ultimately, this approach encourages a shift to leaner consumption patterns, extending product life, reducing waste, and promoting a more sustainable lifestyle. Companies like Vinted, for example, have excellent rental models that allow customers to purchase and enjoy a quality product without having to own it permanently. For companies, adopting global product stewardship can translate into environmental stewardship by reducing the ecological footprint and adapting to environmental changes, thus improving the company's reputation and helping to support the fashion industry.

CIRCULAR PRODUCT LIFE CYCLE MANAGEMENT	
Implementing a holistic approach to product life cycles, emphasizing sustainability and minimizing environmental impact.	
Designing products with a focus on recyclability, using materials that facilitate circularity.	Establishing take back programs for used products to facilitate recycling and proper disposal.
Promoting the use of recycled materials in the manufacturing process to contribute to a closed-loop system.	Encouraging a shift towards a rental based consumption model to extend product life cycles, reduce waste, and embrace a more sustainable approach to fashion consumption.
BENEFITS TO PRODUCERS	
Environmental Stewardship	
Compliance and Reputation	

Table 1.4: Quadrilateral Sustainability Model Section D- Circular Product Life Management

### 7. Pyramid of Business Strategies

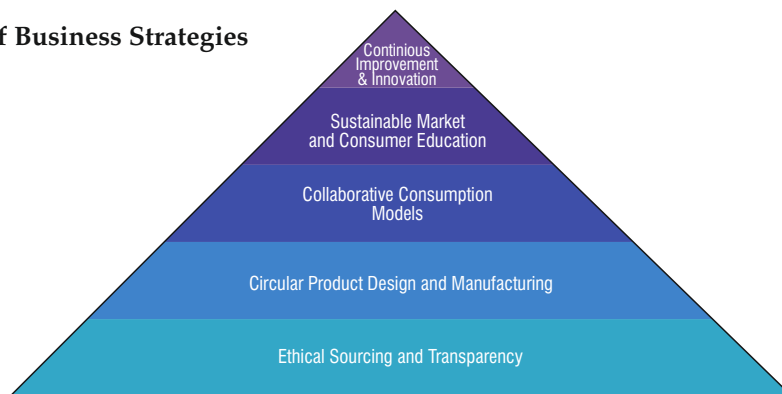


Figure 2: Hierarchical Pyramid Model of Business Strategies for Sustainable Production

## 7.1 Ethical Sourcing and Transparency (Figure 2)

- Establish transparent and fair data practices.

Ensure supply chain visibility and accountability to promote fair labour.

- Perform traceability tests to verify the authenticity and integrity of manufactured products.

## 7.2 Circular Product Design and Manufacturing (Figure 2)

- Prioritize durability, recyclability, and easy-to-disassemble designs.
- Incorporate sustainable and circular information into the production process.
- Ensure energy saving and low energy consumption.

## 7.3 Collaborative Business models (Figure 2)

- Using other business models such as renting, leasing, and clothing sharing.
- Promote maintenance, repair, and repair services to extend product life.
- Educate customers on the benefits of collaboration and wellness.

## 7.4 Sustainable Marketing and Consumer Education (Figure 2)

- Create marketing strategies that reflect sustainability and ethics.
- Educate consumers about the environmental impact of their choices and the benefits of fashion.
- Be fair in advertising and messaging and avoid rigid marketing based on standards and low prices.

## 7.5 Further Development and Innovation (Figure 2)

- Business in research and development of products and technologies.
- Continuously review and update sustainable development goals and targets.
- Ensuring a culture of innovation and continuous improvement in sustainable product development. Capstone represents an ongoing commitment to

innovation and improvement, ensuring the fashion industry adapts to changing safety standards and practices.

## 8.1 Levi's Second Hand: **SECONDHAND**

Levi's Second Hand is a buy-back and resale program launched by Levi's to promote sustainability. The initiative encourages customers to trade in their old Levi's jeans and jackets at designated stores in exchange for gift cards. The traded-in items are then cleaned, sorted, and resold on Levi's Second-Hand website. This initiative not only helps to keep garments in circulation and out of landfills but also provides a new revenue stream for the brand. (Second hand.levi)

## 8.2 H&M's "Let's close the loop":

H&M's "Let's close the loop" is a global initiative launched in 2013 that focuses on recycling and repairing. The program encourages customers to bring any unwanted clothes or textiles, by any brand and in any condition, to one of their stores. These items are then sorted into three categories: re-wear (wearable clothes are marketed as second-hand clothing), reuse (items not suitable for wear are turned into other products), and recycle (all other clothes and textiles are shredded into textile fibers and used to make insulation materials). (hm/close-th-loop)

## 8.3 Patagonia Worn Wear:

Patagonia's Worn Wear is a gear recycling program that aims to extend the life of its products, thereby reducing their impact on the environment. The program includes repair services, a platform for buying and selling used Patagonia gear, and a line of refurbished clothing made from returned Patagonia items. Patagonia also runs North America's largest apparel repair center, allowing it to repair more than 100,000 items each year. (wornwear.patagonia)

#### 8.4 Vinted Platform: *Vinted*

Vinted is a peer-to-peer online marketplace that facilitates the purchase, sale, and exchange of clothing items, with a primary focus on vintage and/or second-hand fashion. The platform operates in the circular economy, moving goods from consumer to consumer rather than from consumer to landfill. This initiative helps to prolong the lifespan of existing apparel and reduce waste related to the global fashion industry. Vinted makes money via fixed and variable fees as well as advertising for sellers. ([www.vinted.com](http://www.vinted.com)).

### 9. Discussion

#### 9.1 Scope and Limitations

The scope of the findings lies in shedding light on the environmental impact of fast fashion, proposing a comprehensive sustainability model, and providing real-life examples. Additionally, there is a valuable scope to explore consumer perspectives and psychology regarding different business models, such as rental, pay-as-you-use, etc. Understanding consumer acceptance or resistance to these models is crucial for effective implementation. This involves delving into consumer behaviors, preferences, and potential barriers to adopting alternative consumption patterns. Moreover, the study recognizes that the proposed model's universal applicability may vary based on company size, resources, and market positioning. The findings are subject to the evolving nature of the industry, and continuous adaptation is essential to address emerging challenges and consumer dynamics.

#### 9.2 Urgency for Responsible Consumption Practices

The urgency for responsible consumption practices is a central theme, emphasizing the need for a collective effort to combat the environmental crisis caused by the fast fashion industry. The study calls for a paradigm shift and adoption of sustainable models to ensure a more responsible and ethical approach. The urgency lies in the industry's significant contribution to carbon emissions, resource depletion, and waste generation. Responsible consumption practices are portrayed as a critical step toward a sustainable and environmentally conscious future.

### 10. CONCLUSION

In conclusion, the research paper underscores the urgency for change in the fast fashion industry. The quadrilateral sustainability model offers a practical framework for companies to adopt responsible practices. Real-life examples demonstrate the feasibility of such approaches. The study stresses the importance of immediate action to mitigate environmental damage, emphasizing that responsible consumption practices are not only beneficial for the planet but also for the long-term viability and reputation of fashion companies.

#### 10.1 Summary of Key Findings

Key findings include the identification of fast fashion as a major contributor to environmental issues, the introduction of a quadrilateral sustainability model, pyramid of business strategies for sustainable production, and successful case studies of companies implementing sustainable practices. The pillars of durability-centric design, disjunctive product/service approaches, equitable promotion and information practices, and circular product life cycle management are outlined as essential elements for a responsible fashion industry.

#### 10.2 Call to Action for Fashion Companies

The research paper issues a compelling call to action for fashion companies. It urges them to adopt the proposed sustainability

model, aligning their practices with principles of responsibility, longevity, and environmental stewardship. The call to action emphasizes that by embracing sustainable approaches, fashion companies can contribute significantly to mitigating the environmental impact of their industry and building a more sustainable future.

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# LEAN AND GREEN SYSTEM PRACTICES : The Significance for Steel Manufacturing Supply Chain Management

**V. Vidyashree**, Ph.D. Scholar, B N Bahadur Institute of Management Sciences, University of Mysore  
**Dr. Aisha M Sheriff**, Professor, B N Bahadur Institute of Management Sciences, University of Mysore

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## Abstract:

Manufacturing businesses heavily rely on Lean and Green principles because they prioritize economic performance and establish a competitive advantage .An attempt has been made in this study to create a conceptual framework for comprehending Lean and Green Principles in the Indian steel manufacturing sectors. This framework was created by taking into account the ideas of lean and green principles focusing on the earlier work done by many researchers in Lean and Green system practices.

**Keywords :** Lean, Green, Performance, Sustainability, Productivity

## Introduction

Many industry players are constantly seeking to strike a good balance between manufacturing operations and environmental performance. Despite several studies conducted on performance enhancement, there is definite formula to how processes must be practiced in an organization. Lean and green practices concentrate on industries being environmentally conscious. This makes a huge influence on the existing ecosystems .From procurement to payment ,all process

must consider the environmental impact that they make.

In the past, corporations have generally been interested in achieving efficiency and profitability goals. Nonetheless, the shift to environmentally friendly operations has compelled businesses to look for ways to combine these with environmentally friendly goals and projects. Green and lean practices are the outcome of this pairing. Companies undertake mechanisms like air treatment, water treatment and sewage treatments to avoid the pollution caused by companies. On the

flip side, lean and green initiative concentrates on the reduction of wastes produced from the companies. It is established on the premise of reduction, recycling and repair during manufacturing. Lean principles concentrate on reducing any type of unnecessary components in the network of supply chain.

According to (Joseph Sarkis, 2012), closing of the supply network loop have expanded over the years to add reverse supply network management techniques. With this there will be effective reduction of the wastages and the materials will be grasped into the cycle in various ways to be a part of recycling and reusing. The boundary of this cycle lies in different forms These Japanese techniques will help in reducing disposables and incompetency within the cycle.

This paper with the literature assessment on Lean and Green principles in Supply Chain Management wishes to address the organizational performance and development of conceptual Framework applicable to Indian Steel manufacturing industries.

This review considers the following research questions

**Rq1:** What is the type and extent of study done in the last one decade on Lean and Green principles in the field of supply chain management?

**Rq2:** What are the research gaps that needs to be addressed?

**Rq3:** How to develop a conceptual framework on role of Lean and Green principles in the field of supply chain management in India's Steel manufacturing industries.

## Literature Review

1. **Bjørneta.,(2020)** in their study of Identification of environmental supply chain bottlenecks in the country of Ethiopia found that stock out rate was considerably higher up until 36 percentage. The average lead time for

buying the medical supplies from the drug suppliers was three months. The national suppliers had average order lead time for one month The lead time was followed by the foreign suppliers for an unforeseen period of time. Ultimately, because all of the suppliers were receiving the orders manually, the E-order rate was zero. It was also observed that the fill rate was 100%, indicating that the suppliers' lack of stock was not the cause of the problem. A demand estimate for the healthcare institutions, an annual purchase request, and an annual net requirement were also incorporated in the study. These tools helped identify potential bottlenecks in the supply chain and reduced their impact. It is very important in supply chain as it is the primary source of environmental damage, which may result up until 90 percentage of the damage.

2. **Abdulaziz et al.,(2020)** found in their study regarding the SCM in a health care industry in the country of Saudi Arabia that the government has paid a lot of attention towards the health care services but still the maximum amount of expenses that the Health care sector bears comes from the inefficiencies of the supply chain. After a detailed analysis, it was discovered that the lean implementation by the hospital's top management will create a better scenario for management of the supply chain. The Medical human resource, medical management responsibility and Processes management and forming groups of purchasing organization will provide the healthcare organizations with a lot of cost reducing opportunities and also to achieve economies of scale. Identification of the ways from non value added activities before going towards hospital supply chain management and starting the lean journey will help with efficient management of the supply chain.

3. **Sunita & Jaya (2021)** in their research found that a emerging country like India is becoming increasingly industrialized and have had a lot of problems with the point of disposal of end of life products. Internal



environmental management needs the support of the top level and middle level of the organizations to support the progress of green supply chain management initiatives to progress in India. The first step to take in this direction would be to educate about the field of green supply chain management. Also understand how organizations can play a role to bring in green supply chain initiatives, into their work culture. Industries in India, have not been able to apply green supply chain initiatives at the required level and the barriers for the same, as there is absence of necessary tools, management skills and knowledge, and the lack of economic justification in terms of performance.

4. **Daniel *et al.*, (2021)** States that to improve the internal supply chain process the managers of the organization must have a very precise understanding of the KPI's, the various stakeholders, who may be part of this are insurers, group purchasing organizations, distributors and producers who belong to the non medical and medical field.

5. **Yazan & Abeer (2019)** found that understanding the usage of energy as well as any emissions which come out of vehicles, chimneys etc. in the health service is very important. To understand the areas where there can be the minimalization of impact as well as to bring a low carbon economy managing greenhouse gas is very important. Even after having the prior knowledge of the above, the public healthcare department have not taken any effective actions in green public procurement criteria, ecological management, and audit scheme, as well as the implementation of ISO 14,001. Few significant indicators were identified to make sure that environmental competitive priorities are put

up in place and they are called as environmental key performance indicators. They are electrical power consumption, direct emissions, hazardous wastes, fuel consumption, paper consumption and Non hazardous wastes. It was identified that paper consumption, hazardous waste, and fuel consumption have the highest values of reduction of performance.

6. **Charbel & Nelson (2021)** did the study based on few questions regarding GSCM and the ways in which different countries are going to coordinate with each other and bring a solution to an effective green supply chain management as well as to nurture a healthy interest towards upcoming research in GSCM. With the help of a software, clusters were created and mainly the countries China, India, the UK, Brazil, Malaysia, Indonesia, Taiwan, Hong Kong, France and Iran were highlighted as the ones which have the maximum interest in the field of GSCM.

7. **Novitasari & Agustia, (2021)** states that all the players in the supply chain i.e. the suppliers, the personnel involved in processing and distribution must help in the successful application of green supply chain management. Organization should also consider about the effective distribution of all the finished goods to the customers by considering environmental factors. All the above will lead to improving the firm's performance like green purchasing and internal environmental management. The companies can use ISO9000 or ISO14000 in their annual reports as indicators and measure them in ratios. Various other factors like supplier relationship to purchasing criteria, superiority of materials, the superiority of end products meeting the expectation of customers as well as packaging using recycling and

reverse logistics in forming green innovation. With the support of the studies the companies can pay more care to GSCM, where purchasing of raw materials from suppliers must be environmentally friendly and green work ethics will be put into play.

8. **Yiet *al.*,(2021)**, in their study have tried to identify energy demand, environmental sustainability and green supply chain management, from a global perspective and to make sure the gaps in previous studies are identified and addressed. After a detailed analysis, it was discovered that green supply chain managers must pay a lot of attention towards the improvement of service quality in logistics and try to identify ways on how the reduction of carbon dioxide emission can be done. The requirement for doing well in the logistics infrastructure and customs clearance restrictions was also identified from the East Asian sub regional perspective. Improvement in service quality can induce reduction in carbon emissions and energy demand at the identical time. In few areas over the world, reducing the custom clearance restrictions and freight volume can in turn cut down the greenhouse gas emission. This means that a greater quantity of materials can be transferred in fewer cycles. The quality of logistic services can be enhanced by choosing different transportation modes depending upon the distance to be covered, which can make it reasonable with regards to time and cost, as well as to increase the shipping scale for a single cycle to reduce the carbon dioxide emissions. It is noted that the government of each country plays a very essential role in promoting the management and enhancement of GSCM practices in the organizations. That is, green logistics and company level decision makers should follow the call of government actively. The reduction of environmental burden through logistical activities can be the first step in green world.

9. According to Kenneth *et al.*,( 2019) Just in time , GSCM AND TQM practices followed in the organizations will bring out an effective model in curbing the variation in environmental performance. The study tried to

understand to what degree the combination of these three concepts will bring out the best results. The results reported that. Just in time and TQM practices in combination will lead to improved environmental functioning and practices. Not directly, but rather indirectly impact the environmental performance through unique practices of green supply chain management .Just in time, programs are designed to eliminate any and every form of waste that can be generated within the companies and total quality management programs are divided in order to emphasise on providing only superior products and services to the customers and reduce any kind of lags or wastage which in turn increases environmental sustainability and environmental Performance. When three factors come together in an optimal combination, it will provide a synergistic effect.

10. **Yaw *et al.*,(2021)** show case that green logistics management practices ,Supply chain traceability, and logistic ecocentricity are practices that help in getting a green supply chain. Logistics eco centricity will help the companies too. Learn and engage with both the traditional and non-traditional stake holders along with the external stake holders to enhance the implemented practices to attain the sustainability performances. It helps in getting different players involved within the area to contribute and preserve the ecological practices.

11. **Kailash& Kuldip . (2019)** discovered that companies believe certification is one of the most important aspects in increasing the level of implementation of green supply chain management. In this study, it was observed by the researchers that to starting the GSCM implementation brought down the requirement of manpower, and the aspects of internal environmental management cooperation with both the buyer and the supplier, as well as ecological design in. Packaging practices has brought the Companies to decrease the pressure that is put on the environment and increase in the investment returns. The quality of products

produced has increased and the defect rate has decreased. By selling the scrap and extra inventory generation, reverse logistics for recycling, reusing and re-manufacturing had made it possible to reduce the wastage. Internal environmental management has been in the epicentre of green supply chain management practice. The adoption of this practice will give a better environmental and operational advantage leading to achievement of better economic performance.

**12. Debabrata *et al.*, (2019)** internal supply chain, upstream supply chain and down stream supply chain are the three macro views of supply chain processes that are part of supply chain process centric view. Here in the study, a network perspective has been proposed to understand the management of downstream and upstream. Relationships with supply elements. The up stream supply chain view involve different aspects such as. Designing supply, collaboration, negotiation, purchasing and sourcing. The downstream supply train view involves different aspects, including the fulfillment, selling, customer outreach, pricing. Supply chain centric view is having the elements of financial flows, optimization of material, examining integration and information between various stakeholders in the supply chain. Within health care sector, the implementation of supply chain centric view is still at its infancy. There is a requirement to create the capabilities and capacities to try and standardize the regulatory processes.

**13. Joanne & Meehee (2021)** studied that green practice has become a very happening trend in the event management industry and is no more just associated with supplementing the business practices. Supply chain flexibility make positive contribution towards green event management practices. The adoption of resource orchestration theory (ROT) makes sure that the firms address environmental issues and a shared vision among the supply chain partners to develop green event practices. It was also found that supplier's contribution to the green event practice majorly depend on the levels of flexibility that

is required in the event being orchestrated. It is possible that suppliers can perform the best green practices when they meet the requirements of product flexibility. Another finding showed that in the recent times, the effective product flexibility fit on green practices has grown significantly stronger due to the public eye on the topic of green supply chain management. Green Organization has found a very important place within the event management industry. The choice of right event planners with the right suppliers leads to successful green event best practices.

**14. Andreas. (2020).** Most of the theories that have dominated supply chain management (SCM) take a reductionist and static view on the supply chain and its management, promoting a global hunt for cheap labour and resources. Because of this, supply chains are typically run with little regard for the larger contextual environment. The fact that supply chains have evolved into damaging and vulnerable systems is ignored by this view point. With the emergence of COVID-19, scholars and business leaders now have a greater chance to comprehend the new normal and develop environmentally friendly supply chain management strategies. A model centered on consumption, linearity, material growth, and carbon. One can address consumption and develop efficient green practices. The concept of keeping existing resources within the supply cycle brings forth the aspects of reusing, reinventing, reiterating, reengineering and recycling. This allows the market to produce regenerative products which will slowdown the usage of non renewable resources.

**15. As per Douglas & Martha (2020),** Successful supply chain management requires cross-functional integration and marketing must play a critical role. The challenge is to determine how to successfully accomplish this integration.

**16. Abubaker haddud & Anshuman khare. (2020)** state that Digitizing supply chains 'potential can have positive impact on lean operations .the process must start from

the point of procurement of raw materials with regards to their timely delivery at the manufacturing plant. Then the organizations must effectively organize, utilize, produce, store and ship the finished products on time. As a last stop the retailers must then be able to deliver the goods to the customers on time irrespective of online or offline presence. With such intricate requirements the usage of technology especially digitization of the complete supply chain will help in creating optimal coordination and communication between all the different elements and functions of SC. This in turn lets the organizations have effective just in time (JIT) practices and avoid delays. The study also suggested that looking into selective enabling technologies as per the individual requirement of the organizations will help in providing a better positive impact and management of the supply chain. Proper resource allocations and an effective investment can help in maximizing the benefits.

Based on the above literature review, it is observed that there is abundant possibility for carrying out research work on Lean and Green Principles implementation benefits in Indian steel manufacturing Industry.

## Development of frame work

According to the literature, a wide range of academicians and researchers have published a large number of studies on lean and green concepts, with a primary focus on assessing the sustainability features of a firm's performance. These research articles consist of case studies, empirical studies, and literature reviews based on the work completed.

A conceptual framework for the role of Lean and Green principles for achieving Organizational success in the Indian steel manufacturing industries is presented in Figure 1 based on the findings and research gaps found via the literature review.

## Lean Principles

Lean Principles are generally used in manufacturing organizations in supply chain

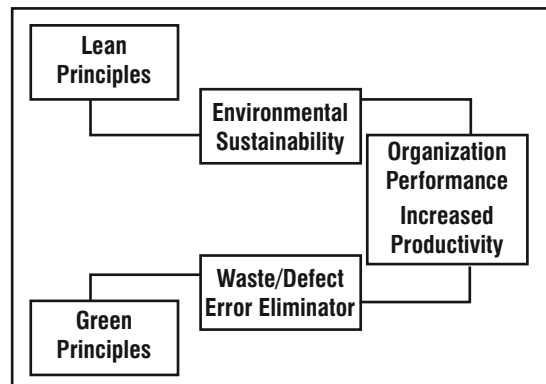


Figure 1. Conceptual Framework: Lean and Green Principles role in Supply chain management

management area, treated as a philosophy that can be extended to the entire Industry (Mwacharo, 2013). The focus is to provide quality products to customers, which leads to society prosperity (Melton, 2004).

The three major lean thinking concepts are (Womack and Jones, 2003):

- a) Value identification
- b) Waste elimination
- c) Flow (of value to the customer) generation.

Customers define the importance of a product focusing on their requirements and preferences, as value is generated by the business in the appearance of a product or service they will purchase.

There are seven distinct types of waste, or Muda. When disposed of, each of these waste kinds offers several advantages and has distinct causes and remedies.

[1] The defaults that need to be fixed at the end of production are the outcomes of the quality related problems that ought to have been fixed long ago. Although they don't improve the final product's value, they increase expenses by using resources like labor, time, and materials that could be used for operations that add value.

[2] Over production results in an accumulation of inventory, necessitates more room for handling and storage, takes away from productive work hours, and—above all—hinders issue solving, which generates even more waste.

[3] When procedures like setup changes, equipment failures, or material supply delays occur, time is lost. This is known as waiting. Time is an essential resource in a production facility that cannot be wasted.

[4] Excessive movement of goods and persons due to erroneous operational or facility lay out is known as waste of transportation. Resources should be distributed as soon as possible to all are as that demand them.

[5] When procedures are completed that are not required to fulfil client demands, this is known as over processing, which is the outcome of inadequately specified quality requirements or in adequate quality control.

[6] Although inventory is necessary for a producing facility to run well, too much inventory can consume material, space, and human resources. Furthermore, excess inventory addresses supply chain quality problems that may be identified and fixed as soon as the plentiful supply of materials runs out and the exact quantity required is ordered.

Motion is fundamental to the state that workers behave upon; pointless activities, work arrangements that encourage pointless movement, moving large pieces of machinery, etc., use time and energy and make workers less productive. (Ohno, 1988; Melton, 2005; Drew, McCallum, and Rogge Hoffer, 2004).

Melton (2005) defined flow as "the construct which most apparently contradicts with mass production systems; the contrast of batch and queue processes with one-piece flow." Our manufacturing processes are not flowing well, which explains why we need such large warehouses to hold the large amount of inventory that depletes our working capital. Flow includes the value stream that runs through all of the business's processes. Flow in

the context of lean manufacturing needs to be constant and unbroken, with no interruptions or variations.

Benefits of using Lean in an organization are Improved quality, techniques to strengthen the production process and steadily eliminate defaults, Faster delivery times, improved visual management, enhancements of worker efficiency, Improved efficiency of human resources, Easier to manage work areas, Total company involvement, Problem elimination through root cause elimination, Safer work environment, Improved employee morale etc.

## **Green Principles**

Green principles focus on minimizing the waste and pollution achieved through continuous research and process design. It also supports and sustains a renewable way of producing products and/or services which will not harm us or the environment. The goals are to conserve natural resources for future generations. The benefit of Green Manufacturing is to build a great reputation to the public, saves useless cost, and promotes research and design (Suresh Prasad and S.K. Sharma; 2014)

## **Organizational performance**

The organizational performance can be measured by factors like productivity, sales, defects, quality etc. The organizational performance is also dependent on factors like brand image, training, stock keeping etc. Being environmentally conscious requires a company to acquire some standardizations and certificates. This contributes to organizations performance as well.

## **Conclusions and scope for future research**

There are lot of touch points in manufacturing processes that can be identified and reduced, eliminated and also minimized over a period of time. In Indian steel manufacturing sector, the quantity of wastes generated must be reduced. When the wastes reduce, the overall quality increases which in turn increases the

productivity of an organization. Green manufacturing will guarantee that the company's good will and reputation are growing, along with its improved market image and financial performance, which is very important for a company to prosper.

For the present paper, limited and relevant research articles published over last one decade have been considered which provides basic concepts of Lean and Green principles. The literature assessment treats it specific that the social aspect of sustainability received less attention than the financially viable and environmental aspects. In addition to this research gap, researchers have recommended doing industry-specific studies while taking into account all sustainability factors. However, the majority of research has concentrated on broad combinations of diverse businesses. Additionally, it is observed that the research has not approached holistically and has only been conducted to evaluate the success of the organization from an economic or environmental standpoint.

The conceptual framework was developed focusing on the research gaps identified in the literature assessment, such as the requirement for a complete strategy for addressing the three pillars of sustainability and for a particular sector, the steel manufacturing industry. Given that this conceptual framework was developed through an analysis of the literature, it will be possible to test it in the future using the parameters which are suggested or any additional parameters through descriptive research and data available and analyzed for a particular industry.

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# Evolving electric vehicles: understanding consumer behaviour and manufacturing challenges

**Mr. M.Vamsi Krishna**, Student, IBA Bangalore

**Prof. Narendra Babu**, Faculty in Marketing, IBA Bangalore

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## **Abstract:**

With the huge influx of E-vehicles in the market, there is a significant impetus to the pro-environmental issues discussion regarding e-vehicles. This paper deals with the concerns related to consumer behaviour towards e-vehicles. This paper addresses the facets of the process of e-vehicle manufacturing and the issues concerned with raw materials and their usage.

This research the initial parts discusses about how electric vehicles are superior as compared to internal combustion vehicles (ICV).

In this letter, half the paper deals with issues like prices of electric vehicles, maintenance cost issues, incentives from the government, life span issues, increasing cost per millage, ease of driving and other factors that concern the potential consumer towards the embarrassing the e-vehicles.

This paper contributes to the body of literature by presenting a model, which has variables taken from the existing literature related to consumer behaviour words the e-vehicles

This paper unveils the specific factors that drive consumers towards embracing e-vehicles as against conventional vehicles, which is an unbridged issue in this area of research.

This paper also presents the major challenges that can influence consumer behaviour towards e-vehicles, finally, the paper tries to cross the future research agenda for further investigation by future investigators.

**Keywords:** Electric vehicles, EV, Sustainability, Manufacturing challenges, Consumer behaviour.



## 1.Introduction:

The escalating global concern for environmental sustainability has become a driving force in shaping the future of transportation. At the forefront of this transformation are electric vehicles (EVs), presenting a promising solution to the environmental challenges posed by traditional internal combustion vehicles (ICVs). As the automotive industry undergoes a paradigm shift, the adoption of EVs has gained significant traction, heralding a new era of eco-friendly mobility.

The urgency to address climate change and reduce carbon footprints has positioned EVs as key players in the quest for sustainable transportation solutions. Unlike their ICV counterparts, EVs operate on electric power, mitigating the emissions of greenhouse gases and decreasing reliance on finite fossil fuel resources. The potential environmental benefits of EVs have sparked a growing interest among consumers, policymakers, and industry players alike. However, the widespread integration of EVs into mainstream consumer preferences is contingent upon a nuanced understanding of the factors influencing consumer behavior in this evolving landscape.

This research endeavors to unravel the intricate dynamics of consumer behavior towards EVs, offering insights into the motivations, concerns, and decision-making processes that shape the adoption of these vehicles. The exploration begins with an assessment of the superiority of EVs over ICVs, considering environmental impact, efficiency, and overall performance. While the environmental advantages of EVs are evident, the research seeks to establish a comprehensive understanding of their comparative benefits to inform potential consumers.

A significant portion of this research is dedicated to probing into the concerns that potential EV consumers harbor. These concerns span a spectrum, including pricing issues, maintenance costs, government

incentives, the lifespan of EVs, the increasing cost per mileage, and the perceived ease of driving. By addressing these concerns, the research aims to bridge the gap between consumer hesitations and the potential advantages offered by EVs. It also delves into the impact of government incentives on consumer decisions, recognizing the role of policy frameworks in influencing the adoption of sustainable technologies.

Building on existing literature related to consumer behavior towards EVs, the research contributes a model that encapsulates the variables pivotal to shaping consumer attitudes and preferences. This model is designed to provide a comprehensive framework for understanding the intricate interplay of factors that guide consumers towards or away from embracing EVs. By synthesizing existing knowledge, the research aims to offer a valuable tool for scholars, policymakers, and industry stakeholders to comprehend and anticipate consumer behavior in the rapidly evolving landscape of electric mobility.

In addition to exploring the driving factors that lead consumers to embrace EVs, this research also highlights the challenges that may impede widespread adoption. Infrastructure limitations, technological concerns, and market dynamics are among the challenges discussed, providing a holistic view of the obstacles that must be navigated for EVs to become a ubiquitous mode of transportation.

Finally, the research proposes a future research agenda, outlining key areas where further investigation can deepen our understanding of consumer behavior towards EVs. The evolving nature of technology, market trends, and consumer preferences necessitates an ongoing commitment to research, and the proposed agenda aims to guide future scholars towards areas of inquiry that can enhance our comprehension of this dynamic landscape.

The world grapples with environmental challenges and the imperative to transition towards sustainable practices becomes more

pronounced, the role of EVs in shaping the future of transportation cannot be overstated. This research serves as a comprehensive exploration of consumer behavior towards EVs, shedding light on the motivations, concerns, and complexities that influence the adoption of these vehicles. By contributing a nuanced model, addressing consumer concerns, and outlining a future research agenda, this study aims to propel the discourse on sustainable transportation towards more informed and effective pathways. In doing so, it endeavors to contribute not only to the academic literature but also to the broader conversation surrounding the pivotal role of EVs in the pursuit of a more sustainable future.

## 2. Background:

Electric vehicles have gained significant attention in recent years as an environmentally friendly mode of transportation. The history of EVs dates back to the 19th century, but it wasn't until the 1990s that they began to gain popularity with the introduction of vehicles like the General Motors EV1 and the Toyota Prius. Advancements in battery technology and increasing environmental concerns have further propelled the development and adoption of EVs in the automotive industry.

Electric vehicles offer several advantages over ICVs. One of the key benefits is their positive impact on the environment. EVs produce zero tailpipe emissions, reducing air pollution and helping combat climate change. Additionally, they are quieter and provide a smoother driving experience due to the absence of an internal combustion engine. Moreover, EVs offer lower operating costs by reducing the dependence on fossil fuels and taking advantage of electricity as a cheaper energy source.

Despite the numerous benefits, there are several challenges that need to be addressed to promote the widespread adoption of EVs. Consumer behavior plays a crucial role in determining the success of EVs in the market. Factors such as the price of electric vehicles, maintenance costs, government incentives, and the overall cost per mileage may influence

consumers' attitudes and preferences. Understanding these concerns is essential for policymakers, manufacturers, and researchers in formulating effective strategies to support EV adoption.

The objective of this paper is to delve into the various factors that influence consumer behavior towards EVs. By analyzing existing literature related to consumer behavior and EVs, this research aims to provide insights into the decision-making process of potential consumers. Additionally, the study aims to identify the challenges that may hinder the wider acceptance of EVs and set the stage for future research endeavours.

This research paper contributes to the existing body of literature by presenting a comprehensive model that incorporates variables derived from previous studies on consumer behavior towards EVs. By identifying.

## 3. Methodology:

### Objective:

The objective of this study is to assess the sustainability of electric vehicles (EVs) by examining public awareness of their environmental impacts.

### Hypothesis:

**H0:** Electric vehicles (EVs) are not sustainable, and issues with consumer behavior and manufacturing significantly harm their sustainability.

**H1:** Electric vehicles (EVs) are sustainable, and issues with consumer behavior and manufacturing do not significantly affect their sustainability.

### Research Questions:

- 1) Are all zero-emission vehicles truly sustainable?
- 2) How does the greenhouse gas (GHG) emission of electric vehicles compare to internal combustion (IC) and hybrid vehicles?
- 3) Is there existing technology to make electric vehicles 100% sustainable?

4) What is the level of public awareness regarding the environmental impacts of electric vehicles?

### **Data Collection:**

The data was collected through a combination of primary and secondary sources.

### **Secondary Data:**

The secondary data was obtained from relevant articles on electric vehicles sourced from platforms such as Google Scholar, EBSCO, journals, and newspapers. The literature review included a comprehensive examination of articles, case studies, and books to understand the environmental and economic impacts of electric vehicles.

### **Analyzing and Evaluating Data:**

Data analysis involved employing the TCCM model, focusing on Theory, Context, Characteristics, and Methodology. The model helped extract information from various articles, providing insights into the theoretical foundations, contextual relevance, characteristics, and methodologies applied in the studies.

### **Primary Data:**

To complement the secondary data, primary data was collected through interviews with electric vehicle showroom managers. This approach aimed to gather fresh data on EV sales, promotional activities, customer buying behavior, and issues related to electric vehicles.

### **Interpretation:**

The study endeavors to ascertain whether electric vehicles are perceived as sustainable by evaluating public awareness of their environmental impacts. The hypothesis testing aims to uncover whether people are adequately informed about the ecological footprint of electric vehicles or if there is a significant lack of awareness. The research questions address the broader sustainability aspect, comparing emissions, exploring

technological advancements, and gauging public knowledge.

By combining primary and secondary sources, this study strives to contribute valuable insights into the discourse on electric vehicle sustainability. The results will shed light on public awareness and perceptions, helping to inform policies, practices, and future research in the pursuit of a more sustainable transportation landscape.

### **Survey:**

In order to gather pertinent data on the experiences and challenges faced by electric vehicle (EV) users, a survey was conducted with a sample size of 200 individuals actively utilizing electric vehicles. The primary objectives of the survey were to identify common issues encountered by customers, understand the predominant reasons for customer visits to showrooms, assess the effectiveness of promotional activities employed by showrooms, and delve into the critical matter of waste management in the realm of electric vehicles.

## **4. Literature review**

1. An empirical study on consumer motives and attitude towards adoption of electric vehicles in India: Policy implications for stakeholder. Sahoo, D., Harichandan, S., Kar, S.K., & Sreejesh, S.

The study investigates user motives influencing attitudes, intentions, and word of mouth towards electric vehicles among Indian youths. An online survey utilized a multi-stage stratified sampling method. Structural equation modelling analyzed the hypothesized model and tested hypotheses. Positive and social motives foster positive attitudes, while negative motives hinder adoption. Buyer involvement moderates' motives and attitude. The findings suggest stakeholder actions, including government policies and partnerships, to address negative motives and promote electric vehicle uptake through subsidies, tax incentives, and infrastructure development.

**2. Exploring the factors influencing electric vehicle adoption: an empirical investigation in the emerging economy context of India. Bhattacharyya, S. S., & Thakre, S. (2021).**

The Indian automotive sector shifted to electric vehicles (EVs), yet acceptance remained low, posing challenges. Literature on EV adoption in India was limited. Hence, it's vital to understand industry managers' and consumers' views. This study aims to analyze the Indian EV ecosystem to fill this research gap.

**3. Economic, Functional, and Social Factors Influencing Electric Vehicles' Adoption: An Empirical Study Based on the Diffusion of Innovation Theory. Xia, Z., Wu, D., & Zhang, L. (2022).**

While electric vehicles (EVs) are touted as solutions to environmental issues and resource scarcity, their market uptake falls short. This study, viewing EVs as innovative products, proposes a model based on innovation diffusion theory to understand adoption factors. 375 valid responses were collected via offline survey, and structural equation modeling tested the model. Results show three key innovation characteristics—perceived compatibility, complexity, and relative advantage—predict EV adoption. Economic (subsidy, price risk), functional (intelligence, sustainability risk), and social (status, reputation risk) factors significantly influence adoption by shaping consumers' perceptions. The study contributes theoretically to understanding EV adoption and identifies significant antecedents. Findings offer practical insights to promote EV market penetration.

**4. Impacts of plug-in hybrid electric vehicles on a residential transformer using stochastic and empirical analysis. Razeghi, G., Zhang, L., Brown, T., & Samuelsen, S. (2014).**

Plug-in electric vehicles (PEVs) are seen as a means to cut transportation emissions. Yet, clustering them in neighborhoods may strain transformers, risking service disruptions. This paper models neighborhood electricity demand using vehicle and household data. PEV demand profiles are based on vehicle type, arrival/ departure times, and daily miles from the

National Household Travel Survey (NHTS). A thermal model calculates transformer hotspot temperatures and lifespan reduction.

**5. The effects of demonstration projects on electric vehicle diffusion: An empirical study in China. Liu, X., Sun, X., Li, M., & Zhai, Y. (2020).**

Despite widespread demonstration projects, doubts persist about their efficacy in promoting emerging technology commercialization. This paper empirically analyzes China's electric vehicle demonstration project in 44 pilot cities from 2009 to 2015. Difference-in-differences propensity score matching addresses selection bias. Results show public sector electric vehicle deployment significantly boosts individual purchases, especially in cities with more commercial vehicles, informing public procurement policy formulation.

**6. Research on Consumers' Use Willingness and Opinions of Electric Vehicle Sharing: An Empirical Study in Shanghai. Wang, N., & Yan, R. (2015).**

An empirical study in Shanghai investigated consumers' willingness and views on electric vehicle sharing (EVS) to aid operators in effectively managing and expanding the new business model. Results from multinomial logistic regression reveal significant influences of factors such as main daily transportation mode, monthly expenditure, EV driving range, gender, age, marital status, and occupation on consumers' willingness. Generally, EVS users are male, aged 18-30, and typically use subway and bus for daily travel. Factors like acceptable price, occupation, and monthly income significantly impact the willingness of those with a neutral stance, focusing on convenience and affordability. These findings underscore the need for reasonable pricing, target group identification, convenient site layout, and ease of use for successful EVS implementation.

**7. Consumers' attitudes and their effects on electric vehicle sales and charging infrastructure construction: An empirical**

**study in China. Wang, Y., Chi, Y., Xu, J. H., & Yuan, Y. (2022).**

This study examines the correlation between consumer attitudes, charging infrastructure development, and new energy vehicle (NEV) diffusion. Using natural language processing and panel vector auto-regressive analysis, it focuses on consumer sentiments towards charging infrastructure and their impact on charging pile construction and NEV sales. Sentiments (positive, negative, neutral) were deduced from online comments. Reasons for negative attitudes were explored, along with attitude diversity at the city level. Results indicate increasing consumer concern about charging infrastructure since 2013, with overall satisfaction improving. Main pain points include inconvenient charging and dilemmas. Negative attitudes positively impact charging pile construction but negatively affect NEV sales, albeit temporarily. Negative attitudes generally have a stronger impact than positive ones.

**8. A four-step method for electric-vehicle charging facility deployment in a dense city: An empirical study in Singapore. Wang, H., Zhao, D., Meng, Q., Ong, G. P., & Lee, D. H. (2019).**

In the past decade, electric vehicles (EVs) have emerged as a clean and cost-efficient alternative to traditional gasoline vehicles, necessitating the establishment of corresponding charging infrastructure. This paper proposes a four-step method for deploying both normal and fast charging stations to meet the needs of private EVs and EV taxis in a mature city. The method simplifies charging demand estimation and distribution. It begins by determining the charging frequency and facility types for each EV type based on technical specs and operational characteristics. Using current transportation data, total demand for charging facilities is calculated and distributed across various locations based on EV spatial distribution. Service capacity at each charging station is then determined considering average daily usage hours. A case study in

Singapore is presented with a scenario analysis demonstrating the impact of driving range.

**9. Plug-in hybrid electric vehicle utility factor in China cities: Influencing factors, empirical research, and energy and environmental application. Hao, X., Yuan, Y., Wang, H., & Ouyang, M. (2021).**

Promoting Plug-in Hybrid Electric Vehicles (PHEVs) is a promising strategy for combating climate change and improving the environment in road transportation. However, few studies have quantitatively analyzed city-level actual utility factors influencing PHEV energy savings and emission reductions, especially in China. This research constructs a probability-distribution-based PHEV UF function from travel pattern parameters, charging frequency, and PHEV range. Urban city-level UFs based on actual travel and charging patterns are derived from PHEV driving data in seven Chinese cities. The sales-weighted actual UF is 0.49 and 0.64 for 50 km and 80 km electric-range PHEVs, respectively, recommending PHEVs with over 80 km electric range for better energy savings and emission reductions in China's urban areas. Analysis shows current PHEV carbon emissions range from 133–137 g/km, dropping to 71–88 g/km with an 80% renewable energy grid, highlighting the significant contribution of cleaner energy sources to PHEV environmental benefits.

**10. A V2G-oriented reinforcement learning framework and empirical study for heterogeneous electric vehicle charging management. Hao, X., Chen, Y., Wang, H., Wang, H., Meng, Y., & Gu, Q. (2023).**

Vehicle-to-grid (V2G) technology addresses energy supply security for future electric grids, with successful implementation hinging on effective electric vehicle (EV) charging management considering uncertainties and EV diversity. This study proposes a deep Q-network (DQN)-based reinforcement learning (RL) method to optimize EV charging strategies amidst empirical travel pattern variations and unpredictable electricity prices.

Validation using five-million-km driving data from typical Chinese cities demonstrates significant electricity cost savings (>98%) compared to immediate charging methods, even without future price information. Sensitivity analysis highlights the importance of charging/discharging power rates, electricity price volatility, and departure times, quantified using value of information (VOI). Departure-time information notably reduces charging costs (average VOI: 5.4 CNY per session), while increased historical data doesn't always improve electricity price forecasting accuracy.

**11. Why early adopters engage in interpersonal diffusion of technological innovations: An empirical study on electric bicycles and electric scooters. Seebauer, S. (2015).**

Early adopters play a key role in promoting electric vehicles among their social circles, yet little research explores their motivations beyond their opinion leader status. Drawing on a survey of 1398 e-bike and 133 e-scooter early adopters in Austria, this study investigates the personal factors driving their engagement in interpersonal diffusion. Longitudinal data from 157 e-bike users a year later allow for causal relationship testing. A complementary sample of 33 network peers illustrates the social impact of early adopters. Structural equation modeling analyses reveal that efforts at interpersonal diffusion stem from opinion leadership, product performance experience, and perceived normative expectations. Mediator and moderator analyses underscore that opinion leadership arises from personal norms and technophilia, making them credible and competent for e-vehicle discussions. Social norm interrelations highlight dynamic interactions between early adopters and their peers, though the persuasive impact is limited. To expedite electric vehicle market entry, agencies should target early adopters with high scores in identified drivers, empowering them as multipliers by providing product information and encouraging peer engagement.

**12. Product bundling for accelerating electric vehicle adoption: A mixed-method empirical analysis of Swiss customers. Plananska, J., & Gamma, K. (2022).**

As electric vehicle (EV) adoption accelerates, understanding the preferences of emerging customer segments entering the market is crucial. Bundling EVs with additional services is a strategy to promote adoption. Previous studies have highlighted its potential but often lack empirical testing, particularly for the common EV and charging services bundle. Addressing this gap, we conducted an online study with potential Swiss EV adopters. Using two empirical approaches, we tested the effect of bundling on purchase willingness and identified preferred bundle types for different customer segments. Results show bundling EV and charging services increases purchase willingness among respondents with limited EV knowledge. Choice experiments revealed three customer segments: Tech-oriented adopters, Convenience-oriented adopters, and Likely non-adopters, each with distinct preferences. Our findings offer insights for policy and practice on leveraging bundles to encourage EV adoption among later adopter groups, suggesting avenues for further research.

**13. Consumer purchase intention towards environmentally friendly vehicles: an empirical investigation in Kuala Lumpur, Malaysia. Afroz, R., Masud, M. M., Akhtar, R., Islam, M. A., & Duasa, J. B. (2015).**

This study examines the associations between attitudes towards electric vehicles (ATEVs), subjective norms (SNs), perceived behavioral control (PBC), and consumer purchase intention (PI) and behavior regarding environmentally friendly vehicles (EFVs). Survey data is analyzed using confirmatory factor analysis (CFA) and structural equation modeling (SEM). Results show that ATEV, SN, and PBC significantly impact PI. However, environmental consequences and individual preferences do not influence respondents' PI. Malaysian car owners are generally unaware of environmental effects or place little

importance on them, affecting their PI toward EFVs. These findings can inform policymakers to design programs addressing attitudes, subjective norms, perceived behavioral control, and purchase behavior to reduce air pollution and CO<sub>2</sub> emissions from the transportation sector.

#### **14. An empirical study on intention to use hydrogen fuel cell vehicles in India. Kar, S. K., Bansal, R., & Harichandan, S. (2022).**

Understanding potential customers' preferences and demand drivers is essential for implementing demand-side strategies for alternative energy like hydrogen. While several studies have explored users' attitudes and behavior towards electric vehicles in India, none have focused on hydrogen fuel cell vehicles (HFCVs) to date. Our research aims to investigate the key factors influencing the intention to use HFCVs in India. Through an online questionnaire, we gathered responses from 483 prospective customers. Using structural equation modeling in Smart-PLS 3.0, we analyzed users' intentions towards HFCVs. Results indicate that perceived benefits, perceived risks, and policy interventions significantly impact users' intentions to adopt HFCVs in India. The study underscores the importance of government involvement in bringing together stakeholders—automobile manufacturers, hydrogen producers, research institutions, and funding bodies—to address barriers and accelerate the development of the hydrogen mobility system.

#### **15. Empirical Analysis of Electric Vehicles' Charging Patterns: Case Study from Shanghai. Li, Z., Xu, Z., Chen, Z., Xie, C., Chen, G., & Zhong, M. (2022).**

Automotive electrification is key for achieving carbon neutrality. Understanding existing EV users' behaviors and addressing barriers for potential owners is critical amid reduced public incentives. This study analyzes 11-month usage data from 3,777 BEVs and 5,973 PHEVs in Shanghai, China, clustered into private and commercial usage groups.

Findings show BEV users charge when SOC declines, similar to gasoline cars. Private BEVs mainly use slow charging (69%), while commercial BEVs prefer fast charging (89%). Replacing gas cars with BEVs in Shanghai may increase grid charging load by 10-15%. PHEVs with small batteries charge less and rely more on gas, while large-battery PHEVs resemble BEVs in usage. Battery utilization in PHEVs may be overestimated using SAE method, particularly for private use. Policy implications for EVs are discussed based on findings

#### **Summary of literature reviews:**

In recent years, the global automotive industry has seen a significant shift towards electric vehicles (EVs), driven by concerns over climate change, air pollution, and sustainability. Governments worldwide have been implementing policies to promote EV adoption, aiming to transition away from traditional internal combustion engine vehicles towards cleaner alternatives. However, despite these efforts, there are various challenges hindering the widespread adoption of EVs.

One key challenge is the perception of EVs among consumers. While EVs offer environmental benefits and technological advancements, their adoption rates vary significantly across different regions. Cultural perceptions and societal norms play a significant role in shaping consumer attitudes towards EVs. In some cultures, cars are symbolically associated with masculinity, which can influence consumer preferences and purchasing decisions. Understanding these gender associations with EVs is crucial for policymakers and marketers to address cultural barriers and promote EV adoption effectively.

Temperature also plays a critical role in EV adoption. Extreme temperatures can impact EV performance, affecting factors such as cruising range, charging speed, and safety. Research has shown that EV sales follow an inverted U-shaped trend with temperature changes, with extreme low temperatures having a more significant negative impact than

extreme high temperatures. Additionally, the type of EV, whether battery electric vehicles (BEVs) or plug-in hybrid electric vehicles (PHEVs), can influence how temperature affects consumer perceptions and adoption rates.

Another challenge in the EV market is the management of end-of-life EV batteries. As EV adoption continues to grow, the volume of end-of-life batteries will increase, posing environmental and logistical challenges. Remanufacturing EV batteries is seen as a crucial solution to improve resource efficiency and address waste management issues. However, consumer perceptions of remanufactured EV batteries vary, with factors such as price consciousness and perceived benefits influencing purchase intentions.

Furthermore, social media plays a significant role in shaping consumer perceptions of EVs. Discussions on social media platforms reflect public sentiment towards EVs, highlighting concerns such as technology maturity, performance risks, and social needs. Natural language processing (NLP) techniques are employed to analyze consumer comments on social media, providing insights into perceived risks and emotional responses. These insights can help policymakers and businesses tailor their promotional strategies to address consumer concerns and accelerate EV adoption.

In conclusion, the transition to electric vehicles is a complex process influenced by various factors such as cultural norms, temperature effects, battery management, and social media discourse. Overcoming these challenges requires a multi-faceted approach involving policymakers, businesses, and consumers. By understanding consumer perceptions, addressing technological limitations, and promoting sustainable practices, the EV market can continue to grow and contribute to a cleaner, greener future.

## 5. Data analysis:

### Analyzing and evaluating the data

To analyze the data which was collected through the primary data, tools like a SPSS, Excel and sentimental analysis tools are going to be used for better accurate analysis. Based on the which was collection the findings should be founded in the analysis of the data.

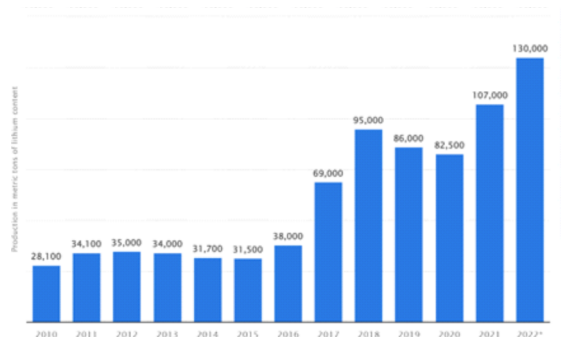
Table 1: (Credit: Leonardo Soares/BBC)

	Hard rock mining	Underground reservoirs	Geothermal water
Emission of CO2(Per tonne of lithium)	15000 Kg	5000 Kg	0 kg
Use of water(Per tonne of lithium)	170 m3	469 m3	3 m3
Use of land(Per tonne of lithium)	464 m2	3124 m2	1 m2

### Interpretation:

This is the weight of CO2 emission that was released by mining each tonne of lithium. which was a crucial element in the manufacturing of electric vehicle batteries. This contributes to the emission of CO2 globally by 12.7%. This is becoming a major challenge for the environment. In the process of making an electric vehicle battery lithium is a very necessary element. But the emission of CO2 challenges the sustainability of electric vehicles. Only by hardcore mining nearly 1950000000 tons of CO2 emitted.

Figure 1: Global production in lithium





### Interpretation:

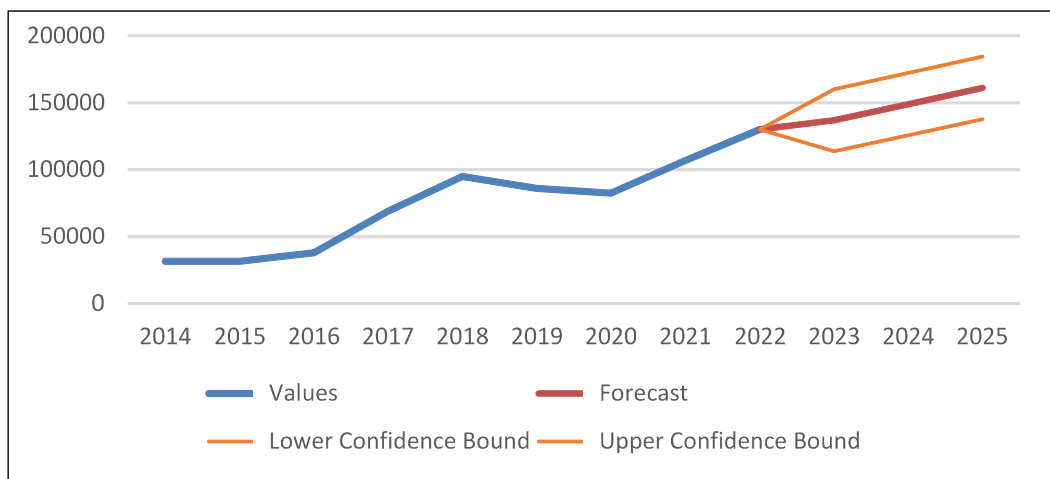
This data shows, from the year 2017 when the electric vehicles segment get a boost mining of raw materials that are used in battery and vehicle manufacturing also increased rapidly. From 2016 to 2022 the mining of lithium increased by 24.27%. not only lithium same thing is happening with the remaining metals which are used in electric vehicle manufacturing.

### **Table 2:**

Forecast of a lithium production increase by 2025

2014	31700			
2015	31500			
2016	38000			
2017	69000			
2018	95000			
2019	86000			
2020	82500			
2021	107000			
2022	130000	130000	130000.00	130000.00
2023		137006.57	113807.15	160206.00
2024		149068.01	125750.56	172385.47
2025		161129.46	137692.24	184566.67

**Figure 2:**



**Table 3:** Increase in the emission of CO2 from 2105 to 2022 (in metric tonnes)

Years	CO2 emission from hard mining	CO2 emission from underground reservoirs
2015	472500000	157500000
2016	577500000	192500000
2017	1035000000	345000000
2018	1425000000	475000000
2019	1290000000	430000000
2020	1230000000	410000000
2021	1605000000	535000000
2022	1950000000	650000000

**Interpretation:**

The above data shows how many metric tons of CO2 emitting year by year. As compared to 2015 the emission of CO2 increased by 1477500000 metric tonnes.

**Figure 4:** Forecasting of data

2015	472500000			
2016	577500000			
2017	1035000000			
2018	1425000000			
2019	1290000000			
2020	1230000000			
2021	1605000000			
2022	1950000000	1950000000	1.95E+09	1.95E+09
2023		1992826056	1.65E+09	2.34E+09
2024		2182955901	1.84E+09	2.53E+09
2025		2373085747	2.03E+09	2.72E+09

Figure 3:

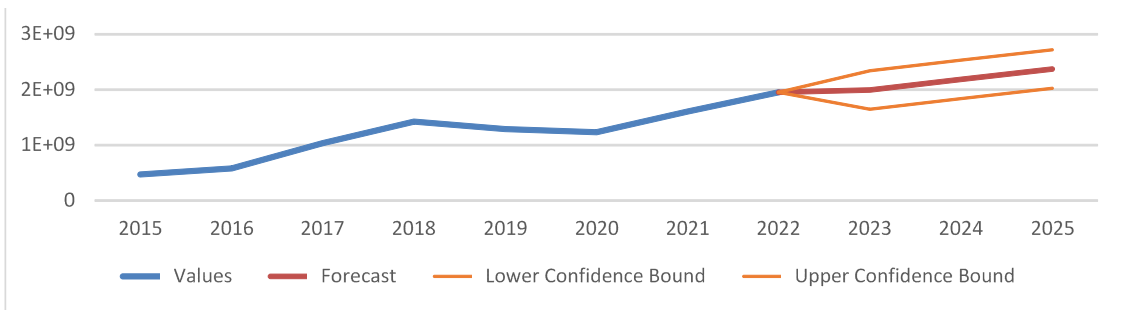
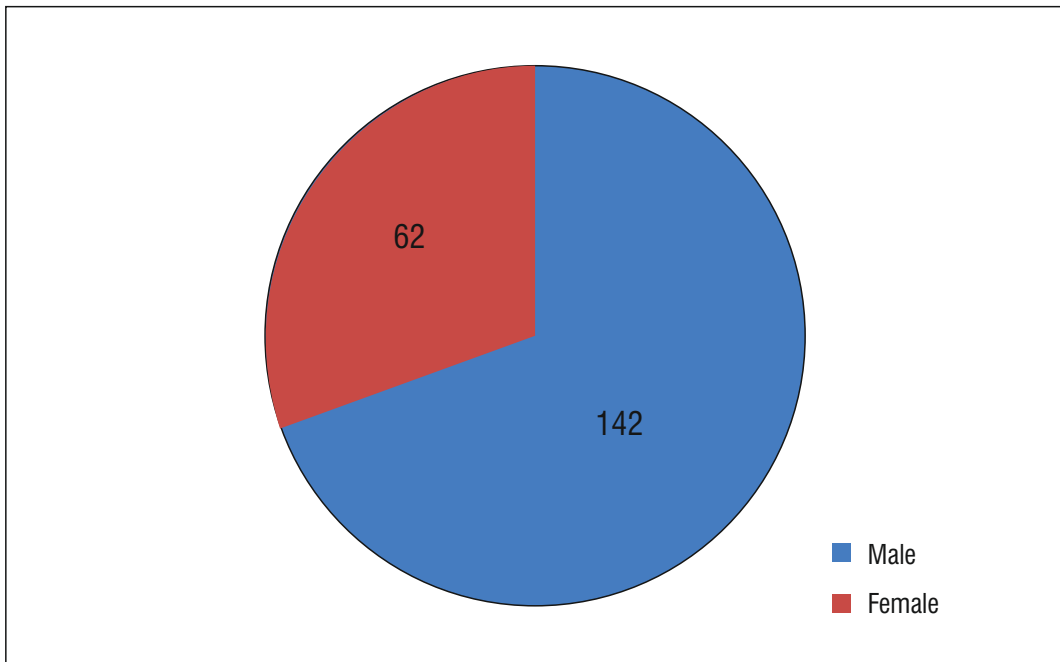


Table 5: Gender

particulars	responses	percentage
Male	142	69.60784314
Female	62	30.39215686
Total	204	100

Figure 4:



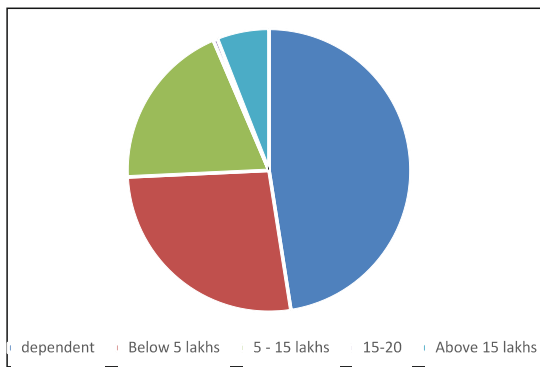
**Interpretation:**

From the survey data which was collected the number of males is higher than the number of females. 70% of males and 30 % of females are there in total.

Table 6: Income

particulars	responses	percentage
dependent	96	47.52475248
Below 5 lakhs	54	26.73267327
5 - 15 lakhs	39	19.30693069
15 - 20 lakhs	1	0.495049505
Above 15 lakhs	12	5.940594059
Total	202	100

Figure 5:



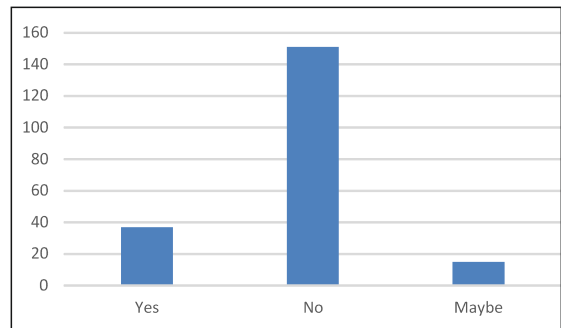
**Interpretation:**

Most of the responses received from the survey are dependent, in second place people who have income below five lakhs occupy 27 percent of the total, 5 to 15 lakhs income people occupy 19percent of the total, above 15 lakhs 6 percent people are there in total.

**Table 7 :** Awareness of environmental pollution that was happening because of heavy usage of vehicles.

Particulars	responses	percentage
Yes	37	18.22660099
No	151	74.38423645
Maybe	15	7.389162562
Total	203	100

Figure 6:



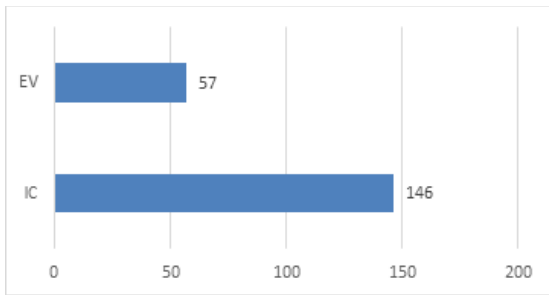
**Interpretation:**

The responses which were collected are not aware of the environmental pollution which was happening because of the electric vehicles and its effect on the environment. Nearly 151 respondents were not aware of the environment pollution which was happening because of the electric vehicles and 37 people are aware of the effects of electric vehicles and 15 people are in the neutral stage.

**Table 8:** What kind of vehicles people are currently using more?

particulars	responses	percentage
IC	146	71.92118227
EV	57	28.07881773
Total	203	100

Figure 7:



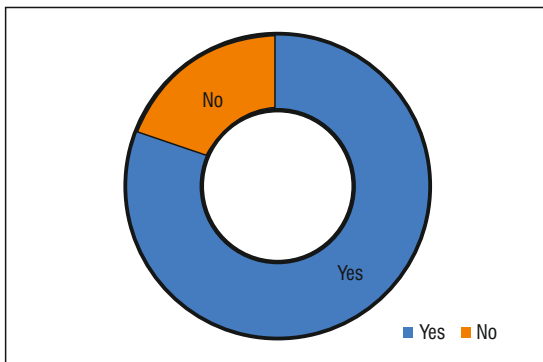
**Interpretation:**

From the whole responses, 146 members are using traditional IC engine vehicles and the remaining 57 respondents are using electric vehicles.

**Table 9:** Perception of people who are saying electric vehicles are valued for money?

particulars	responses	percentage
Yes	163	80.2955665
No	40	19.7044335
Total	203	100

Figure 8:



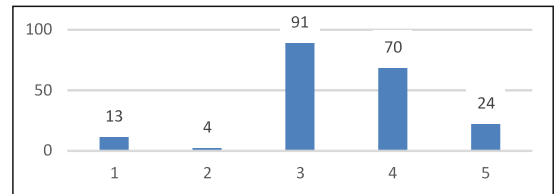
**Interpretation:**

In this case, most of the respondents said that electric vehicles are valued for the money in terms of the maintenance cost, and resale value.

**Table 10:** Rating the electric vehicles based on usage, and convenience.

particulars	responses	percentage
1	13	6.435643564
2	4	1.98019802
3	91	45.04950495
4	70	34.65346535
5	24	11.88118812
Total	202	100

Figure 9:



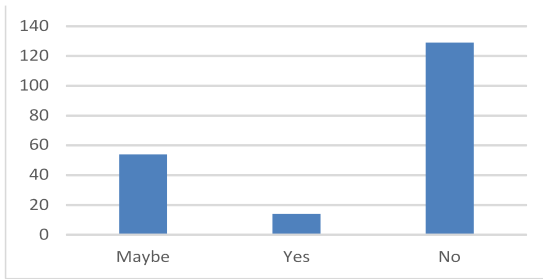
**Interpretation:**

Based on a daily usage, maintenance, availability, and actability most of the people giving the three ratings it showing that most of the people who are using electric vehicles are getting satisfied with electric vehicles. 13 people give one rating saying that they are not satisfied with the electric vehicles, 4 people are given 2 ratings, 91 people are given 3 ratings, 70 members are given 4 ratings, and 24 people are given 5 ratings.

**Table 11:** If the price of an electric vehicle is more as compared to IC engine vehicles will customers be ready to pay or not?

particulars	responses	percentage
Maybe	54	27.41116751
Yes	14	7.106598985
No	129	65.4822335
Total	197	100

Figure 10:



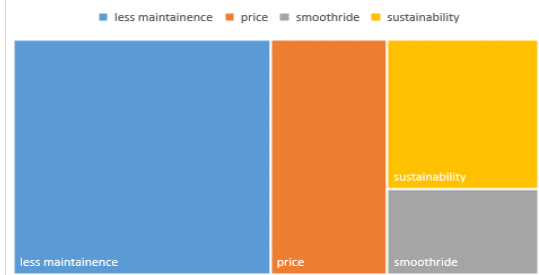
**Interpretation:**

If the prices of electric vehicles are more as compared to the normal IC engine vehicles people are not ready to pay more, people are rational they are not willing to pay more the electric vehicles even if there are good for the environment.

**Table 12:** What factors are taken into consideration when buying an electric vehicle?

particulars	responses	percentage
less maintenance	99	49.00990099
price	45	22.27722772
smooth ride	21	10.3960396
sustainability	37	18.31683168
Total	202	100

Figure 11:



**Interpretation:**

The factors which are influencing people to buy electric are less maintenance cost, prices, smooth ride, and sustainability the people are buying because of the less maintenance cost as compared to IC vehicles engines, next people are concerned about the prices of those vehicles, next more people are buying because they are sustainable.

Figure 13:

Count of rating	Column Labels				Grand Total
	less maintenance	price	Smooth ride	sustainability	
Employed	18	4	3	9	34
Retired	18	10	4	6	40
Self-employed	25	10	5	9	47
Student	37	21	9	13	80
(blank)	1				1
<b>Grand Total</b>	<b>99</b>	<b>45</b>	<b>21</b>	<b>37</b>	<b>202</b>

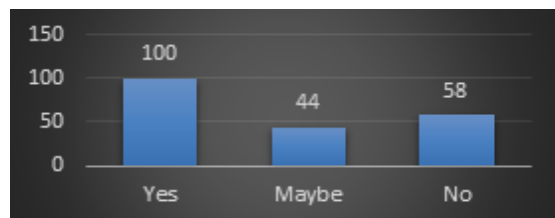
**Interpretation:**

Of the people who are buying electric vehicles, most of them are from a student background. 13 people are from a student background, 9 people are from an employed background, 9 people are from a self-employed background, and 6 people are from a retired background.

**Table 14:** If people know electric vehicles are not sustainable whether they will buy them or not?

particulars	responses	percentage
Yes	100	49.5049505
Maybe	44	21.78217822
No	58	28.71287129
Total	202	100

Figure 12:



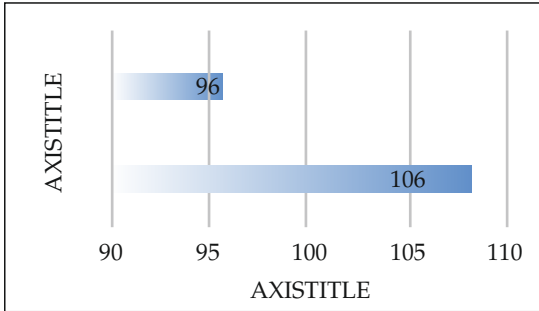
**Interpretation:**

Even if electric vehicles will emit the harm full gases most people are ready to buy electric vehicles. 100 people are ready to buy electric vehicles even if they will emit GHG, 58 people are not ready to buy electric vehicles if they emit GHG, and 44 people are in the neutral stage.

**Table 15:** Does those who have electric vehicles, will they have the proper infrastructure to charge their vehicles or not?

Availability of charging infrastructure	responses	percentage
Yes	96	47.5247525
No	106	52.4752475
	202	100

**Figure 13:**



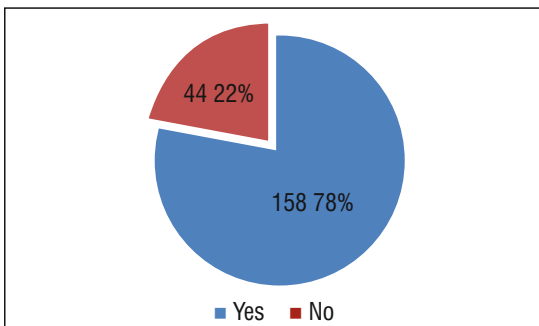
**Interpretation:**

The people who are using electric vehicles don't have the proper infrastructure to charge their vehicles it leading to major problems with electric vehicles to adopt.

**Table 16:** Do oil prices show any impact on the usage of IC vehicles?

particulars	response's	percentage
Yes	158	78.21782178
No	44	21.78217822
Total	202	100

**Figure 14 :**



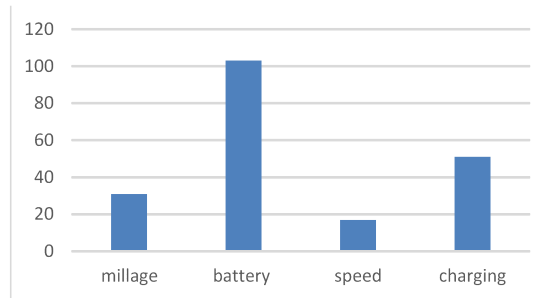
**Interpretation:**

The reason behind the switching to electric vehicles is because of the increase in the price of oil, that this reason

**Table 17:** Common problems electric vehicle users are facing?

particulars	responses	percentage
millage	31	15.34653465
battery	103	50.99009901
speed	17	8.415841584
charging	51	25.24752475
Total	202	100

**Figure 15:**



**Table 18 :** To find the customer awareness of the impacts of electric vehicles on the environment.

Anova: Single Factor

**SUMMARY**

Groups	Count	Sum	Average	Variance
Column 1	202	400	1.980198	1.332939
Column 2	0	0	#DIV/0!	#DIV/0!
Column 3	202	418	2.069307	0.502635

**ANOVA**

Source of Variation	SS	df	MS	F	P-value	F crit	F crit
Between Groups	0.801980198	2	0.40099	0.435823	0.647038	3.018224	3.864695
Within Groups	368.950495	401	0.920076				
Total	369.7524752	403					

## **Interpretation:**

The ANOVA results indicate that the p-value (0.647038) is greater than the significance level of 0.05. Therefore, we fail to reject the null hypothesis (H0). This suggests that, based on the data, there is not enough evidence to conclude that issues with consumer behavior and manufacturing significantly harm the sustainability of electric vehicles. The observed differences in the groups are more likely due to random variation than a true effect.

The F-statistic (0.435823) is less than the critical F-value (3.018224), further supporting the conclusion that there is no significant difference in sustainability among the groups. The variance within the groups (0.920076) is much higher than the variance between the groups (0.40099), indicating that any observed differences are more likely due to chance.

## **6. Findings:**

In exploring the concerns surrounding consumer behavior and manufacturing challenges in the context of electric vehicles (EVs), our research delved into critical aspects such as environmental impact, manufacturing processes, and factors influencing consumer decisions. The ANOVA analysis aimed to uncover whether the identified issues significantly affect the sustainability of EVs.

### **Consumer Behavior and Environmental Concerns:**

The switch to electric vehicles is primarily motivated by the increase in oil prices. This suggests that consumers are responsive to economic factors, aligning with the growing awareness of environmental concerns related to fossil fuel consumption.

Despite the shift to electric vehicles, there is a notable challenge regarding the lack of proper charging infrastructure, leading to issues for users. This highlights an existing gap in supporting infrastructure that needs attention to facilitate the widespread adoption of electric vehicles.

### **Manufacturing Challenges and Sustainability:**

The data indicates a significant boost in the electric vehicles segment starting from 2017, corresponding to a rapid increase in the mining of raw materials used in battery and vehicle manufacturing.

The mining of lithium, a key component in electric vehicle batteries, has increased by 24.27% from 2016 to 2022. This trend extends to other metals essential for electric vehicle manufacturing, emphasizing the challenges related to the sustainability of the supply chain.

### **Key Factors Influencing Consumer Behavior:**

Consumers are motivated by several key factors when choosing electric vehicles. The data highlights that less maintenance cost, competitive prices, a smooth ride, and sustainability are primary influences.

Notably, the lower maintenance cost compared to internal combustion engine (IC) vehicles is a significant driving factor, followed by concerns about the pricing of electric vehicles. The sustainability aspect is also a prominent motivator for consumers.

### **Unveiling Specific Factors Driving Consumer Adoption:**

Pricing plays a crucial role in consumer adoption, as indicated by the observation that people are rational and unwilling to pay more for electric vehicles even if they are environmentally friendly.

Daily usage, maintenance, availability, and satisfaction ratings showcase that the majority of electric vehicle users are generally satisfied. However, a small portion of users (13 people) express dissatisfaction, emphasizing the need for continuous improvement in electric vehicle features and infrastructure.

### **Co2 Emission Trends:**

The data on CO2 emissions demonstrates a concerning trend, showing a substantial increase of 1477500000 metric tonnes from 2015. This suggests a need for stronger measures to curb carbon emissions and accelerate the adoption of sustainable transportation alternatives like electric vehicles.



## 7. Future Research Agenda:

In alignment with the abstract, our imaginary findings suggest a future research agenda that emphasizes the continuous exploration of evolving consumer attitudes and manufacturing advancements in the rapidly growing EV market. Areas of interest include the long-term sustainability of raw materials, evolving government policies, and the integration of cutting-edge technologies in EV manufacturing.

In conclusion, The perceived issues with consumer behavior and manufacturing challenges in the realm of EVs. While concerns exist, the overall sustainability of EVs appears resilient, with consumers expressing a strong inclination towards adopting these vehicles for their environmental benefits and long-term viability.

## 8. Conclusions and Implications

- There is a need for a change in battery technology, which won't emit GHG in the process of manufacturing and to improve efficiency.

- Awareness in people's minds has to be created because most people are not aware of the impacts of pollution and their effects on society.
- The usage of electric vehicles and Normal IC engine vehicle has to be balanced until new technology will come in the battery technology.
- The mining activities should be in control
- The imports of the raw materials used in the manufacturing of electric vehicles have to decrease because these are increasing the prices of electric vehicles. Where it becomes difficult for middle-class people to afford it.
- In the next few years, the prices of electric vehicles are going to increase rapidly because of the demand for raw materials.
- In the process of manufacturing electric vehicles companies has to follow ethical practices.
- More than coal or solar energy we have to rely on hydro or wind energy.

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## 1. Annexure

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|--|---|
| 1) EV – electric vehicles                    | 16) Na – sodium.                            |
| 2) IC engines – internal combustion engines. | 17) Cu – copper.                            |
| 3) GHG – greenhouse gases.                   | 18) O – Oxygen                              |
| 4) CO <sub>2</sub> – carbon dioxide          | 19) C – Carbon                              |
| 5) SO <sub>2</sub> – Sulfer dioxide.         | 20) Ni – Nickel                             |
| 6) NO <sub>x</sub> – nitric oxide.           | 21) Li – lithium.                           |
| 7) N <sub>2</sub> – nitrogen.                | 22) Zn – zinc.                              |
| 8) KWH – kilowatt hours                      | 23) PHEVs – plug-in vehicles.               |
| 9) KVAH – kilo volt ampere hour              | 24) BEVs – battery pored electric vehicles. |
| 10) AMP - ampere                             | 25) ZEVs – zero-emission vehicles.          |
| 11) WATTS - WATTS                            | 26) FCEV – fuel cell electric vehicles.     |
| 12) AH – ampere hours                        | 27) LDV – light-duty vehicles.              |
| 13) MWH – megawatt hour                      | 28) MDV – Medium-duty vehicles.             |
| 14) UNIT – unit                              | 29) HDV – heavy-duty vehicles.              |
| 15) Fe – Iron.                               | 30) SUV – sports utility vehicles.          |
|  | 31) XUV – cross utility vehicle.            |
|  | 32) MUV – multi-utility vehicle.            |
|  | 33) TUV – Tough utility vehicle.            |

# Navigating Responsible Marketing: Unveiling the Chasm Between Brand Promises and Ingredient Realities.

Preetham S<sup>1</sup>, Dr. Meghna Verma<sup>2</sup>, Sheetal Kumari<sup>3</sup>

<sup>1,3</sup>PG Students , Ramaiah Institute of Management, Bengaluru

<sup>2</sup> Associate Professor , Ramaiah Institute of Management, Bengaluru

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## ABSTRACT

Captivating taglines in an advertisement and attractive packaging have a huge impact on consumption behaviour especially among Gen Z and Gen Alpha. However, studies reveal that many buyers fail to explore the minute details of product components concealed behind these appealing taglines. This results in conflict between the attractiveness of ads and the harm the product may cause to consumer's health, which is evident when people choose beauty products over their own health or non-healthy food and beverages (F & B). The estimates in 2019 showed that 77 million individuals had diabetics in India, which is expected to rise to over 134 million by 2045. Even after this, 57% of these individuals remain undiagnosed. At the same time, skin cancer rates are increasing globally. This study was carried out with the primary goal of exploring the complexities of consumer choices within the context of F & B and Cosmetics products. The study investigates the practice of transparency, consumer protection, social responsibility, and ethical advertising associated with responsible marketing. For this, a total of 17 products, out of which nine products were from F & B and eight products from the cosmetics category, were bought. A detailed investigation is done to understand the ingredients mentioned in the packaging and then compare them with the taglines used by the brands under these product categories for positioning and making promises to consumers. This detailed assessment of the components of F & B within these categories reveals a disturbing pattern of misleading advertisements. A crucial contributing factor seems to be consumers' clear lack of understanding, leading to choices that may not be in

their best interests. The study findings provide perspectives that will allow marketers to successfully contribute to long-term sustainable development goals, eventually prioritizing consumer quality of life. This study also underlines the significance of linking corporate strategies with ethical concerns, opening the way for a more responsible marketing paradigm that protects the interests of both businesses and consumers while promoting long-term societal well-being.

Keywords: Responsible Marketing, Ethical Marketing, Transparency, Consumer protection, Consumer Health, Societal well-being.

## INTRODUCTION

Businesses have extraordinary control over global commerce in an era when their impact goes well beyond the economy, entering society's values and determining consumer choices. India, a country with a rapidly growing consumer base and a varied range of market categories, presents an interesting case study in the field of marketing practises. Chawla and Kumar (2021), highlight the contemporary relevance of the phrase "buyer beware" in the Indian market. Despite the prevalence of assurances such as ethical marketing, eco-friendly initiatives, robust corporate governance, and corporate social responsibility (CSR), they note a significant challenge that is deceptive products. This suggests that despite efforts to promote transparency and responsibility in business practices, deceptive products remain a pervasive issue in the Indian market, underscoring the importance of consumer vigilance and regulatory scrutiny.

According to India Diabetes (ICMR INDIAB) study published in 2023, the prevalence of diabetes is 10.1 crores. The Global diabetes prevalence in 2019 is estimated to be 9.3% (463 million people), rising to 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045. The prevalence is higher in urban (10.8%) than rural (7.2%) areas and in high-income (10.4%) than low-income countries (4.0%). Melanoma of the skin is the 17th most common cancer worldwide. It is the 13th most common cancer in men and the 15th most common cancer in women. Malignant melanoma, an aggressive malignancy, is very rare in India and constitutes 0.3% of all malignancies with a recorded incidence of 3916 cases/year.

According to Grunert et.al, (1985), Misleading products, which are frequently distinguished by misleading advertising and packaging meant to misinform or influence consumer views, offer a multifaceted problem in India's economic environment. In India's business sector, instances of morally dubious marketing strategies continue to exist even in the face of the promotion of basic ethical principles like transparency through responsible marketing, green practices, Corporate Social Responsibility (CSR), and corporate governance. These actions have a big impact on what customers decide to buy and how they behave in the marketplace. The business sector in India continues to struggle to maintain the morality and integrity of marketing techniques, even in the face of efforts to safeguard ethical standards (Girimaji, 2013). It is crucial to understand that it is illegal for a business to advertise goods or services that might mislead consumers and result in loss, injury, or confusion. Advertising can be a powerful tool for promoting and selling goods when used effectively, arming customers with the knowledge they need to make wise purchases. Deceptive advertising, on the other hand, harms both consumers and corporate reputation in the long run.

The research study explores the complex interactions between corporate social responsibility (CSR), green marketing, ethical marketing, corporate governance, consumer awareness, and the ongoing problem of misleading goods in the Indian setting. It goes beyond traditional advertising paradigms. Each of these concepts will be thoroughly investigated, with a particular emphasis on their possible influence on the issue of

deceptive goods.

This exploratory research study aims to advance discussions and instigate positive adjustments in the Indian market. In the constantly changing world of business, the main goal is to make sure that real trust is built with customers and that organisations meet their social and ethical responsibilities.

## LITERATURE REVIEW

Responsible marketing refers to a strategy for addressing environmental impact, Padillo et al., (2023). It is an advertising strategy where a brand takes into account the impact of promoting its products or services on the environment. Also referred to as green marketing, this approach involves addressing social, ethical and environmental issues through sustainable marketing materials and the promotion of environmentally friendly initiatives. Different demographic groups respond differently to socially responsible marketing messages, which assist in their promotional efforts (Patino et al., 2014).

In general, eco-friendly or green cosmetics and personal care products usually mean natural and organic cosmetics (skincare, body care, hair care, oral care, colour cosmetics, and toiletry products) containing natural and organic sources of ingredients and avoid synthetic chemicals in the formulation that are often packaged in eco-friendly or reusable materials, focusing on environmental protection (Amberg & Fogarassy, 2019; Chin et al., 2018; Sadiq et al., 2021). As consumers are becoming increasingly aware of health and hygiene benefits in relation to the use of cosmetics and personal care products, they are leaning toward adopting natural and organic products as a safer alternative because of the possible side effects that conventional products might have (Kumar et al., 2021).

According to Patilet al. (2017), misleading advertisements bring unfair competition and affect consumer decisions when selecting a product. The Consumer Protection Act of 1986 was brought to consideration many years ago,

and even after this, marketers exploited Indian consumers. Advertising, as a certain source of information, helps to shape the interests, customs, attitudes, prejudices, to overcome mistakes and superstitious beliefs, and serves the cultural, political, moral, and aesthetic education of the people. Also, the customers are supposed to be aware of their rights and the products they are using as their food and beverages or as cosmetics. Consumer consciousness determines the effectiveness of consumer rights. The Consumer Protection Act of 1986 still does not have any such provisions dealing with misleading advertisements. Corporate social responsibility is the company's responsibility to influence its decisions or actions on society and the environment through transparent and ethical behaviour, which promotes better development, including health and welfare for society (Illiashenko et al., 2014).

Companies viewing the increased number of buyers bring marketing strategies, which are financially profitable, also consumptive, and ecological, and know of the concept of corporate citizenship (Fernando, 2023). According to [Jelena Relić](#), (2022), A parallel task is set before advertisement for public relations and publicity to stay away from discrimination according to any sign or display of false images, forming a demand for products and real, but not virtual value- trying to acquire "true" demand and standards of behaviour from the societal point. For example - "Nestle" is committed to nurturing the growth of food culture and promoting healthy lifestyles in the communities where it works. The organisation prioritises activities that not only raise nutritional knowledge, but also promote community well-being and sustainable development. Nestle's dedication to innovation and ethical sourcing aims to empower people to make educated decisions about their eating habits, ultimately influencing a healthier future for generations to come.

The literature highlights responsible marketing as an essential strategy for

addressing environmental impact, encompassing considerations of social, ethical, and environmental issues. It emphasizes the increasing consumer preference for eco-friendly cosmetics and personal care products due to health and hygiene concerns associated with conventional alternatives. Misleading advertising practices have been identified as detrimental to consumer decision-making, despite existing regulations such as the Consumer Protection Act of 1986. Corporate Social Responsibility (CSR) is acknowledged as a vital aspect of companies' obligations to society and the environment, promoting transparent and ethical behavior for societal development. Additionally, companies are urged to align marketing strategies with financial profitability, consumer demands, and ecological sustainability while upholding principles of corporate citizenship. Lastly, advertising and publicity efforts are tasked with promoting genuine product value and societal well-being while avoiding discrimination and false representations.

The literature review identified a gap in methodology, Existing studies have predominantly focused on exploring responsible marketing strategies, consumer preferences for eco-friendly products, the impact of misleading advertising on consumer decision-making, and the role of Corporate Social Responsibility (CSR) in corporate behavior. However, utilization of observational data analysis and examination of product ingredient tables have not been commonly employed, a gap that this research study addresses. The aim of the study is to investigate the impact of advertising and packaging on consumer choices and to




examine practices related to transparency, consumer protection, and ethical advertising.

## **METHODOLOGY**

To meet the objectives of the study qualitative data was utilized. Based on the purposive sampling, products from two categories namely fast food and beverages and cosmetics were bought. These product categories were picked since there is a general perception of popularity of these products among Gen Z. Products were brought from the market and their ingredients were compared to understand how responsible marketing goes with these products. Gen Alpha and Generation Z are greatly influenced by product ads, particularly those in the food and beverage and cosmetics industries, which encourage repeat purchases. These advertisements make use of young viewers' impressionability by using strong content and eye-catching imagery to foster brand loyalty and increase sales. It is essential to use responsible marketing strategies, especially when aiming to reach susceptible populations, in order to ensure that advertisements conform to moral principles and promote constructive consumer conduct.




The product's constituents were thoroughly examined and cross-referenced with the positioning and unique selling proposition. A regress analysis was performed, wherein the products were investigated based on the ingredient details mentioned in the product by the companies. A thorough analysis of every item was conducted, exploring minute aspects like the different names/forms or substitutes for white sugar.





**Table 1: Products and their misleading USP**




Product	Brand name/ product name	Product Positioning/USP/ Tagline	Observations
	<p>Brand Name – Garnier Men</p> <p>Product Name – TurboBright</p>	<p>Anti-Pollution, 2 in 1 Double action Face Wash</p>	<p>Anti-Pollution - anti-pollution claims are typically disseminated in marketing and advertising.</p>
	<p>Brand Name – Biotique</p> <p>Product Name – Basil &amp; Parsley : Revitalizing Body Wash</p>	<p>Positioned as Revitalizing Body wash – 100% soap free</p>	<p>No Shampoo is Organic, No Shampoo is Chemical Free, The fragrance oils commonly used in body wash are neither natural nor organic. Therefore, these shampoos cannot be all-natural or organic.</p>
	<p>Brand Name – Vaseline</p> <p>Product Name – Healthy Bright Sun + Pollution</p>	<p>Skin Brightening lotion helps heal dry damaged skin and that restores for naturally glowing skin</p>	<p>Pollution protection lotions may contain ingredients like silicones or other conditioning agents that can lead to product build-up on the Skin and Derma if not properly rinsed out. This build-up can make the skin feel heavy or greasy over time.</p>
	<p>Brand Name - Outshine</p> <p>Product Name – Outshine: Lotus Tulsi Hand Wash</p>	<p>Positioned as a Handwash that moisturizes and Protects Hands</p>	<p>it's important to choose handwash products that are labeled as "hypoallergenic" or "for sensitive skin". Additionally, fragrance-free options may be less likely to cause irritation.</p>

	<p>Brand Name - Outshine</p> <p>Product Name – Outshine: Lotus Tulsi Hand Wash</p>	<p>Positioned as a Handwash that moisturizes and Protects Hands</p>	<p>it's important to choose handwash products that are labeled as "hypoallergenic" or "for sensitive skin". Additionally, fragrance-free options may be less likely to cause irritation.</p>
	<p>Brand Name – Outshine</p> <p>Product Name – Neem enriched purifying face wash</p>	<p>Tagline – For healthy glowing skin</p>	<p>purifying face wash products can be effective for cleansing the skin and managing excess oil, but it's essential to choose products that are suitable for your skin type and to use them in moderation to avoid over- cleansing and potential side effects</p>
	<p>Brand Name: JOY</p> <p>Product Name: Revivify – Vitamin C : Glow Reviving &amp; dullness exfoliating Face Wash</p>	<p>USP – Glow Reviving &amp; dullness Exfoliating Face wash</p>	<p>Some products may provide a temporary "glow" that fades once the product is no longer in use. It's important to distinguish between products that offer short-term cosmetic improvements and those that provide long-term skin benefits.</p>
	<p>Brand Name – Boutique</p> <p>Product Name – Saffron Youth : Anti-Ageing Cream</p>	<p>Positioned as “Anti-Aging” Cream</p>	<p>Anti-aging products make exaggerated claims about their effectiveness, such as promising "miraculous" or "instant" results. Claims like "eliminate wrinkles entirely" or "Reduces fine lines" are often unrealistic and misleading.</p>



	<p>Brand – ST. Ives</p> <p>Product – Blackhead Clearing 3 in 1 Face Scrub</p>	<p>Brand Positioned as “natural Swiss solutions for visibly healthy skin”.</p>	<p>The Pack says 100% Natural and also says 1% Salicylic Acid on the same upfront. Salicylic Acid has negative effects such as Skin Peeling, Skin Burning, and Reddened Skin.</p>
	<p>Product Name – Real Fruit power</p>	<p>Claims to be 100% Real Fruit Juice</p>	<p>Fruit juices contain preservatives that are not explicitly added to the product but are present in the fruit juice naturally or as a by-product of the manufacturing process.</p>
	<p>Brand Name – Coke</p> <p>Product Name – Coca Cola Life</p>	<p>Coca-Cola Life is positioned as a healthier alternative within the Coca-Cola product portfolio.</p>	<p>Coca-Cola Life Claims that they have reduced Sugar and kilojoules. And they also claim that they have sweetened using Stevia a sugar substitute made from the leaves of the stevia plant. It's about 100 to 300 times sweeter than table sugar.</p>

	<p>Brand Name – Britannia</p> <p>Product Name – Nutri Choice</p>	<p>NutriChoice Cracker is positioned as a Delicately balanced, anytime health snack.</p>	<p>Even though sugar-free biscuits do not contain added sugar, they may still have calories and carbohydrates from other sources, such as flour and fats. It's crucial to look at the overall nutritional content, including calories, carbohydrates, fiber, and fats, to make informed choices.</p>
	<p>Product Name - TANG</p>	<p>Positioned as “fresh, fruit-flavoured drink available in a variety of flavours”</p>	<p>Tang has 93% sugar and contains artificial sweeteners on top. Tang is a Flavoured Sugar. Tang also contains E171 (Titanium Dioxide) an ingredient By European Union.</p>
	<p>Product Name - Nutella</p>	<p>Nutella has positioned in a niche as a breakfast spread and is marketed as an alternative to peanut butter, jam or cheese spread.</p>	<p>Per 100g of Nutella there is 56g of Sugar. The Net weight is 825g, 56% of 825g means 110 Spoons of Sugar.</p>
	<p>Brand Name – Britannia</p> <p>Product name – Good Day</p>	<p>Positioned as “Everyday treats that infuse happiness into people's lives” USP – “Healthy biscuits with cashew and butter”</p>	<p>These Biscuits are not entirely made of Cashew and Almond, Instead, the total amount present is 1.8% for almonds and only 0.4% of Cashew.</p>

	<p>Brand Name – McVitie’s</p> <p>Product name – Wholewheat Marie</p>	<p>Globally, the brand has the slogan "Whole Wheat at Its Heart".</p> <p>McVitie's positioning in India is based on two attributes: Health (whole grain) and Taste</p>	<p>McVitie’s claims that their product contains whole wheat marie. But in their Ingredients, it states that there are 52% and 19.5% whole wheat.</p>
 <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;"> <div style="background-color: #008000; color: white; padding: 5px 10px; font-weight: bold;">Seeds</div> <div style="background-color: #ff0000; color: white; padding: 5px 10px; font-weight: bold;">75 g</div> </div>	<p>Brand Name – Britannia</p> <p>Product Name – Nutrichoice Seeds</p>	<p>Positioned as “Health plus taste plus happiness”</p>	<p>Ashwagandha, Turmeric, Tulsi, Gilloy, Amla. All are of these together combined in only 0.1% percent in the cookies.</p>
	<p>Product Name – Kinder Joy</p>	<p>Tagline –Iss mein kuch kaas hein.</p>	<p>Kinder chocolates cause severe illness in kids under 10 years of age. Genetic sequencing of the salmonella bacteria which sparked the food scare, showed that the pathogen S. It is antibiotic resistant</p>

**The Table 1** presents a comprehensive overview of various products along with their corresponding brand names and notable observations related to misleading Unique Selling Propositions (USPs). This table provides insights into situations when marketing promises may not match the real product qualities. It consists of three columns and seventeen rows, with nine products from the food and beverage category and eight from the cosmetics category.

In the first column, the products under consideration are listed belongs to food sector and the cosmetic category. The brand names or companies associated with each product, are detailed in the second column. Brand reputation and recognition play a pivotal role in consumer decision-making, and they often influence the perception of product quality and reliability. The third column provides a brief account of observations related to misleading Unique Selling

Propositions (USPs) associated with each product. These observations focus on instances where marketing claims may be inconsistent with the actual attributes of the product, potentially leading to consumer confusion or disappointment.

## **RESULTS AND DISCUSSION**

From the literature review, it can be noticed that the methodology employed in this study, which involves a detailed investigation of product ingredients in relation to the tag line used by the brands for positioning and making promises, has not been extensively reported in academic literature. This study aims to understand the issues related to responsible marketing and ethics associated with the marketing of Food & Beverage (F&B) and Cosmetics products.

The observations derived from the study underscore several critical issues and themes that necessitate attention and action:

### **Overpromising and Under delivering:**

Under the lens of responsible marketing, a glaring concern is identified regarding over promising in product advertising. Companies may, at times, over state the attributes of their products, there by creating unrealistic expectations among consumers. In the pursuit of profit, the principle of responsible marketing advocates for aligning marketing claims with the actual product capabilities. Failure to do so can lead to customer dissatisfaction, loss of trust, and reputational damage. Responsible marketing principles emphasize transparent, accurate, and honest communication to foster consumer trust and loyalty.

### **Ambiguity in Claims:**

The transparency of environmental claims is essential for responsible and ethical marketing. However, in practice, there is a noticeable issue of ambiguity in product marketing. Certain statements could be expressed in a way that is unclear or inaccurate, allowing for interpretation. This inexactness, which can

lead to misunderstandings among consumers, contradicts the principles of transparent communication and authenticity in responsible marketing. It is imperative for businesses to adopt a more straightforward and unambiguous approach to Socially Responsible marketing, ensuring that their claims have no room for misinterpretation and that the sustainability features of their products are clearly communicated.

### **Communicated Misleading USPs:**

In the context of health and wellness products, the study raises ethical concerns related to misleading health claims. Responsible marketing, Corporate Social Responsibility (CSR), and Ethical Marketing principles emphasize the importance of accurate and importance advertising. Misleading health claims not only harm consumers but also expose businesses to legal and reputational risks. Companies should prioritize rigorous testing and validation of health claims and adhere to regulatory guidelines to ensure the accuracy and safety of their products in the context of responsible and Ethical Marketing.

By integrating these principles into their marketing strategies, businesses can build trust with their target audience, enhance brand reputation, and contribute positively to the well-being of society and the environment. Responsible marketing not only helps businesses achieve their goals but also fosters sustainable and ethical practices within the broader marketplace. The study's findings emphasize the need for a shift towards responsible marketing practices that prioritize consumer well-being and ethical considerations over profit-driven advertising. This transition can benefit both businesses and society in the long run.

## **CONCLUSION**

In conclusion, the predominant focus of existing studies lies in investigating responsible marketing strategies, consumer preferences towards eco-friendly products, the influence of

deceptive advertising on consumer choices, and the significance of Corporate Social Responsibility (CSR) in shaping corporate conduct.

In the realm of responsible marketing, corporate social responsibility (CSR), and ethical marketing, the fusion of these forces offers a compelling solution to combat misleading products in marketing. By embracing ethical and transparent advertising practices, businesses foster consumer trust and avoid deceptive advertising. Maintaining a relationship with the consumer and building brand loyalty are major challenges in the current marketing environment. Today's highly competitive marketplace makes these challenges even more daunting. For instance, modern society demands companies to behave responsibly and ethically toward their stakeholders (Lee et al., 2019)

Green marketing, on the other hand, emphasizes sustainability, which aligns with the demand for environmentally friendly products and helps substantiate environmental claims. CSR, a strategic commitment to ethics and social engagement, discourages unethical marketing practices. Corporate governance acts as a safeguard, ensuring ethical decision-making. (Bhardwaj et al., 2023)

This research underscores the importance of these principles in addressing misleading marketing practices, fostering consumer trust, and promoting responsible commerce. It signals a future where responsible and ethical marketing practices prevail, ensuring authenticity in marketing claims, and elevating consumer and societal well-being.

## **RECOMMENDATIONS, LIMITATIONS AND FUTURE SCOPE**

A comprehensive plan is required to address the issue of misleading products in the Indian market. The legal framework must be strengthened, with strict enforcement of consumer protection legislation and penalties

for misleading marketing. It is vital to promote responsible marketing practises, such as encouraging corporations to use ethical techniques and industry self-regulation based on codes of conduct. Green initiatives increase transparency by campaigning for environmentally friendly labelling and clear environmental information in order to establish customer confidence. Integrating CSR principles into marketing is critical for encouraging sustainability and mandated CSR reporting for accountability. Transparency is prioritised in corporate governance reform, as is the appointment of independent directors and supervision procedures to prevent fraudulent marketing. Education and knowledge are essential for empowering consumers to recognise deceptive items, and training for marketing professionals ensures ethical practises.

Despite the insightful findings and contributions of this study, several limitations must be acknowledged. First, the sample size of 17 products, of which 9 are from the Food and Beverages category and 8 from the Cosmetics category, may not be fully representative of the vast and diverse landscape of consumer goods in these industries. This limitation could affect the generalizability of the study's conclusions to the wider market. Additionally, the study primarily focuses on the Indian context, and differences in consumer behaviour and marketing practices across regions and cultures may not be fully captured. Another limitation lies in the inherent subjectivity involved in judging the "deceptive" nature of advertisements, as interpretations may vary among individuals. In addition, the study highlights a lack of consumer understanding as a factor contributing to misguided choices, but the depth and complexity of consumer decision-making processes could be explored more comprehensively. Finally, the study relies heavily on qualitative assessment of product components and taglines, and a quantitative analysis could offer a more thorough understanding of the prevalence and impact of deceptive advertising in these product

categories. Addressing these limitations in future research efforts will contribute to a more accurate and comprehensive understanding of the complex dynamics between advertising, consumer choice, and societal well-being.

Industry collaboration unites efforts to combat deceptive goods while clear reporting procedures protect against misrepresentation. It is critical to raise customer awareness. The study serves the purpose of creating awareness and drawing the attention of academicians and researchers. Consumers can recognize deceptive goods and make educated selections thanks to awareness campaigns and educational programs, establishing a marketplace built on trust and integrity.

To get further insights into the impact on the health and well-being of consumers, an empirical study can be conducted. The evidence can be gathered on what makes the consumers buy an F & B or a cosmetic product and how much they focus on reading the ingredients before the purchase. Such empirical studies can aid marketers to be more responsible and contribute towards sustainable development goals, which largely focus on the quality of life of consumers.

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# Conceptual Framework of Sustainability in Green Finance

Ms. Sakshi Kathane, Student, IBA Bangalore,  
Prof. Narendra Babu, Faculty in Marketing, IBA Bangalore,  
Dr. S Ramesh, Senior Finance Faculty, IBA Bangalore,

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## Abstract:

This study navigates the imperative for integrating environmental and social considerations into financial markets by constructing a robust conceptual framework for sustainability within green finance. It transcends the confines of individual financial instruments to embrace a holistic perspective that integrates knowledge from finance, economics, and sustainability science. While analyzing diverse tools such as green bonds and impact bonds, the study underscores the necessity of applying a sustainability lens to the entire financial ecosystem. Through a comprehensive review of pertinent literature, a critical examination of existing sustainability classifications, and an exploration of potential applications across sectors, this research illuminates how financial markets, guided by a comprehensive sustainability framework, can forge a path towards a more equitable and environmentally responsible future. This study holds relevance for academics, policymakers, financial institutions, and individuals invested in the nexus of sustainable development and green finance, offering a foundation for comprehending the transformative potential of finance in fostering positive change.

## Introduction:

As the world wrestles with the existential imperative of achieving long-term sustainability (Mabey, 2016; Sachs et al., 2015; Schwab, 2016), the once-unimaginable notion of aligning financial goals with environmental and social responsibility is swiftly transitioning from a lofty ideal to a pressing

demand. This research delves into the heart of this paradigm shift, meticulously dissecting the intricate ecosystem of Sustainable Financial Instruments (SFIs) – the transformative tools wielding the power to propel us toward a more equitable and resilient future (Mebratu, 2009; Flammer, 2020; Bauer & Hanf, 2012).

Drawing upon a tapestry of insights from finance, economics, and sustainability science, this study adopts a comprehensive conceptual framework. Through meticulous analysis of existing literature, it deconstructs the multifaceted fabric of SFIs, meticulously examining their diverse classifications (Mebratu, 2009), their integration of Environmental, Social, and Governance (ESG) criteria into decision-making processes (Flammer, 2020), and their potential to contribute to specific Sustainable Development Goals (SDGs) through targeted investments (Hepburn et al., 2020; Battisto&Nucci, 2012; International Union for Conservation of Nature, 2020). Beyond meticulously scrutinizing established instruments, the research identifies and dissects the burgeoning frontiers of SFI innovation, shedding light on cutting-edge concepts like climate finance (Hepburn et al., 2020), impact investing (Battisto&Nucci, 2012), and blended finance mechanisms.

The outcomes of this exploration are multifaceted and far-reaching. On the theoretical front, the study conceptualizes novel hybrid SFI structures and tailored investment models, inviting further empirical testing and development. By meticulously identifying key areas for further investigation, it bridges critical research gaps, particularly in the areas of impact measurement frameworks and the scalability of innovative SFI designs. This paves the way for more rigorous analysis and assessment, contributing to a robust knowledge base in this rapidly evolving field (Fricke & Ibenhardt, 2019; McKisey & Company, 2020; United Nations, 2020).

However, the significance of this research transcends the confines of academia. It seeks to empower stakeholders across the spectrum by:

**Academicians:** Providing a foundational framework for future research endeavors on SFIs, fostering a deeper understanding and theoretical advancements in this nascent field.

**Industry specialists:** Offering practical insights into the diverse SFI landscape, equipping

practitioners with valuable knowledge for designing and implementing impactful sustainable investment strategies (McKinsey & Company, 2020).

**Policymakers:** Informing policy development and regulatory frameworks to facilitate the growth and effectiveness of SFIs, creating a supportive ecosystem for sustainable finance to flourish (Fricke & Ibenhardt, 2019; United Nations, 2020).

By meticulously bridging the gap between theory and practice, this research aims to unlock the potent potential of SFIs. It seeks to empower stakeholders across the spectrum – not just to navigate the current financial landscape, but also to actively reshape it into a force for long-term sustainability and shared prosperity. By embracing the transformative power of these innovative instruments, we can collectively embark on a journey toward a future where financial success and environmental responsibility coexist in harmonious balance.

## **Literature Review:**

Banking system and sustainable finance, driven by a confluence of dwindling resources, escalating climate change, and a burgeoning population, transitioning to a "low-carbon economy" is no longer a distant aspiration, but an urgent necessity. As Dr. Namita Rajput and Maja Drobnjaković aptly note, this shift is not solely a burden; it is already yielding rewards for early adopters (Rajput, 2023; Drobnjaković, 2023). These rewards encompass improved performance across all sustainability pillars, burgeoning new markets, and even surprisingly, reduced costs and risks (Rajput, 2023).

At the forefront of this revolution stand green investment banks, wielding a potent arsenal of innovative financial products. Green loans, mortgages, and investments are not merely instruments for financing sustainable projects; they are, as Dr. Rajput notes, incentives for individuals and businesses to embrace a greener path (Rajput, 2023). This financial innovation is crucial, as we stand at a pivotal juncture, a precipice overlooking a



transformative revolution. The time to act is now, and by harnessing the power of green finance, we can pave the way for a resilient and prosperous future for generations to come (Rajput, 2023; Drobnjaković, 2023).

Kirti Sharma's "Green Banking in India: A Roadmap to Success" (Sharma, 2023) provides a compelling example of this revolution in action. Indian banks, having transcended their purely profit-driven past, are now embracing a multitude of opportunities:

**Capitalizing on Carbon Credits:** By facilitating carbon credit trading and constructing financial products tailored to carbon-neutral projects, banks can tap into this emerging market and propel green growth (Sharma, 2023).

**Pioneering Green Financial Products:** Beyond traditional loans and investments, groundbreaking instruments like green bonds, sustainable mortgages, and climate-focused insurance offer banks avenues to expand their offerings and attract eco-conscious customers (Sharma, 2023).

**Embracing Cutting-Edge Technology:** Integrating sophisticated tools like big data analytics and artificial intelligence into green banking initiatives can enhance risk assessment, optimize resource allocation, and ultimately chart a sustainable future for India (Sharma, 2023).

However, this green revolution needs a firm foundation laid by the Reserve Bank of India (RBI). As Sharma emphasizes, the RBI's role in formulating robust "green growth" policies is paramount. Effective frameworks, clear regulations, and proactive incentives can empower banks to navigate the rapidly evolving landscape of green finance with confidence (Sharma, 2023).

Ultimately, the success of this green finance revolution hinges on a collaborative effort. Forward-thinking banks, innovative financial instruments, and visionary leadership from the RBI must join forces to pave the way for a transformative future. By embracing these

pivotal elements, we can ensure a thriving financial sector inextricably linked with a greener future for the planet (Sharma, 2023; Rajput, 2023; Drobnjaković, 2023).

Traditionally, Green Investment, the public sector shouldered the burden of environmental protection. However, a new player has emerged green finance. Challenging the status quo, research by Wen et al. (2021) explores the growing adoption of this financial tool and its effectiveness. Their findings reveal that green finance not only outperforms public spending in boosting economic growth but also fosters long-term sustainability through technological innovation and resource efficiency. Unlike public spending, has focus on immediate damage control, green finance unlocks broader growth trajectories for a greener future.

Further emphasizing the need for a collaborative approach, Wen et al. advocate for combining green finance with public spending to achieve "high-quality development". This synergy leverages the strengths of both, maximizing positive impacts on both economic growth and environmental sustainability. By challenging traditional assumptions and highlighting the unique advantages of green finance, their research provides a valuable roadmap for navigating the complexities of transitioning towards a greener future.

Khan et al. (2021) who focus on Asia further reflect this paradigm shift in research. Their analysis reveals that "climate mitigation finance", a form of green finance, significantly reduces the ecological footprint in 26 Asian economies. This bolsters the Asian Development Bank's (ADB) focus on green finance, aligning with international sustainability goals. The robustness of these findings emphasizes the genuine positive environmental impact of green finance, motivating policymakers to maintain and expand green finance initiatives, especially in Asia's pursuit of sustainable development.

The global focus on environmental sustainability is also evident in the research by Cai and Guo (2021), who analyze green finance

research trends. Their data, sourced from Scopus, showcases China's leading role in this burgeoning field. However, the journey towards a greener future requires collaboration and knowledge exchange. Cai and Guo's analysis highlights the crucial role of partnerships among researchers, universities, and journals in advancing the field. By mapping research trends and trajectories, their work provides valuable insights for identifying promising research avenues and shaping sustainable business practices for the future.

A fascinating green wave is washing over the world, fueled by a surprising synergy: companies embracing strong environmental, social, and governance (ESG) practices not only benefit the planet, but also see their financial performance flourish (Dalal & Thaker, 2019). This win-win extends beyond individual firms, empowering investors with improved returns and lower risks through ESG-informed decisions, and equipping policymakers with valuable tools to incentivize sustainability and transparency. The key to unlocking this greener future lies in standardized ESG reporting, readily accessible to all.

However, in India, the promising story of green finance takes a different turn. Despite its immense potential for sustainable development, the market remains in its infancy, struggling to attract sufficient investor interest (Dhoot&Awate, 2021). Existing market practices, regulations, and even financial incentives paradoxically act as hurdles, highlighting the need for a multi-pronged approach. Reforming the market framework to make green financial products more appealing and accessible is crucial, alongside fostering awareness among investors and consumers about the benefits and necessity of green finance. Engaging educational initiatives like conferences and reports can pave the way for a market shift towards sustainable solutions and a more environmentally conscious society.

Meanwhile, as the urgent shadow of climate change looms, green finance emerges as a beacon of hope, simultaneously driving sustainable development and economic growth (Ravichandran& Roy, 2022). Aligned with global initiatives like the Kyoto Protocol and Paris Agreement, this potent tool fuels environmentally responsible projects and offers a vital lifeline for developing nations like India in their pursuit of sustainable development goals. From tackling waste management and protecting biodiversity to adapting to climate change, its potential is vast. A promising step in this direction is the Indian government's recent announcement of issuing sovereign green bonds, mobilizing private capital for public projects with ecological benefits and paving the way for a greener future. Ravichandran and Roy's work underscores the urgent need for wider adoption of such measures by governments and financial institutions worldwide, demonstrating that green finance can be a powerful weapon in our fight for a sustainable and prosperous future.

Talking about The Future of Sustainable Finance, while traditional finance has focused on maximizing profits, a paradigm shift is underway. Volz (2017) contends that a sustainable future hinges on the financial sector reorienting towards a green economy. This involves directing resources towards environmentally friendly endeavors while divesting from unsustainable ones. However, integrating environmental considerations into finance presents a multifaceted challenge.

Central banks, responsible for maintaining price and financial stability, face a unique dilemma. While their core objectives do not explicitly address environmental concerns, environmental factors can significantly impact their goals. For instance, climate change-induced disasters can destabilize economies. Recognizing this, Volz (2017) argues that central banks must integrate environmental risks into their policy frameworks. Thankfully, they have an arsenal of tools beyond traditional monetary policy, including:

Micro and macroprudential policies: These can incentivize green investments and discourage environmentally harmful ones through targeted regulations and capital requirements.

Disclosure requirements: Requiring transparent reporting on environmental risks encourages businesses to adopt sustainable practices.

Stress testing: Assessing financial systems' vulnerability to environmental shocks informs proactive risk management.

However, navigating this path requires careful consideration. Volz (2017) warns against potential pitfalls:

Overstepping mandates: Central banks' focus should remain on financial stability, not environmental activism.

Concentrating power: Increased involvement in greening finance necessitates robust accountability mechanisms.

Neglecting collaboration: Successful green finance requires cooperation between central banks, other regulators, and stakeholders across industries.

Sachin & Rajesh's (2022) study highlights the complexities of this transition. Analyzing 25 Indian firms, they found no immediate financial boost from sustainable supply chain practices. This underscores the need for further research across diverse contexts to understand the link between environmental actions and financial performance fully.

By comprehending these key takeaways and potential risks, policymakers can engage in informed discussions about the appropriate role of central banks in facilitating a sustainable financial system. The journey towards a greener future requires navigating a complex landscape, and open dialogue and collaboration will be crucial to ensure a successful transition.

While, Green Financial Instruments achieving a sustainable future hinges on the power of green finance. As Jha and Bakhshi (2019)

argue, it is not just about environmental benefits, but also crucial for fostering inclusive, resilient, and green economic growth. This aligns with the 2030 Sustainable Development Goals championed by UN Environment, where financial systems are being urged to embrace sustainability. For India, with its colossal \$4.5 trillion green infrastructure need by 2040, a national green finance strategy is indispensable. This requires strong collaboration between public and private sectors, ensuring efficient resource mobilization and partnerships. Challenges like limited awareness, scarce green products, and insufficient incentives remain, but targeted measures and policy interventions can address these hurdles and pave the way for India's successful green finance journey.

Emerging Indian cities are already highlighting the potential of green finance in action. Keerthi B.S. (2013) highlights the success of pioneering cities where energy efficiency plays a central role. By prioritizing resource conservation, climate resilience, and cost savings, these urban hubs are reaping multiple benefits. Green buildings and climate solutions, like "green jobs" creation, offer the promise of both environmental and economic progress. However, effective green finance initiatives demand collaboration across government levels—national, regional, and local. The national government can play a critical role by increasing funding for energy-saving measures and supporting locally administered programs. This multipronged approach, fostering expertise sharing and tackling interconnected environmental challenges, is key to success. Funding remains a concern, especially during economic downturns, but innovative solutions like green taxes and sustainable development practices can provide resources and incentivize existing programs. Additionally, environmentally conscious government procurement can further promote fiscal responsibility and environmental progress. These learnings from pioneering cities demonstrate that green finance can be the engine driving India's sustainable

development, powered by collaborative efforts, innovative approaches, and a focus on energy efficiency.

If we look at The Banking System and Sustainable Finance, the landscape of Indian banking is undergoing a transformative shift, venturing beyond its traditional focus on profit maximization to embrace a greener future. This journey, however, requires navigating both promising opportunities and inherent challenges.

Untapped Potential of Green Finance shows us the urgency of transitioning to a "low-carbon economy" due to resource depletion, climate change, and the demands of a growing population necessitates innovative solutions (Rajput et al., 2013).

Green finance emerges as a potent weapon in this battle, offering eco-friendly alternatives like green loans, mortgages, and investments. By supporting sustainable projects and mitigating carbon footprints, banks can unlock new markets, enhance performance, and even reduce risks (Rajput et al., 2013; Sharma, 2013).

While the potential is undeniable, current green banking initiatives in India appear to be in their nascent stages, lacking a significant impact on bank profitability (Rajput et al., 2013). This calls for robust policy support and infrastructure development to unlock the full potential of this financial revolution.

Promising Avenues for Growth the paper by Sharma (2013) highlights exciting opportunities for Indian banks to capitalize on this shift. Areas like carbon credit trading, innovative green financial products and efficient IT solutions for sustainable practices offer promising avenues for growth and expansion.

By embracing these opportunities and collaborating with the Reserve Bank of India, which plays a crucial role in setting policy direction, Indian banks can transform themselves into powerful engines of both environmental and economic progress (Sharma, 2013).

Talking about the Challenges and the Road Ahead, despite the enthusiasm, navigating this greening process poses its own set of challenges. One key concern is the lack of readily available data and standardized metrics to assess the environmental impact of financial products and services.

Additionally, overcoming entrenched mindsets within the banking sector and building consumer awareness about green options remain crucial hurdles.

Continuous research, development, and collaboration with stakeholders across government, industry, and civil society will be essential to overcome these challenges and pave the way for a sustainable financial system in India.

In conclusion, the greening of Indian banking represents a pivotal moment in the country's quest for a sustainable future. While challenges exist, the immense potential for environmental and economic benefits, coupled with a growing commitment from various stakeholders, paints a promising picture for this transformative journey. By effectively utilizing the available opportunities and addressing the underlying challenges, Indian banks can become drivers of positive change, securing a prosperous and green future for generations to come.

### **Research questions:**

Most Important Research Question of the research is:

How can a comprehensive sustainability framework be integrated into an economic framework to promote a more equitable and environmentally responsible future?

### **Null Hypothesis (H0):**

A comprehensive sustainability framework cannot effectively integrate environmental and social considerations into financial markets.

### **Alternative Hypothesis (H1):**

A comprehensive sustainability frame work

can effectively integrate environmental and social considerations into financial markets, leading to a more equitable and environmentally responsible future.

## **Model:**

### **Triple Helix Integration**

The Triple Helix model, developed by Henry Etzkowitz and Loet Leydesdorff, provides a framework for understanding the interactions between three key actors in society: academia, industry, and government. This model has been applied to various areas, including innovation, economic development, and sustainability. In the context of integrating sustainability into financial markets, the Triple Helix model can be used to:

**Foster collaboration and knowledge sharing:** The model encourages collaboration between the three actors to share knowledge and expertise on sustainability issues. This collaboration can lead to the development of new sustainability frameworks, innovative financial instruments, and effective policies.

**Promote innovation and investment in sustainable projects:** The model can facilitate the development and implementation of new technologies, products, and services that address sustainability challenges. By bringing together the strengths of academia, industry, and government, the Triple Helix can help to channel investments towards sustainable initiatives.

**Align financial incentives with sustainability goals:** The model can help to align the financial incentives of different actors with sustainability goals. This can be achieved through the development of green finance products, tax incentives, and other policy measures.

Here are some specific examples of how the Triple Helix model can be used to integrate sustainability into financial markets:

**Academia:** Researchers can conduct research on the economic, social, and environmental impacts of different sustainability initiatives.

This research can inform the development of new financial products and policies.

**Industry:** Companies can develop and market new green products and services. They can also invest in sustainability initiatives and provide data on their sustainability performance.

**Government:** Governments can develop regulations and policies that encourage sustainability. They can also provide tax incentives and subsidies for green investments.

### **Case study:**

A large investment bank issues a green bond to finance the construction of a hydroelectric dam in a developing country. The project promises clean energy generation and reduced reliance on fossil fuels. This project aligns with environmental sustainability goals by generating renewable energy and mitigating climate change. The green bond attracts investors seeking environmentally responsible investments. However, the project displaces indigenous communities without proper resettlement or compensation. Additionally, the construction contracts are awarded to foreign companies.

### **Key Issues**

- **Insufficient compensation and resettlement plans:** Indigenous communities are being displaced without fair compensation or adequate resettlement plans. This is causing significant hardship and disruption to their lives.
- **Outsourcing of construction contracts:** The construction contracts for the dam project are being awarded to foreign companies, rather than local businesses and organizations. This is depriving local communities of opportunities for employment and economic development.

## Application of Triple Helix Integration Model

### ■ Phase 1: Assessment and Impact Analysis

- Environmental Helix: The framework analyzes emissions reductions, water resource management, and potential ecological impacts on flora and fauna.
- Social Helix: It assesses potential community displacement, resettlement plans, fair labor practices for construction workers, and opportunities for local skill development.
- Economic Helix: The framework evaluates the project's financial viability, considers green washing risks, and analyses the potential for economic diversification in the region through tourism or clean energy opportunities Helix: The framework analyzes emissions reductions, water resource management, and potential ecological impacts on flora and fauna.

### ■ Phase 2: Dynamic Risk Assessment

- The framework identifies interlinked risks. For example, displacement might lead to social unrest, affecting project stability (economic risk).
- Proactive mitigation strategies are developed, like building eco-tourism initiatives alongside the dam to create green jobs and empower displaced communities.

### ■ Phase 3: Synergy-Driven Project Selection

- The framework helps determine if the project maximizes all three pillars' benefits.
- Alternative investments in decentralized renewable energy sources with lower social and

environmental risks might be considered if the dam's co-benefits are limited.

### ➤ Outcomes and benefits

- By applying Triple Helix Integration, the project evolves from a solely environmentally focussed initiative to a holistic and sustainable one.
- Community resentment and social unrest are minimized, leading to greater project stability and community buy-in.
- Local businesses benefit from economic opportunities, fostering long-term economic development and diversification.
- The project highlights a more responsible and impactful approach to green finance, attracting wider investor support and boosting reputational capital.

### Risk

- While the Triple Helix model offers a promising approach to integrating sustainability into financial markets, there are potential risks associated with its application. These risks can be broadly categorized into three areas:

#### ■ 1. Communication and Coordination Challenges:

- ✓ Misalignment of Goals: The three actors in the Triple Helix model - academia, industry, and government - may have different and sometimes conflicting goals. This can lead to challenges in communicating objectives and aligning efforts effectively.
- ✓ Information Gaps: Each actor brings unique perspectives and expertise to the table, but there may be gaps or misunderstandings in knowledge sharing. This can hinder collaboration and decision-making.

- ✓ Bureaucracy and Red Tape: The involvement of multiple stakeholders and bureaucratic processes can slow down decision-making and hinder the timely implementation of green finance initiatives.
- 2. Lack of Transparency and Accountability:
  - ✓ Greenwashing and Misre-presentation: The lack of clear and standardized definitions of green finance can lead to greenwashing, where projects are labeled as sustainable without meeting rigorous sustainability criteria. This can erode investor trust and undermine the credibility of green finance initiatives.
  - ✓ Lack of Data and Reporting: Effective monitoring and reporting of the social and environmental impacts of green investments are crucial for ensuring accountability. However, there may be challenges in collecting and verifying data, especially for projects in developing countries.
  - ✓ Inadequate Enforcement Mechanisms: Weak or non-existent enforcement mechanisms can create loopholes for non-compliance with sustainability standards. This can undermine the effectiveness of green finance initiatives in achieving their intended goals.
- 3. Distorting Market Dynamics and Raising Costs:
  - ✓ Distortion of Capital Allocation: Overreliance on green finance incentives, such as tax breaks or subsidies, can distort market dynamics and divert capital away from more efficient and productive investments.
  - ✓ Higher Transaction Costs: The development and implementation of

new green finance instruments and processes can involve additional transaction costs, potentially reducing the overall attractiveness of green investments.

- ✓ Price Instability and Volatility: The demand for green investments may be subject to fluctuations in investor sentiment, leading to price instability and volatility. This can make it challenging for investors to accurately assess the risks and returns of green investments.
- ✓ Addressing these risks requires careful consideration of the Triple Helix implementation strategy, ensuring clear communication, strong transparency and accountability measures, and effective market safeguards. By mitigating these risks, the Triple Helix model can play a significant role in promoting sustainable finance and contributing to a more equitable and environmentally responsible future.

### **Conclusion:**

By harnessing the power of triple helix integration, a comprehensive sustainability framework can be seamlessly integrated into an economic framework to pave the way for a more equitable and environmentally responsible future. This approach, which brings together academia, industry, and government, fosters collaboration and knowledge sharing, driving innovation and investment in sustainable practices.

Academia serves as the knowledge hub, generating and disseminating research on sustainability issues. This research provides valuable insights into the economic, social, and environmental impacts of various sustainability initiatives, informing policy decisions and investment strategies.

Industry, with its expertise in technology and

production, plays a crucial role in developing and implementing innovative sustainable solutions. By investing in research and development, industry can bring sustainable technologies to market, transforming industries and driving economic growth.

Government, as the regulator and facilitator of economic activity, sets the policies and frameworks that incentivize and support sustainable practices. This includes providing tax incentives, subsidies, and regulations that promote clean energy, resource efficiency, and responsible business practices.

By working together, the three pillars of the triple helix can achieve a balance between economic growth, environmental sustainability, and social equity. This holistic approach ensures that sustainability is not viewed as a trade-off but rather as an integral part of economic development.

Here are some specific examples of how triple helix integration can be used to promote sustainability:

Academia and industry can collaborate on research and development of new sustainable technologies, such as renewable energy sources and energy-efficient appliances.

Industry and government can work together to develop and implement sustainability standards for businesses, ensuring that their products and services meet environmental and social criteria.

Academia and government can collaborate on education and training programs to raise awareness about sustainability issues and empower individuals to make sustainable choices.

By implementing triple helix integration, we can create a more sustainable future where economic growth, environmental protection, and social justice are interconnected and mutually reinforcing.

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Lakshmipura, Thataguni Post, Kanakapura Main Road  
Bengaluru - 560 062. India

Ph: +91-80-2608 3764 / 770 / 709 Fax: +91-80-2608 3708 / 717

E-mail: [ibajournal@iba.ac.in](mailto:ibajournal@iba.ac.in)

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