



**NESAMONY MEMORIAL
CHRISTIAN COLLEGE
MARTHANDAM**

63rd Position in India Rankings -
2025 for Colleges by NIRF
KANYAKUMARI DISTRICT
TAMIL NADU, INDIA



Proceedings of
National Conference on

**SUSTAINABLE
LEADERSHIP IN THE
AGE OF AI: BALANCING
INNOVATION, ETHICS,
AND ENVIRONMENTAL IMPACT**

10th April 2026 (Hybrid mode)



Organised by

DEPARTMENT OF MANAGEMENT STUDIES & RESEARCH CENTRE

&



Institution's Innovation Council (IIC)

In Association with



**STATE INSTITUTE OF EDUCATIONAL TECHNOLOGY (SIET),
Government of Kerala, Thiruvananthapuram**

Prof. Dr. A. J. S. Pravin
Correspondent- Secretary

Dr. G. D. Biji
Principal

Dr. C. L. Jeba Melvin
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Dr. D. Ashlin Melbha
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MESSAGE FROM CORRESPONDENT SECRETARY



Our institution, Nesamony Memorial Christian College has always been keen on embracing innovative technologies that enhance learning, research, and leadership practices. We are particularly enthusiastic about adopting Artificial Intelligence across academic and administrative domains to improve the quality of education and prepare our students for the demands of the modern world. I personally hold a deep interest in the advancements of Artificial Intelligence and strongly believe that integrating AI responsibly and ethically will empower our institution to achieve excellence while contributing positively to society and environmental sustainability.

It gives me immense pleasure to convey my heartfelt greetings to all the distinguished guests, academicians, researchers, industry professionals, and students participating in the National Conference on *Sustainable Leadership in the Age of AI: Balancing Innovation, Ethics, and Environmental Impact*.

In the present era, Artificial Intelligence is transforming every sphere of human life, redefining leadership practices, organizational strategies, and decision-making processes. While technological innovation continues to accelerate progress, it is essential that leaders adopt sustainable and ethical approaches to ensure the responsible use of technology while safeguarding environmental resources. The theme of this conference is both timely and significant, as it encourages thoughtful dialogue on balancing innovation with ethical responsibility and environmental stewardship. I extend my best wishes to all the participants for fruitful deliberations and enriching academic interactions. I congratulate the organizers for bringing out this conference and wish it a grand success.

With best wishes,



Prof. Dr. A.J.S. Pravin
Correspondent - Secretary

MESSAGE FROM THE PRINCIPAL



It gives me immense pleasure to note that the Department of Management Studies and Research Centre, in association with the Institution's Innovation Council of NMCC and the State Institute of Educational Technology (SIET), Government of Kerala, is organizing the National Conference on Sustainable Leadership in the Age of AI: Balancing Innovation, Ethics and Environmental Impact on April 10, 2026.

In today's rapidly advancing digital era, the integration of Artificial Intelligence into various sectors has brought remarkable opportunities as well as significant responsibilities. Higher education institutions play a vital role in nurturing responsible leaders who are capable of balancing innovation with ethical practices and environmental sustainability. Conferences of this nature provide an excellent platform for academicians, researchers, industry experts, and students to share knowledge, exchange ideas, and deliberate on emerging trends and responsible technological advancements.

The theme of this conference is both timely and significant, as sustainable leadership and ethical innovation are essential to ensure that technological progress contributes positively to society and the environment. I am confident that the discussions and deliberations during this conference will inspire meaningful insights, promote collaborative research, and encourage innovative solutions that support sustainable development.

I sincerely appreciate the dedicated efforts of the Organizing Committee and extend my best wishes for the grand success of the conference.

With best wishes,

A handwritten signature in green ink, likely belonging to Dr. G. D. Biji, the Principal.

Dr. G. D. Biji
Principal

MESSAGE FROM THE CHIEF GUEST



I am delighted to extend my warm greetings to the organizers, participants, academicians, researchers, and students of the National Conference on Sustainable Leadership in the Age of AI: Balancing Innovation, Ethics, and Environmental Impact.

The theme of this conference is highly relevant in today's rapidly evolving world, where technological advancement and environmental sustainability must go hand in hand. Artificial Intelligence has emerged as a transformative force, offering innovative solutions to complex global challenges. At the same time, the responsibility to ensure ethical practices and environmental conservation remains paramount for building a sustainable future.

This conference serves as a valuable platform for bringing together experts, scholars, and young minds to exchange knowledge, share research insights, and explore new perspectives. Such academic initiatives play a crucial role in fostering collaboration, encouraging innovation, and developing responsible leadership capable of addressing both present and future challenges.

I appreciate the organizing committee for their dedicated efforts in successfully arranging this conference and providing an opportunity for meaningful academic engagement. Events of this nature significantly contribute to knowledge dissemination, research advancement, and the promotion of sustainable development practices.

I am confident that the deliberations and discussions during this conference will lead to insightful outcomes, productive collaborations, and impactful contributions to the fields of technology, leadership, and sustainability.

I congratulate the organizers on bringing out the conference proceedings and extend my best wishes for the grand success of this conference. I also wish all participants a rewarding and enriching experience.

With best wishes,

A handwritten signature in green ink, reading "S.A. Senthil Kumar".

Dr. S. A. Senthil Kumar

Registrar

National Institute of Technology (NIT)

Tiruchirappalli – 620 015

Government of India

MESSAGE FROM THE ORGANISING SECRETARY



It gives me immense pleasure to announce that the Department of Management Studies and Research Centre, in association with the Institution's Innovation Council of Nesamony Memorial Christian College and the State Institute of Educational Technology (SIET), Government of Kerala, is organizing the National Conference on "*Sustainable Leadership in the Age of AI: Balancing Innovation, Ethics and Environmental Impact*" on April 10, 2026.

In this rapidly evolving digital landscape, Artificial Intelligence is transforming every sector, presenting both unprecedented opportunities and critical challenges. As organizing secretary, I strongly believe that higher education institutions have a pivotal responsibility in shaping future leaders who can harmonize technological innovation with ethical values and environmental sustainability.

This conference aims to provide a vibrant platform for academicians, researchers, industry professionals, and students to engage in meaningful dialogue, exchange ideas, and explore emerging trends in responsible AI and sustainable leadership. The theme is highly relevant in today's context, emphasizing the need for a balanced approach to innovation that ensures long-term societal and environmental well-being.

We are confident that the deliberations and scholarly interactions during this conference will generate valuable insights, foster collaborative research, and inspire innovative solutions aligned with sustainable development goals. I take this opportunity to express my sincere gratitude to all members of the organizing committee for their tireless efforts and dedication. I also extend a warm welcome to all participants and wish the conference a grand success.

With warm regards,

Dr. C.L. Jeba Melvin

Organising Secretary

Research Activity Co-ordinator (IIC)

Associate Professor

Department of Management Studies & Research Centre

**MESSAGE FROM THE JOINT ORGANISING
SECRETARY**



It is our great pleasure to extend a warm welcome to all delegates, academicians, researchers, industry experts, and students participating in the National Conference on Sustainable Leadership in the Age of AI: Balancing Innovation, Ethics, and Environmental Impact.

In today's rapidly evolving technological landscape, Artificial Intelligence has become a powerful tool influencing leadership, decision-making, and organizational growth. While innovation continues to transform industries, it is equally important to ensure that ethical considerations and environmental sustainability remain at the forefront of technological progress. This conference aims to provide a vibrant platform for intellectual exchange, collaborative research, and meaningful discussions that address the challenges and opportunities associated with sustainable leadership in the era of Artificial Intelligence.

We are delighted to witness the enthusiastic response from participants across various institutions, contributing valuable research papers and innovative ideas aligned with the conference theme. The diversity of topics presented in these proceedings reflects the commitment of scholars and professionals toward creating responsible, ethical, and environmentally conscious leadership models supported by emerging technologies.

We express our sincere gratitude to the Chief Guest, keynote speakers, session chairs, reviewers, and participants for their valuable support and contributions, which have played a significant role in the successful organization of this conference. We also extend our heartfelt appreciation to the management, organizing committee members, and volunteers whose dedication and teamwork made this event possible.

We hope that the discussions and presentations during this conference will inspire new perspectives, strengthen academic collaborations, and contribute to sustainable and ethical advancements in leadership practices.

We congratulate all contributors to this conference proceedings and wish the conference every success.

With warm regards,

A handwritten signature in blue ink, appearing to read 'Ashlin Melbha', with a stylized flourish at the end.

Dr. D. Ashlin Melbha

Joint Organising Secretary

Convener (IIC)

Assistant Professor

Department of Management Studies & Research Centre



MESSAGE FROM THE CONVENER

It gives me immense pleasure to welcome all scholars, practitioners, industry leaders, and students to this National Conference on “Sustainable Leadership in the Age of AI: Balancing Innovation, Ethics, and Environmental Impact.”

We are living in a transformative era where Artificial Intelligence is redefining the boundaries of innovation and reshaping industries, economies, and societies. While AI offers unprecedented opportunities for growth and efficiency, it also brings with it critical challenges related to ethical responsibility, sustainability, and environmental stewardship. This conference seeks to create a meaningful platform to explore these intersections and to deliberate on how leadership can evolve to address them responsibly.

The theme of this conference underscores the importance of fostering a leadership mindset that not only embraces technological advancement but also remains deeply committed to ethical integrity and ecological balance. Sustainable leadership in today’s context demands a holistic vision—one that aligns innovation with inclusivity, accountability, and long-term environmental consciousness.

We are honored to have an esteemed gathering of academicians, researchers, policymakers, and industry experts who will share their valuable insights, research findings, and experiences. I am confident that the discussions and deliberations during this conference will contribute significantly to shaping frameworks and strategies for responsible AI-driven leadership.

I extend my heartfelt gratitude to all contributors, organizing committee members, reviewers, and participants whose efforts and enthusiasm have made this conference possible. Your active engagement will undoubtedly make this event intellectually enriching and impactful.

Wishing you all a productive and inspiring conference experience.

Warm regards,

Dr. S. Sam Santhosé
Convenor

Associate Professor & Head
Department of Management Studies & Research Centre

MESSAGE FROM THE EMINENT SPEAKER



It gives me immense pleasure to learn that the Department of Management Studies & Research Centre is hosting a National Conference on “Sustainable Leadership in the Age of AI: Balancing Innovation, Ethics, and Environmental Impact.”

In a highly evolving technological environment marked by rapid advancements in the field of artificial intelligence, the domain of management education holds a vital responsibility in shaping future-ready leaders. The timeliness of this conference is, therefore, remarkable considering how organizations across the globe are striving to integrate innovation with ethical responsibility and environmental sustainability.

I am confident that the meaningful discussions and conclusions made from the brainstorming sessions of this conference will positively impact the future of our society. I sincerely appreciate the efforts taken by the organizing committee in arranging this event at the most appropriate time.

With best wishes,

A handwritten signature in blue ink, consisting of stylized cursive letters, likely 'Edwin A G'.

Mr. Edwin A G

Deputy Vice President &
Zonal Sales Head at Federal Bank
Thiruvananthapuram, India

MESSAGE FROM THE EMINENT SPEAKER



It is a privilege to note that the Department of Physics and Research Centre of Nesamony Memorial Christian College is organizing an International Conference on “Innovative Pathways in Energy, Smart Materials, and Quantum Computation for a Sustainable World.” State Institute of Educational Technology Kerala (SIET- Kerala) is proud to be associated with this significant academic endeavour.

The theme of the conference is both timely and relevant, especially as we mark a century since the foundational framework of modern quantum theory was established. The emerging field of quantum computation holds immense promise in optimizing complex systems such as energy grids, logistics, and material design, thereby offering innovative solutions to address climate change and accelerate decarbonization.

I sincerely hope that the deliberations at this conference will lead to meaningful insights and practical, implementable outcomes. Wishing the conference great success and impactful academic engagement.

With best wishes,



Dr. Aburaj B

Director

State Institute of Educational Technology (SIET)
Government of Kerala
Thiruvananthapuram

PREFACE

A GLIMPSE OF OUR COLLEGE

Nesamony Memorial Christian College (NMCC), established in 1964 and located in Marthandam, Kanyakumari District, Tamil Nadu, is a well-established arts and science institution administered by the Church of South India (CSI) Kanyakumari Diocese and affiliated with Manonmaniam Sundaranar University. The college recently secured a 63rd rank in the NIRF All India Rankings (2025), reflecting its quality of education. NMCC offers a wide range of undergraduate, postgraduate, research, and certificate programs across science, arts, commerce, and management streams, grounded in value-based and skill-oriented education. It is recognized under Sections 2(f) and 12(B) of the UGC Act and places strong emphasis on both academic excellence and personal development. The college, sprawled in a lush green campus, has an excellent infrastructure, library, indoor-outdoor stadium, hostel and internet facilities, fostering a vibrant and inclusive learning environment. Dedicated faculty members support students in becoming competent and socially responsible global citizens. NMCC also focuses on uplifting students from rural and underprivileged backgrounds, offering scholarships and support services to enhance access to higher education.

DEPARTMENT AT A GLANCE

The Department of Management Studies was established to impart quality management education and commenced its MBA programme in the academic year 2000–2001. With an integrative and interdisciplinary approach to teaching, the department emphasizes academic excellence, ethical values, and practical exposure, supported by well-equipped facilities and experienced faculty who shape professionally competent and socially responsible graduates. The Research Centre in Management Studies was established in the academic year 2017–2018 following provisional recognition by Manonmaniam Sundaranar University, and it promotes advanced research and doctoral studies in Management by facilitating research guidance, scholarly publications, and interdisciplinary collaboration.

ABOUT THE INSTITUTION’S INNOVATION COUNCIL (IIC) – NMCC

The Institution’s Innovation Council (IIC) is a dynamic initiative under the Ministry of Education’s Innovation Cell to cultivate a culture of innovation, creativity, and entrepreneurship among students and faculty. It aims to build a vibrant local innovation ecosystem on campus, support student start-ups, scout and pre-incubate ideas, and enhance problem-solving and cognitive abilities. The IIC organizes innovation and entrepreneurship activities, workshops, seminars, hackathons and industry interactions, recognizes innovative projects, and creates mentoring and networking opportunities to help young innovators transform ideas into impactful solutions.

HIGHLIGHTS OF THE CONFERENCE

The One Day National Conference on “Sustainable Leadership in the Age of AI: Balancing Innovation, Ethics, and Environmental Impact” brings together academicians, research scholars, and students to explore the evolving landscape of leadership in an AI-driven world. The conference highlights responsible AI adoption, ethical leadership practices, sustainable innovation, and environmentally conscious decision-making. Through expert talks and research presentations, participants will gain valuable insights into integrating artificial intelligence with ethical governance and sustainability goals, fostering forward-looking leadership for a resilient and responsible future.

We take this opportunity to express our sincere gratitude to the college Management, Correspondent, and Principal for their constant encouragement and valuable support in all our academic endeavours. Our heartfelt appreciation goes to our chief guest and eminent speakers who shared their valuable findings during the conference, as well as to our fellow faculty members and students, who contributed their dedicated efforts toward the successful conduct of this event.

By

Organizing Committee

ORGANIZING COMMITTEE

Correspondent

Prof. Dr. A.J.S. Pravin

Principal

Dr. G.D. Biji

Organising Secretary

Dr. C.L. Jeba Melvin

Joint Organizing Secretary

Dr. D. Ashlin Melbha

Research Activity Co-ordinator (IIC)

Associate Professor

Department of Management Studies & Research Centre

Convener (IIC)

Assistant Professor

Department of Management Studies & Research Centre

Convener

Dr. S. Sam Santhosé

Associate Professor & Head

Department of Management Studies & Research Centre

Organising Committee

Dr. L. Noble Lawrence

Dr. T. Helen Snekha

Dr. P. Prejith

Dr. B. Anisha

Dr. S. Boving Sathya

Dr. J. Jenila

Dr. P. Metilda

Dr. S. Sunitha

Dr. N. Santhy

CHIEF GUEST



Dr. S. A. SENTHIL KUMAR

Registrar
National Institute of Technology (NIT), Tiruchirappalli – 620 015
Government of India

EMINENT SPEAKERS



Mr. EDWIN A G

Deputy Vice President & Zonal Sales Head at
Federal Bank
Thiruvananthapuram, India



Dr. B. ABURAJ

Director
State Institute of Educational Technology (SIET)
Thiruvananthapuram
Government of Kerala

INAUGURAL INVITATION

Date: 10 April 2026

Venue: MBA Seminar Hall

Time: 10 – 11am

Tamil Thai Vazhthu

Prayer : **Rev. (Mrs). Starie Princilal,**
Chaplain

Welcome Address : **Dr. C.L. Jeba Melvin**
Organizing Secretary
Research Activity Co-ordinator (IIC)
Associate Professor
Department of Management Studies & Research Centre

Presidential Address : **Dr. G.D. Biji**
Principal

Special Address : **Prof. Dr. A.J.S. Pravin**
Correspondent – Secretary

Introducing the Chief Guest : **Dr. Siji Oliver**
Assistant Professor,
PG Department of Commerce, Sacred Heart College,
Thevara, Kochi

Release of the Conference Proceedings

Inaugural Address : **Dr. S. A. Senthil Kumar**
Registrar
National Institute of Technology (NIT), Tiruchirappalli – 620 015
Government of India

Vote of Thanks : **Dr. D. Ashlin Melbha**
Joint Organizing Secretary
Convener (IIC)
Assistant Professor
Department of Management Studies & Research Centre

PROGRAMME SCHEDULE

Date: 10 April 2026

Venue: MBA Seminar Hall

Inaugural Meeting (10 – 11am)

Technical Session I: (11 am – 11.15 am)

Invited Talk : **Dr. S. A. SENTHIL KUMAR**
Registrar
National Institute of Technology (NIT), Tiruchirappalli
Government of India

Tea Break (11.15 am – 11.20 am)

Online Presentation (11.20 am – 12 pm)

Offline Presentation (12 pm – 1 pm)

Lunch Break (1 pm–1.30 pm)

Session II: (1.30 pm – 3 pm)

Invited Talk : **Mr. EDWIN A G**
Deputy Vice President & Zonal Sales Head at
Federal Bank
Thiruvananthapuram, India

Valedictory Function (3 pm – 3.30 pm)

VALEDICTORY MEETING

Date: 10 April 2026

Venue: MBA Seminar Hall

Time: 3 – 3.30 pm

Welcome Address : **Dr. Olivia George**
Principal
Bright International School, Panachamoodu, Tamil Nadu

Felicitation : **Dr. G.D. Biji**
Principal

Report of the Conference : **Dr. C.L. Jeba Melvin**
Organising Secretary
Research Activity Co-ordinator (IIC)
Associate Professor
Department of Management Studies & Research Centre

Valedictory Address : **Dr. B. Aburaj**
Director
State Institute of Educational Technology (SIET)
Government of Kerala

Best Paper Award & Certificate Distribution

Feedback from the Participants

Vote of Thanks : **Dr. D. Ashlin Melbha**
Joint Organising Secretary
Convener (IIC)
Assistant Professor
Department of Management Studies & Research Centre

National Anthem

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GREEN ENTREPRENEURSHIP AND ECO-INNOVATIVE BUSINESS MODELS: CATALYZING SUSTAINABLE DEVELOPMENT IN KERALA

¹Dr. Asha Devi. J, ²Dr. K.S Chandrasekar

¹Post-Doctoral Fellow, Institute of Management in Kerala (IMK), University of Kerala, Thiruvananthapuram, Kerala, E-mail: ashadevij@gmail.com

²Vice Chancellor, Cluster University of Jammu.

ABSTRACT Kerala's forests, coastlines, and backwaters provide a strong foundation for green entrepreneurship and eco-friendly business models. This study looks at how local entrepreneurs use these resources to support sustainable development while facing climate issues like coastal erosion and biodiversity loss. It explores circular economy strategies in waste-to-energy start-ups and organic spice-farming cooperatives in Wayanad. Kerala's eco-innovations benefit from policies such as the Kerala State Biodiversity Board's green funding and the Harithamithram zero-waste program, which blend traditional knowledge with modern technology. For instance, seaweed-based bioplastics from Alappuzha offer scalable ways to cut plastic pollution and create rural jobs. However, challenges like limited venture capital, shortages of green technology skills, and supply chain problems during monsoons remain. This study suggests a Kerala-focused framework for eco-innovative business models that emphasizes people, planet, and profit, as well as public-private partnerships. Kerala's strategy provides useful lessons for India's southern bio-economy, supporting SDG 13 (Climate Action) and SDG 8 (Decent Work). Expanding these models could boost GDP by 5-7% through eco-tourism and green exports, making Kerala a global example of resilient and inclusive growth.

Keywords: Biodiversity conservation, Eco-innovative business models, Green entrepreneurship, Kerala Startup Mission, Social entrepreneurship, Sustainable development.

1. INTRODUCTION

Environmental degradation and climate change are major global problems that require new entrepreneurial solutions. Green entrepreneurship supports both environmental sustainability and economic value, moving away from traditional profit-only business models. As countries seek to grow their economies while protecting the environment, eco-innovative business models are seen as effective paths to sustainable development. India faces serious environmental challenges and loses \$95 billion each year due to environmental damage. Green entrepreneurship is growing quickly, with over 12,400 cleantech ventures, a 180% increase since 2020. In the first half of 2025, sustainable startups raised \$2.8 billion, up 73% from the previous year. This trend shows that ecological challenges are now seen as major economic opportunities. Kerala is known for its rich biodiversity and is a unique place for green entrepreneurship. The Western Ghats, backwaters, and coastal areas offer valuable natural resources that require protection but can also be sustainably used. Policies like the Kerala State Biodiversity Strategy and Action Plan (K-SBSAP) 2025-2035 and the goal of carbon neutrality by 2050 help create a supportive environment for eco-innovative businesses. Kerala has led the way with innovative green entrepreneurship projects. Tree Tag, started by Abhijith Kumar Meenakumari and Aashuthosh B Sai, won Climathon-2022 for its technology platform that tracks sapling growth and care. Green Bio Products, founded by Pradeep Pokkat and Ali Askar, created India's first fully biodegradable bottles, helping to reduce plastic pollution and create business value. These examples show how Kerala's entrepreneurs are turning environmental awareness into successful businesses. Green entrepreneurship and eco-innovative business models are changing Kerala's economy by tackling climate change and promoting sustainability through renewable

energy, organic farming, and eco-tourism. Programs like KSUM and KINFRA support these efforts, but challenges remain in securing sufficient funding and implementing policies.

Key Aspects of Green Entrepreneurship in Kerala

- **Eco-Innovation Areas:** Key sectors include solar energy initiatives, organic agriculture, sustainable tourism (eco-tourism), and circular economy practices, particularly in urban waste management.
- **Sustainable Business Models:** Focus on adopting eco-friendly procedures, reducing waste, utilizing renewable raw materials, and implementing efficient energy management.
- **Government Initiatives:** The proposed Green Enterprise Policy aims to catalyze green growth, complemented by support from KSUM (Kerala Startup Mission) and KSIDC (Kerala State Industrial Development Corporation).
- **Catalyzing Sustainability:** Green enterprises are crucial for protecting Kerala's biodiversity, reducing pollution, and developing resilient, sustainable communities.
- **Challenges:** Key hurdles include high upfront investment costs, limited access to finance, regulatory challenges, and the need for greater market awareness for sustainable products. (Prokopenko et al., 2025)

Green entrepreneurship drives economic growth by creating jobs and encouraging business in environmentally conscious sectors. It supports climate change mitigation, resource protection, and pollution reduction. Innovation leads to cleaner technologies and sustainable practices. Key opportunities include ecotourism in southern Kerala, organic agriculture to meet demand for chemical-free produce, innovative waste management through recycling and upcycling, and renewable energy solutions like solar power. Even with these advances, important gaps remain in understanding how eco-innovative business models operate in Kerala's unique social and ecological setting. Most research focuses on developed countries or manufacturing-based economies, not on places like Kerala, with high human development, a service-driven economy, and unique biodiversity challenges. (Shruthi, 2016) More research is needed to determine how green entrepreneurship leads to sustainable economic, social, and environmental outcomes in Kerala. This study aims to fill these gaps by developing a detailed framework for green entrepreneurship and eco-innovative business models that align with Kerala's unique context. By combining current theories with Kerala's policies, natural resources, and business environment, the research aims to provide useful guidance to entrepreneurs, policymakers, and others working toward sustainable development.

2. OBJECTIVES OF THE STUDY

- To examine the theoretical linkages between green entrepreneurial orientation, eco-innovation, and sustainable development performance within Kerala's biodiversity-rich context.
- To assess the eco-innovative business models that integrate triple bottom line principles on economic, social, and environmental aspects specific to Kerala's entrepreneurial ecosystem.

3. METHODOLOGY

This research uses a conceptual study approach, relying on a systematic literature review and theoretical synthesis. It draws from secondary sources such as peer-reviewed journals, policy documents from the Kerala State Biodiversity Board and Kerala Startup Mission, industry reports on green entrepreneurship in India, and case studies of successful eco-innovative ventures in Kerala. The study used databases such as Scopus, Web of Science, Google Scholar, and specialized sustainability journals, searching for keywords including "green entrepreneurship," "eco-innovation," "sustainable business models," "triple

bottom line," "environmental entrepreneurial orientation," and "circular economy." The search focused on publications from 2020 to 2026 to include recent perspectives and key foundational works.

4. LITERATURE REVIEW

Guo et al. examined how environmental entrepreneurial orientation (EEO) enhances firm performance, drawing on the resource-based view and stakeholder theory. Using survey data from 416 Chinese firms, the study constructed a moderated-mediation model that revealed that environmental innovation mediates the positive effect of EEO on firm performance. The research found that stakeholder pressure positively moderates the influence of EEO on environmental innovation, suggesting external pressures amplify the translation of entrepreneurial orientation into innovative outcomes. The study's strength lies in its large sample size and rigorous statistical modeling; however, its focus on established Chinese firms limits its applicability to emerging entrepreneurial ecosystems like Kerala's startup landscape, where ventures operate at earlier developmental stages and face different stakeholder dynamics. Anwar et al. investigated the relationship between green entrepreneurial orientation (GEO) and environmental performance, addressing a notable research gap on how environmentally friendly business strategies encourage environmental innovation. The study demonstrated that GEO enables enterprises to mitigate harmful ecological effects while achieving financial and societal objectives. Key findings indicated that GEO reduces resource and manufacturing costs while enhancing green innovation, resulting in outstanding business performance and minimized negative ecological impacts. However, the research primarily focused on manufacturing sectors in developed economies, overlooking service-oriented economies and SMEs that dominate Kerala's entrepreneurial landscape. The study's emphasis on cost reduction may not fully capture the value proposition mechanisms relevant to biodiversity conservation and ecosystem restoration ventures prevalent in Kerala. Maldonado-Guzmán et al. (2022) examined the relationships among financial resources, eco-innovation, and sustainable performance, addressing inconclusive findings in the existing literature. The research demonstrated that financial resources have significant positive effects on eco-innovation, which, in turn, positively impacts sustainable performance by creating and improving eco-innovative products, processes, and management systems. The study's contribution lies in clarifying the resource-innovation-performance pathway; however, it does not account for non-financial resources, such as biodiversity knowledge, traditional ecological practices, and community capital, which are particularly abundant in Kerala. This gap is critical, as Kerala's green ventures often leverage indigenous knowledge systems and community partnerships as competitive advantages, suggesting that resource conceptualizations need to be broadened beyond financial capital.

5. FINDINGS

Based on the theoretical synthesis and analysis of Kerala's green entrepreneurship landscape, this study presents the following key findings.

The research proposes an integrated conceptual framework linking green entrepreneurial orientation to sustainable development performance through eco-innovative business models within Kerala's biodiversity-rich, policy-enabled ecosystem. Green entrepreneurial orientation serves as the antecedent, comprising environmental proactiveness, environmental risk-taking, and environmental innovativeness strategic orientations that prioritize ecological value creation alongside economic objectives. Eco-innovative business models act as the mediating mechanism, translating orientation into action through four innovation types: product eco-innovation featuring biodegradable alternatives, process eco-innovation via circular production systems, organizational eco-innovation through green supply chains, and marketing eco-innovation with sustainability-based value propositions. The framework integrates the Resource-Based View for distinctive resources through biodiversity and knowledge assets; Stakeholder Theory for balancing demands of communities, government, investors, and ecosystems;

and the Natural Resource-Based View for competitive advantage via environmental stewardship capabilities. Unlike generic models, it recognizes Kerala's unique resource configuration, high human capital, biodiversity richness, strong social networks, and progressive environmental governance as sources of sustainable competitive advantage.

Analysis reveals four distinct pathways through which Kerala entrepreneurs implement eco-innovations. Biodiversity-based product innovation involves ventures like Green Bio Products that transform endemic plant resources into commercial alternatives, such as biodegradable bottles from plant materials, creating value by addressing plastic pollution while utilizing Kerala's botanical diversity. Technology-enabled conservation services feature platforms like Tree Tag that employ digital technologies for afforestation tracking, commercialize conservation activities through data-driven accountability, and create new service markets. Circular economy business models see entrepreneurs leveraging Kerala's decentralized waste management infrastructure, including MRFs and RRFs, to create viable businesses in waste-to-energy, recycling, and upcycling, supported by policies like the Green Protocol models such as circular-economy approaches in waste-to-energy start-ups and agro ecological innovations in organic spice-farming cooperatives in Wayanad exemplify this pathway by combining resource recovery with regenerative agriculture. Agro-ecological innovations in regions like Wayanad further combine traditional agricultural knowledge with modern certification systems, enabling access to premium markets while preserving soil health and biodiversity.

The synthesis identifies five critical factors that differentiate successful eco-innovative ventures in Kerala. Policy-business alignment enables ventures to strategically align with government programs like KSUM incubation and KSBB funding to access resources and legitimacy. Community embeddedness strengthens partnerships with local communities, cooperative societies, and traditional knowledge holders to enhance access to resources and social license. Hybrid value propositions communicate both environmental benefits, such as pollution reduction and conservation, and functional advantages, such as cost savings and quality improvements. Adaptive capacity provides flexibility to navigate seasonal variations, monsoon disruptions, and policy changes by diversifying revenue streams. Transparent impact reporting through the presentation of triple-bottom-line metrics builds stakeholder trust and attracts conscious consumers.

Despite enabling factors, Kerala's green entrepreneurs face persistent challenges, including financial constraints from limited venture capital availability for early-stage green ventures and traditional investors' skepticism of extended payback periods in environmental businesses; skill gaps marked by a shortage of professionals combining environmental science knowledge with business management capabilities; scale limitations due to small market sizes and fragmented supply chains that hinder economies of scale; infrastructure gaps with inadequate green technology manufacturing facilities necessitating dependence on imports; and regulatory complexity in navigating multiple approval processes across biodiversity, environmental, and commercial regulations.

The framework reveals specific mechanisms through which Kerala's eco-innovative ventures achieve triple-bottom-line outcomes. Economic value creation arises from premium pricing for certified sustainable products, such as organic spices commanding 30-40% higher prices; cost savings from resource-efficiency in waste-to-energy, reducing input costs; access to green financing and impact investment pools; and first-mover advantages in emerging eco-markets. Social value creation includes rural employment generation in biodiversity-rich regions; preservation of traditional knowledge through commercial validation; community capacity building through training and technology transfer; and enhanced social cohesion through cooperative business structures. Environmental value creation encompasses direct biodiversity conservation through habitat restoration initiatives; pollution reduction

via circular-economy models; carbon sequestration through afforestation businesses; and ecosystem service enhancement through sustainable agriculture.

6. SUGGESTIONS

Establish a green venture capital fund through the Kerala Startup Mission dedicated to early-stage green ventures, with patient capital expectations of 5-7-year horizons. Streamline green approvals by implementing single-window clearance systems for ventures aligned with K-SBSAP objectives to reduce regulatory burden. Develop a biodiversity banking system with tradable credits that enable developers to offset impacts by funding conservation ventures and creating new revenue streams. Introduce green procurement mandates requiring state institutions to allocate 25% of procurement budgets to certified eco-innovative products from Kerala ventures. (Kerala Industrial Policy 2023, n.d.) Provide tax incentives, including a 100% profit tax exemption for the first five years, for ventures demonstrating measurable biodiversity conservation outcomes.

Launch specialized incubation programs by establishing bio-innovation incubators at KSUM, focusing on biodiversity-based products, circular economy models, and conservation technologies. Integrate green entrepreneurship curriculum into MBA programs at Kerala's B-Schools, combining environmental science, business modeling, and impact measurement. Build mentorship networks connecting green entrepreneurs with successful founders who have navigated the tensions of conservation-commerce. Create technology access programs with shared laboratories and prototyping facilities for biodegradable materials, renewable energy, and waste processing technologies. Develop market-linkage platforms as digital marketplaces that connect eco-innovative products with conscious consumers and institutional buyers.

Develop impact measurement frameworks with standardized metrics for triple-bottom-line assessment specific to Kerala's biodiversity ventures. Systematically document successes and failures of Kerala's green ventures to build knowledge repositories through case documentation. Foster collaborative research partnerships between academic institutions, KSBB, and entrepreneurs for evidence-based innovation. Create protocols for the ethical commercialization of indigenous ecological knowledge, benefiting source communities through the integration of traditional knowledge.

Structure public-private partnerships between government conservation programs and private ventures for scalable impact. Promote community enterprise models as cooperative, community-owned green ventures, ensuring equitable benefit distribution. Incentivize corporate engagement for established companies to source from and invest in Kerala's green startups through CSR linkages. Connect Kerala ventures with global green markets, impact investors, and technology partners via international partnerships. Establish an annual Green Entrepreneurship Summit as a flagship event that showcases innovations, attracts investors, and facilitates knowledge exchange.

7. CONCLUSION

This study presents a comprehensive framework for understanding green entrepreneurship and eco-innovative business models in Kerala, a region known for its rich biodiversity, progressive environmental policies, high human development, and strong social entrepreneurship. By systematically analyzing theory and Kerala-specific initiatives, the research fills key gaps in understanding how environmental entrepreneurship leads to sustainable outcomes in economic, social, and ecological terms. Kerala's green ventures achieve triple bottom line results through four main eco-innovation pathways: biodiversity-based products; technology-driven conservation services; circular-economy models, such as waste-to-energy start-ups; and agroecological innovations in organic spice-farming cooperatives in Wayanad. These are supported by factors like policy support through K-SBSAP and KSUM, natural resources, infrastructure, and community partnerships. Success relies on aligning

with policies, working closely with communities, offering both environmental and practical value, being adaptable, and measuring impact clearly. However, ongoing challenges such as limited funding, skill shortages, small scale, infrastructure gaps, and complex regulations require targeted solutions. The study suggests creating dedicated green venture capital, simplifying approval processes, offering specialized incubation, updating educational programs, and building ecosystem partnerships to help Kerala become a global leader in biodiversity-friendly entrepreneurship. Ultimately, Kerala stands at a pivotal juncture where its environmental endowments, policy foresight, and entrepreneurial energy can converge to pioneer a development model reconciling prosperity with planetary health. By nurturing eco-innovative ventures that transform ecological challenges into economic opportunities, Kerala can demonstrate that sustainability is not a constraint on growth but a catalyst for resilient, inclusive, and regenerative development, a lesson of global significance as humanity confronts existential environmental challenges.

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ESTIMATION AND COMPARISON OF INDIAN FINANCIAL DERIVATIVES MARKET

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ABSTRACT *This study presents an estimation and comparative analysis of the Indian financial derivatives market using descriptive statistical techniques based on empirical data from major indices. The analysis covers broad market indices, sectoral indices, and futures contracts by employing statistical measures such as mean, standard deviation, skewness, kurtosis, and probability values. The results indicate that average returns across all indices are positive but marginal, reflecting moderate market performance. The comparative findings reveal that sectoral indices such as Realty, PSU Bank, and Metal exhibit significantly higher volatility than broad market indices like NIFTY 50 and NIFTY 100. Skewness values indicate predominantly negative asymmetry, while high kurtosis across all indices confirms the presence of leptokurtic distributions with extreme market movements. The study highlights that volatility and return characteristics vary considerably across sectors and instruments, emphasizing the need for segment-specific and dynamic hedging strategies in the Indian financial derivatives market.*

1. INTRODUCTION

The Indian financial derivatives market has witnessed substantial growth over the past two decades and has become a key component of the financial system. It plays an essential role in facilitating risk management, improving price discovery, and enhancing portfolio diversification. Since the introduction of derivatives trading, the market has expanded significantly in terms of trading activity, product offerings, and participation from various categories of investors. Instruments such as futures and options on major indices provide investors with opportunities to hedge against market uncertainties and manage financial risks efficiently.

The increasing integration of global markets, coupled with domestic economic developments and sector-specific factors, has led to greater volatility in the Indian derivatives market. This volatility necessitates a detailed estimation and comparison of return and risk characteristics across different indices and instruments. Understanding volatility behavior is crucial as it directly impacts investment decisions and the effectiveness of hedging strategies.

2. REVIEW OF LITERATURE

The pioneering work of Black and Scholes (1973) established the theoretical framework for option pricing and emphasized the role of volatility in asset valuation. Although the model assumes constant volatility, it laid the foundation for empirical studies focusing on volatility estimation. Similarly, Fama and French (1992) contributed to the understanding of return dynamics by identifying multiple factors influencing stock returns, reinforcing the importance of analysing return dispersion and variability.

In the Indian context, Agarwal and Sinha (2013) examined sectoral indices across different market phases and found significant variation in sectoral performance depending on economic conditions. Gupta and Biswas (2014) analysed broad market and sectoral indices and observed that volatility increases during periods of market uncertainty, particularly in sectors such as finance and energy. Kumar and Mishra (2015) focused on futures markets and highlighted that volatility tends to be higher

during bearish phases. Batra (2004) identified that periods of economic instability are associated with increased market volatility, while Singh and Kar (2017) emphasized the cyclical nature of sectoral performance and the importance of skewness and kurtosis in capturing extreme values.

3. OBJECTIVES OF THE STUDY

The study aims to estimate and compare the return and volatility characteristics of broad market indices, sectoral indices, and futures in the Indian financial derivatives market. It seeks to analyse differences in mean returns, variability, skewness, and kurtosis across indices.

4. DATA AND METHODOLOGY

The study is based on secondary data collected from reliable sources such as the National Stock Exchange (NSE) and NIFTY Indices. The dataset includes observations for major broad market indices, sectoral indices, and futures contracts over an extended period. The analysis is conducted using statistical tools such as EViews and MS Excel. Descriptive statistical techniques are employed to estimate mean returns, standard deviation, skewness, and kurtosis. The standard deviation is used as a measure of volatility, while skewness and kurtosis help in understanding the shape and distribution of returns.

5. ANALYSIS AND INTERPRETATION

Table 1: Descriptive Statistics

INDEX	Mean	Median	Std. Dev.	Skew.	Kurt.	Prob.	Obs.
NIFTY 50	0.0006	0.0010	0.0135	-0.1847	15.96	0.000	5587
NIFTY 100	0.0006	0.0011	0.0135	-0.2841	15.80	0.000	5276
NIFTY 200	0.0005	0.0012	0.0135	-0.4077	16.03	0.000	5024
NIFTY 500	0.0007	0.0014	0.0131	-0.4653	15.05	0.000	5587
NIFTY Auto	0.0007	0.0010	0.0148	-0.1502	10.18	0.000	5024
NIFTY Bank	0.0007	0.0008	0.0179	0.0619	10.90	0.000	4659
NIFTY Cons. Dura.	0.0008	0.0012	0.0152	-0.3871	9.99	0.000	4709
NIFTY Energy	0.0007	0.0009	0.0156	-0.2561	11.81	0.000	5589
NIFTY Fin. Services	0.0007	0.0009	0.0175	-0.0242	12.39	0.000	5024
NIFTY FMCG	0.0006	0.0007	0.0123	-0.2079	9.57	0.000	5589
NIFTY Healthcare	0.0005	0.0008	0.0118	-0.2562	9.27	0.000	4709
NIFTY Infrastructure	0.0005	0.0010	0.0159	-0.1236	13.83	0.000	5024
NIFTY IT	0.0007	0.0006	0.0173	-0.1617	11.39	0.000	5589

NIFTY Media	0.0002	0.0005	0.0179	-0.1678	10.26	0.000	4520
NIFTY Metal	0.0006	0.0009	0.0216	0.4154	15.85	0.000	5024
NIFTY Oil & Gas	0.0006	0.0009	0.0152	-0.3259	13.14	0.000	4709
NIFTY Pharma	0.0006	0.0008	0.0124	-0.1616	8.86	0.000	5589
NIFTY Private Bank	0.0008	0.0007	0.0182	-0.0133	12.00	0.000	4711
NIFTY PSE	0.0007	0.0009	0.0156	-0.1538	11.83	0.000	5589
NIFTY PSU Bank	0.0006	0.0006	0.0220	0.4557	12.85	0.000	5026
NIFTY Realty	0.0002	0.0012	0.0251	-0.1733	9.96	0.000	4270
NIFTY Futures	0.0006	0.0008	0.0141	-0.2645	16.06	0.000	5587
Bank NIFTY Futures	0.0007	0.0007	0.0182	0.0633	11.13	0.000	4659

Sources: Computed using Eviews 9

Table 1 shows that the mean returns across various indices range from 0.0002 (NIFTY Media and NIFTY Realty) to 0.0008 (NIFTY Private Bank and NIFTY Consumer Durables). This suggests that the NIFTY Private Bank and NIFTY consumer durable indices had relatively higher average returns compared to others. The standard deviation of returns varies significantly across indices, with NIFTY Realty exhibiting the highest volatility (0.0251) and NIFTY Healthcare showing the lowest (0.0118). This indicates that NIFTY Realty's returns are more dispersed from the mean, suggesting higher risk and uncertainty. The skewness values for most indices are negative, indicating a leftward tail in the distribution of returns. Here, NIFTY 500 has a skewness of -0.4653, suggesting that it is more likely to experience negative returns. Conversely, NIFTY PSU Bank shows positive skewness (0.4577), indicating a tendency towards higher returns. All indices show kurtosis values greater than 3, indicating leptokurtic distributions. This suggests that returns are more peaked around the mean than a normal distribution, indicating a higher likelihood of extreme outcomes. Here, NIFTY Futures has a kurtosis of 16.06, reflecting a substantial risk of extreme returns. The results of the Jarque-Bera test for normality (all p-values < 0.001) indicate that the returns of all indices deviate significantly from a normal distribution. This reinforces the findings from skewness and kurtosis, suggesting that hedging strategies shall account for these non-normal characteristics.

6. CONCLUSION

The estimation and comparative analysis of the Indian financial derivatives market reveal several important insights into return behavior and volatility dynamics across broad market indices, sectoral indices, and futures contracts. The mean returns across all indices are positive but relatively low, indicating modest average performance over the study period. Broad market indices such as NIFTY 50, NIFTY 100, NIFTY 200, and NIFTY 500 exhibit stable and consistent mean returns, suggesting overall market resilience. In comparison, certain sectoral indices such as NIFTY Consumer Durables, NIFTY Private Bank, and NIFTY Auto demonstrate slightly higher mean returns, indicating better performance in specific sectors.

The standard deviation values highlight significant differences in volatility across indices. Sectoral indices, particularly NIFTY Realty, NIFTY PSU Bank, and NIFTY Metal, exhibit substantially higher volatility compared to broad market indices. This confirms that sector-specific factors contribute to greater price fluctuations, making sectoral indices riskier than diversified broad market indices. On the other hand, relatively lower volatility is observed in defensive sectors such as NIFTY FMCG, NIFTY Healthcare, and NIFTY Pharma, indicating their stability during varying market conditions. Futures contracts, especially Bank NIFTY Futures, also show higher volatility compared to NIFTY Futures, reflecting the sensitivity of banking sector derivatives to market movements. The skewness values indicate that most indices are negatively skewed, suggesting a higher probability of extreme negative returns. However, a few indices such as NIFTY Metal, NIFTY PSU Bank, and Bank NIFTY Futures exhibit positive skewness, implying occasional large positive returns. This asymmetry in return distribution highlights the uneven risk-return profile across different market segments.

Overall, the findings demonstrate that the Indian financial derivatives market is characterized by high volatility, non-normal return distributions, and significant differences across sectors and instruments. The comparative analysis confirms that sectoral indices are more volatile than broad market indices, while futures contracts amplify market risk due to leverage effects. These results emphasize the importance of adopting phase-wise and sector-specific hedging strategies rather than relying on uniform approaches. The study highlights that effective risk management in the Indian derivatives market requires careful consideration of volatility patterns, distributional characteristics, and sectoral behavior to enhance hedging efficiency and investment decision-making.

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SUSTAINABILITY PRACTICES IN THE TOURISM SECTOR OF KERALA AND THE ROLE OF PLANTATION LANDSCAPES

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ABSTRACT Kerala has emerged as a pioneering region in sustainable tourism by integrating ecological conservation, human development, and community participation. With tourism contributing significantly to the state economy, Kerala has adopted innovative approaches such as Responsible Tourism (RT) and eco-tourism. This paper examines sustainability practices in Kerala's tourism sector, with a particular focus on the role of plantation landscapes in advancing eco-friendly and inclusive tourism models. By analysing recent data on tourist arrivals, revenue generation, and policy initiatives, the study highlights how Kerala balances economic growth with environmental stewardship.

Keywords: Tourism, Kerala Tourism, ICT in tourism, Tourism Marketing

1. INTRODUCTION

Kerala occupies a unique position among Indian states due to its high Human Development Index (HDI), strong social indicators, and rich biodiversity. The state's development model has enabled it to integrate tourism growth with sustainability concerns more effectively than many other regions. Tourism has become a major driver of Kerala's economy, contributing more than 10 percent to the Gross State Domestic Product (GSDP) and supporting nearly one-fourth of total employment, either directly or indirectly. The state receives approximately 2.3 to 2.5 crore tourists annually, reflecting its strong appeal in both domestic and international markets.

2. GROWTH AND ECONOMIC CONTRIBUTION OF TOURISM

Kerala's tourism sector has shown remarkable resilience and growth in the post-pandemic period. In 2025, the state recorded approximately 2.58 crore tourist arrivals, marking one of the highest figures in its history. Domestic tourists accounted for nearly 70 percent of total arrivals, while foreign tourist arrivals reached around 8.2 lakh, indicating a gradual recovery of international tourism. Tourism revenue has also witnessed substantial growth, with total earnings estimated to exceed ₹45,000 crore annually in recent years. This economic contribution is significant not only in terms of revenue generation but also in sustaining livelihoods across sectors such as hospitality, transport, handicrafts, and local trade.

3. RESPONSIBLE TOURISM: KERALA'S SUSTAINABILITY FRAMEWORK

Kerala introduced Responsible Tourism in 2008 as a pilot initiative in destinations such as Kumarakom, Kovalam, Thekkady, and Vythiri. Over time, this initiative expanded across the state, transforming Kerala into a global model for community-based tourism. Responsible Tourism in Kerala is guided by the principles of economic sustainability, social equity, and environmental protection, often referred to as the triple bottom line approach.

The scale of Responsible Tourism initiatives has grown significantly over the years. At present, more than 26,000 micro and small enterprises operate under the RT network, and these initiatives benefit over 1.5 lakh families across the state. A notable feature of this model is its emphasis on gender inclusivity,

with approximately 80 percent of the enterprises being led by women. Additionally, more than 20,000 individuals have received training in tourism-related skills, enabling them to participate effectively in the sector. Responsible Tourism has played a crucial role in strengthening local economies by linking tourism demand with local supply chains. Hotels and resorts increasingly procure agricultural produce, handicrafts, and services from local communities, thereby reducing economic leakage and ensuring that tourism revenue circulates within the region.

4. ECOTOURISM AND ENVIRONMENTAL SUSTAINABILITY

Kerala's tourism strategy is deeply rooted in its natural assets, including the Western Ghats, backwaters, forests, and coastal ecosystems. The Western Ghats, recognised as one of the world's biodiversity hotspots, provide a strong foundation for ecotourism initiatives. These initiatives aim to minimise environmental impact while generating income for local communities and promoting conservation awareness. Ecotourism projects in Kerala have focused on low-impact activities such as guided nature trails, wildlife observation, and community-based tourism experiences. The state has also taken measures to address environmental concerns such as waste management and plastic reduction in tourist destinations. These efforts reflect a broader commitment to maintaining ecological balance while promoting tourism growth.

5. PLANTATION LANDSCAPES AND SUSTAINABLE TOURISM

Plantation agriculture forms a vital component of Kerala's economy and landscape, particularly in highland districts such as Idukki and Wayanad. The state has extensive cultivation of crops such as tea, coffee, rubber, cardamom, and pepper. Plantation crops together occupy a significant share of cultivated land in Kerala, with estimates indicating that plantation areas account for more than 8 to 10 lakh hectares.

Recognising the potential of plantation landscapes for tourism, the government has introduced a policy allowing up to 5 percent of plantation land to be utilised for tourism-related activities. This policy has opened new avenues for the development of agro-tourism and plantation-based tourism. Plantation tourism typically involves activities such as estate stays, guided tours of plantations, and experiential learning related to cultivation and processing of crops. The integration of plantations into tourism contributes to sustainability in multiple ways. Environmentally, plantation areas maintain green cover and help preserve biodiversity, particularly in ecologically sensitive regions. Economically, plantation tourism provides an additional source of income for plantation owners and workers, reducing dependence on fluctuating commodity prices. Socially, it creates employment opportunities for local communities and promotes cultural exchange between visitors and residents.

6. CONVERGENCE OF PLANTATION TOURISM AND RESPONSIBLE TOURISM

The development of plantation tourism aligns closely with the principles of Responsible Tourism. By encouraging local sourcing, community participation, and environmentally friendly practices, plantation tourism strengthens the sustainability framework already established by the RT model. Farm tourism initiatives under Responsible Tourism promote direct interaction between tourists and farmers, enabling visitors to experience agricultural practices while supporting local livelihoods.

This convergence also enhances value addition within the tourism sector by creating unique and authentic experiences that differentiate Kerala from other destinations. As a result, plantation tourism not only contributes to economic growth but also reinforces Kerala's identity as a sustainable tourism destination.

7. CHALLENGES AND LIMITATIONS

Despite its achievements, Kerala's tourism sector faces several challenges in sustaining its growth trajectory. Certain destinations experience overtourism, leading to environmental stress and infrastructure pressure. Issues such as waste management, coastal erosion, and ecological degradation continue to pose significant concerns. Additionally, climate change has increased the vulnerability of the state to natural disasters such as floods and landslides, which can adversely affect tourism. Another challenge lies in balancing tourism development with the interests of traditional livelihoods, particularly in coastal and rural areas. Ensuring equitable distribution of tourism benefits remains a critical issue that requires continuous policy attention.

8. CONCLUSION

Kerala's experience demonstrates that tourism can be developed as a sustainable and inclusive sector when guided by strong policy frameworks and community participation. The Responsible Tourism initiative has successfully created a model that integrates economic growth with social and environmental objectives. The inclusion of plantation landscapes into tourism represents a significant step forward in expanding sustainable tourism practices.

With tourism generating more than ₹45,000 crore in annual revenue, supporting millions of livelihoods, and attracting over 2.5 crore visitors each year, Kerala stands as a leading example of how sustainability can be embedded in tourism development. The continued integration of plantation-based tourism, community participation, and ecological conservation will be crucial in ensuring the long-term sustainability of the sector.

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IMPACT OF GREEN HUMAN RESOURCE MANAGEMENT (GHRM) INITIATIVES ON EMPLOYEE SUSTAINABLE PRACTICES: A STUDY OF IT COMPANIES IN CHENNAI, INDIA

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ABSTRACT *This research article investigates the impact of Green Human Resource Management (GHRM) initiatives and awareness on Employee Sustainable Practices (ESP) within Information Technology (IT) companies in Chennai, India. Adopting a descriptive and quantitative research design, data were collected from 393 employees using a structured questionnaire with a five-point Likert scale. The measurement instrument demonstrated exceptional reliability, with a Cronbach's alpha of 0.99. The findings reveal that "minimising carbon footprint" is the highest-ranked sustainable practice among employees (Mean = 3.74). Demographic analysis indicates that while gender, age, and professional experience do not significantly influence ESP, higher educational attainment (undergraduate and postgraduate levels) correlates with significantly stronger engagement in sustainable behaviours ($p = .021$). Regression analysis demonstrates that GHRM Initiatives (GHI) and GHRM Awareness (GHA) collectively explain 72% of the variance in Employee Sustainable Practices ($R^2 = 0.72$), with GHRM Awareness emerging as the most significant predictor ($\beta = 0.66$, $p < .001$). These results suggest that creating employee awareness is a critical strategic lever for IT firms to enhance environmental performance and organisational sustainability.*

Keywords: *Green Human Resource Management, Human Resource Management, Employee Sustainable Practices, GHRM Initiatives*

1. INTRODUCTION

In the contemporary era of global environmental challenges, the concept of sustainability has transitioned from a corporate social responsibility (CSR) obligation to a core strategic imperative for organisations worldwide. The rapid industrialisation and subsequent environmental degradation have necessitated a fundamental shift in how businesses operate, particularly in resource-intensive sectors. Within this context, the Information Technology (IT) sector, once considered a "clean" industry, has come under scrutiny due to its substantial energy consumption, carbon footprint, and e-waste generation. In India, a global hub for IT and software services, the pressure to adopt sustainable practices is particularly acute as the nation strives to balance economic growth with environmental preservation.

Green Human Resource Management (GHRM) has emerged as a critical framework for aligning human capital management with these environmental objectives (Gaikwad, 2025). GHRM refers to the systemic use of human resource policies and practices to promote the sustainable use of resources and prevent environmental degradation. It involves transforming traditional HR functions such as recruitment, training, performance management, and employee relations into "green" counterparts that foster an eco-friendly organisational culture (Manoj et al., 2024). The strategic evolution of HR from a support function to a strategic partner means that GHRM is now viewed as a primary driver for achieving a sustainable competitive advantage.

The Indian IT sector, specifically in metropolitan tech hubs like Chennai, represents a unique landscape for studying GHRM (Jayakani & Rani, 2024). Chennai houses a high density of multinational and domestic IT firms, making it an ideal location to examine the institutionalisation of green practices. The

city's IT sector has shown particular emphasis on green HRM practices that positively impact organisational sustainability and environmental performance, though the implementation varies across organisations (Jayakani & Rani, 2024). Recent studies focusing on Chennai's IT sector have demonstrated significant relationships between green HRM practices and organisational culture, with environmental performance being directly influenced by green HRM initiatives (Verma & Vetrivel, 2025).

A critical gap often identified in GHRM implementation is the "policy-practice" divide. While organisations may implement various green initiatives (GHI), the success of these programs is heavily dependent on employee awareness (GHA) and the subsequent translation of policies into tangible employee sustainable practices (ESP) (Sowmiya, 2024). Employees serve as the "green human capital" that moves an organisation toward its environmental goals. Understanding the relationship between organisational initiatives, employee awareness, and actual sustainable behaviour is therefore vital for HR practitioners and policymakers.

This study aims to address this gap by empirically investigating the impact of GHRM initiatives and awareness on employee sustainable practices within Chennai's IT sector. By examining specific behaviours such as carbon footprint reduction, waste management, and energy conservation and the demographic factors influencing them, this research provides a comprehensive analysis of the "human side" of environmental sustainability in a critical Indian industry.

2. REVIEW OF LITERATURE

2.1 THE CONCEPT AND STRATEGIC IMPORTANCE OF GHRM

Green Human Resource Management (GHRM) is defined as the alignment of an organisation's human resource management practices with its environmental goals to improve environmental performance (Gaikwad, 2025). Unlike traditional HRM, GHRM focuses on the environmental impact of every HR process, from the initial job description to the final exit interview. In the Indian context, GHRM is increasingly recognised as a strategic imperative for sustainable development, as it allows organisations to internalise environmental values and build a workforce that is inherently eco-conscious.

Research indicates that the uptake of GHRM in Indian IT organisations has seen a mixed but upward trajectory (Arora & Kaul, 2020). All surveyed IT/IT services companies in India are aware of green HRM, with 75% actively following its practices, making this sector the most active in green HRM implementation, particularly in green training and development, reward management, and discipline management. This growing institutionalisation is reflected in the measurable links between GHRM practices and improved environmental and organisational performance (Amudha et al., 2022).

2.2 DIMENSIONS OF GREEN HUMAN RESOURCE MANAGEMENT

Literature identifies several core GHRM dimensions that are instrumental in driving organisational sustainability:

2.2.1 GREEN RECRUITMENT AND SELECTION

This involves screening candidates not only for their technical skills but also for their environmental values, knowledge, and commitment (Prasad & Mangipudi, 2022). By hiring individuals who already possess a "green" mindset, organisations can more easily align individual goals with organisational sustainability targets. This practice ensures a "green person-organisation fit" from the very beginning of the employee lifecycle.

2.2.2 GREEN TRAINING AND DEVELOPMENT

Training is perhaps the most critical lever for building employee eco-skills (Lekhi et al., 2024). Green training programs focus on educating employees about the organisation's environmental policies, energy-saving techniques, and waste reduction practices. Such programs are essential for cultivating GHRM awareness, which is a necessary precursor to sustainable behaviour change (Kumar & Kant, 2024).

2.2.3 GREEN PERFORMANCE MANAGEMENT AND REWARDS

This dimension involves linking employee performance appraisals and compensation to environmental Key Performance Indicators (KPIs) (Tari & Nirmala, 2025). When employees are evaluated on their contribution to sustainability, such as reducing paper usage or achieving energy efficiency targets, they are more likely to prioritise green behaviours. Rewards, both monetary and non-monetary, serve as powerful incentives for reinforcing eco-friendly actions.

2.2.4 GREEN ORGANISATIONAL CULTURE

Beyond specific policies, GHRM aims to foster a workplace culture where sustainability is a shared value (Verma & Vetrivel, 2025). A green culture encourages discretionary environmental behaviours, often referred to as "Organisational Citizenship Behaviour for the Environment" (OCBE). In Chennai's IT sector specifically, green HRM policies have been found to significantly enhance organisational culture, with Green Performance Management and Green Training & Development being key drivers.

2.3 IMPACT OF GHRM ON ORGANISATIONAL PERFORMANCE

Empirical evidence from the Indian IT sector suggests that GHRM contributes positively to multiple facets of sustainability (Ghosh & Haque, 2024). GHRM significantly contributes to Employee Green Behaviour (EGB), Financial Performance (FP), and operational performance (OpP) in the Indian ICT sector, with employee green behaviour mediating the connection between GHRM and both financial and operational performance. Studies have documented that GHRM practices lead to improved environmental performance, including reduced energy consumption, lower waste levels, and a smaller overall carbon footprint.

Furthermore, the impact of GHRM extends beyond environmental metrics to include organisational and financial performance. For instance, GHRM has been linked to cost reductions through resource efficiency and enhanced corporate reputation, which can attract both investors and talent (Mitta & Kaur, 2022). The findings showed a positive and significant mediating role of green innovation (product and process) between Green HRM and environmental performance, with servant leadership also moderating this relationship in Indian IT companies.

2.4 THE ROLE OF EMPLOYEE BEHAVIOUR AND AWARENESS

The relationship between GHRM policies and sustainability outcomes is not direct; it is often mediated by the human element (Prasad et al., n.d.). Employee awareness, engagement, and pro-environmental behaviour are the central mechanisms through which GHRM initiatives translate into organisational results. Green human resource management positively and significantly impacts IT employees' environmentally friendly performance and eco-friendly behaviour, with organisational commitment partially mediating these relationships.

Studies have shown that green employee engagement, characterised by an employee's emotional and cognitive connection to the organisation's green goals, correlates with higher productivity and stronger environmental performance (Dwivedi & Banerjee, 2025). The study found that Green Motivation and Awareness of Green HRM Practices (AGHRME) significantly predicted managerial performance in Indian IT firms. When employees are aware of GHRM initiatives, they are more likely to engage in

discretionary eco-behaviours, such as turning off unnecessary lights or opting for sustainable transportation.

2.5 GHRM IN CHENNAI'S IT SECTOR CONTEXT

The Chennai IT industry faces specific challenges and opportunities in GHRM implementation (Jayakani & Rani, 2024). While green HR practices are widely implemented in Chennai's IT sector, certain practices are not as outstanding as others. GHRM activities like development, training, performance assessment, and compensation significantly impact organisational sustainability, with the study examining how environmental and employee performance mediate this connection. The sector's reliance on highly educated human capital provides a fertile ground for greening the workforce, with recent research showing significant variance among education levels concerning employee sustainable practices (Verma & Vetrivel, 2025).

3. RESEARCH METHODOLOGY

3.1 RESEARCH DESIGN

This study utilised a descriptive research design to provide a precise representation of the characteristics, behaviours, and opinions related to GHRM initiatives in IT companies in Chennai. A quantitative methodology was adopted to assess the relationships and explore cause-and-effect correlations among the variables, utilising closed-ended data and statistical assessment.

3.2 DATA COLLECTION AND SAMPLING

The study involved a survey of 393 employees from various IT firms in Chennai. This study utilised a Probability Sampling method, specifically combining Proportionate Stratified Sampling and Systematic Sampling. Data were collected using a structured questionnaire developed based on an extensive literature review of GHRM practices. The instrument utilised a five-point Likert scale (ranging from 1 = Strongly Disagree to 5 = Strongly Agree) to capture employee perceptions and behaviours.

3.3 RELIABILITY OF THE INSTRUMENT

The reliability of the research instrument was rigorously tested using Cronbach's alpha (α). The overall reliability coefficient was 0.99, indicating exceptional stability and consistency. Individual dimensions also demonstrated high reliability:

- Green Recruitment and Selection (GRS): 0.95
- Green Training and Development (GTD): 0.96
- Green Performance Management System (GPM): 0.95
- Green Compensation and Reward (GCR) 0.96
- Employee Sustainable Practices: 0.96

3.4 DATA ANALYSIS TECHNIQUES

Statistical analysis was performed using IBM SPSS Statistics 26. The analytical techniques included:

- Descriptive statistics and ranking based on mean values.
- Independent samples t-tests and One-way ANOVA to examine the impact of demographic factors.
- Multiple linear regression to investigate the impact of GHRM Initiatives (GHI) and GHRM Awareness (GHA) on Employee Sustainable Practices (ESP).

4. ANALYSIS

4.1 RANKING OF EMPLOYEE SUSTAINABLE PRACTICES (ESP)

Employees' engagement in various sustainable practices was ranked based on mean scores from Likert-scale responses. The primary findings include:

- **Minimising Carbon Footprint (Mean = 3.74):** Choosing environmentally friendly transportation modes was the most significant practice for employees.
- **Impact of Decisions (Mean = 3.72):** Employees reported a high level of conscientiousness regarding the environmental impact of their work-related decisions and actions.
- **Waste Management (Mean = 3.66):** Proper recycling and reducing paper usage were key priorities.
- **Energy Conservation (Mean = 3.65):** Active participation in turning off lights and equipment when not in use.
- **Sustainable Alternatives (Mean = 3.64):** Consciousness of the environmental impact of products and services and efforts to choose sustainable alternatives.

4.2 IMPACT OF DEMOGRAPHIC FACTORS

The study examined how demographic characteristics influenced the adoption of sustainable practices:

- **Gender:** No significant difference was found between male and female respondents ($t(391) = 1.70$, $p = .090$), suggesting that environmental consciousness is a shared value across genders in the Chennai IT sector.
- **Age:** No statistically significant differences were observed among various age groups ($F = 0.11$, $p = 0.951$). Mean scores for ESP remained consistent across all age brackets.
- **Education Level:** A significant variance was detected ($F = 3.91$, $p = .021$). Respondents with undergraduate (UG) and postgraduate (PG) degrees exhibited significantly higher mean scores for practices related to assessing the environmental impact of decisions (ESP2) and waste management (ESP3) compared to those with diplomas.
- **Experience:** Overall, professional experience did not significantly impact ESP ($F = 1.70$, $p = 0.167$), although certain specific practices showed varying engagement levels in post-hoc tests.

5. FINDINGS

5.1 REGRESSION ANALYSIS OF GHRM AND ESP

Table 5.1: Multiple Linear Regression Results for ESP

The results of the multiple linear regression analysis examining the impact of GHRM Initiatives and GHRM Awareness on Employee Sustainable Practices are presented in Table 5.1.

Predictor Variables	Unstandardised Coefficient (B)	Standardised Coefficient (β)	t-value	Significance (p-value)
Constant	0.37	—	—	—
GHRM Initiatives (GHI)	0.23	0.23	—	< 0.001
GHRM Awareness (GHA)	0.69	0.66	—	< 0.001

Model Summary

R	R ²	Adjusted R ²	F-value	Significance
—	0.72	—	511.02	< 0.001

A multiple linear regression model was developed to assess the impact of GHRM Initiatives (GHI) and GHRM Awareness (GHA) on Employee Sustainable Practices (ESP). The model was highly statistically significant ($F(2, 390) = 511.02$, $p < .001$) and accounted for 72% of the variance in ESP ($R^2 = 0.72$).

The resulting regression equation is: $ESP = 0.37 + 0.23GHI + 0.69GHA$

Both independent variables showed a positive impact on ESP:

- **GHRM Awareness (GHA):** Demonstrated a highly significant impact (standardised coefficient $\beta = 0.66$, $p < .001$). This indicates that employees' understanding and awareness of GHRM policies are the primary drivers of their sustainable behaviour.
- **GHRM Initiatives (GHI):** Showed a significant positive impact (standardised coefficient $\beta = 0.23$, $p < .001$). This indicates that the actual implementation of green HR programs directly supports and enables sustainable practices.

5.2 SUMMARY OF KEY FINDINGS

The analysis demonstrates that GHRM initiatives and employee awareness are critical precursors to sustainable behaviour in the workplace. While demographic factors like gender and age are not determinants of sustainability engagement in this sample, educational level plays a significant role in the depth of engagement with complex sustainable practices. Most importantly, the level of awareness (GHA) has a nearly threefold stronger influence on behaviour than the mere presence of initiatives (GHI).

6. DISCUSSION

The findings from the Chennai IT sector provide robust evidence for the efficacy of GHRM in driving sustainability. The high R-squared value (0.72) observed in this study is notably higher than some other sector-specific models reported in the literature, demonstrating the exceptional strength of GHRM factors as predictors of employee behaviour in Chennai's IT firms (Senthilkumar & Ramanathan, 2023). This suggests a more mature implementation or a more environmentally receptive workforce compared to other regions.

The dominant influence of GHRM Awareness ($\beta = 0.66$) over GHRM Initiatives ($\beta = 0.23$) highlights a critical strategic insight: it is not enough for firms to merely implement green policies; they must ensure that these policies are clearly communicated and understood by the workforce (Ateeq et al., 2024). This supports the "mediation" perspective found in literature, where employee awareness and green human capital translate organisational intent into tangible environmental action. Without awareness, even the most well-designed initiatives may fail to produce the desired behavioural changes.

The significant impact of education level ($p = .021$) suggests that higher education provides the conceptual framework necessary for employees to integrate environmental considerations into complex job responsibilities, such as assessing the environmental impact of business decisions (Kumar & Kant, 2024). The lack of significant differences across gender and age groups indicates a broad-based, cross-demographic commitment to sustainability within the Chennai IT workforce, providing a solid foundation for further GHRM institutionalisation.

7. RESEARCH GAPS AND LIMITATIONS

While this study provides robust evidence for the Chennai IT sector, several limitations exist based on the provided sources:

- The findings are focused on Chennai; results may vary in other regions or sectors with different industrial cultures (Delphinus & Mwita, 2024).
- The reliance on survey data may introduce social desirability bias, where respondents over-report their sustainable behaviours.
- While awareness was measured, other potential mediators like organisational commitment or green self-efficacy were not explicitly detailed in this specific analysis (Pathak & Agarwal, 2024).

8. CONCLUSION

This study confirms that Green Human Resource Management is a powerful tool for driving sustainability in the Indian IT sector. In Chennai, IT firms have successfully cultivated high levels of reliability in their green HR instruments, and employees are actively engaged in minimising their carbon footprints and managing waste. The research highlights that while initiatives are important, the clarity and awareness of these initiatives among employees are the true catalysts for sustainable practice (Rautrao et al., 2024).

9. RECOMMENDATIONS FOR IT COMPANIES

- Organisations should invest heavily in comprehensive green training and internal communication programs. Since employee awareness is the strongest driver of sustainable practices, ensuring every employee understands "why" and "how" to be green is paramount.
- Tailor sustainability training to different educational backgrounds. Employees in decision-making roles (often with higher degrees) should receive advanced training on integrating environmental impact assessments into business operations.
- Firms should continue developing integrated GHRM systems that combine recruitment (hiring for green values), training (building awareness), and performance management (incentivising behaviour) to reinforce a cohesive green organisational culture.

By focusing on these areas, IT companies in Chennai can significantly enhance their environmental performance and contribute to the broader goal of organisational and regional sustainability.

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ADOPTION OF AI AND DIGITAL PLATFORMS IN GREEN BRAND BUILDING ACROSS HOTELS APARTMENTS

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ABSTRACT *Green brand building means a brand that is prominent for its environmental accountability and sustainability. AI helps companies assess huge environmental datasets to track carbon footprint, calculate energy consumption, optimize resource usage. The study illustrates that AI and accountable marketing considerably influence customer behavior and economic outcomes like cost savings, operational efficiency, and revenue generation. This study does attempt to understand the extent green practices and sustainability in this sector in order to recognize challenges and recommend possible strategies. Properties that implement AI-driven systems, such as smart energy management and digital guest interfaces, demonstrate improved operational effectiveness through reduced energy consumption, optimized resource usage, and minimized waste. The successful execution of these technologies depends on triumph over key challenges will make adoption of AI and Digital Platforms in Green Brand Building across Hotels Apartments will easily possible.*

Keywords: *Technology integration, Sustainable hospitality and tourism, Customer experience, Artificial intelligence, Green technologies.*

1. INTRODUCTION

AI and digital platforms emerging as the Platforms in Green Brand Building refer to how companies use artificial intelligence and digital technologies to strengthen their environmentally responsible brand image. Green brand building means a brand that is prominent for its environmental accountability and sustainability. As per Booking.com annual research, more than half of travelers (53%) are now aware of travel's impact on communities as well as the environment, and that two thirds (69%) now desire to leave places better than when they arrived. Globally, in 2025, traveling more sustainably remains important for most travelers (84%). Back in 2016 less than half (42%) of global travelers believed they traveled more sustainably.

AI helps companies assess huge environmental datasets to track carbon footprint, calculate energy consumption, optimize resource usage. AI can predict energy demand and lessen waste in production and Personalized Sustainable Marketing. AI discovers customer behavior and promotes eco-friendly products to the true audience. AI recommends sustainable products on targeted campaigns for environmentally conscious consumers. AI also helps to track supply chains and ensures sustainability to recognize environmentally harmful suppliers, Supports ethical sourcing, and improves brand credibility.

2. LITERATURE REVIEW

Latest technologies, environmental concerns and shifting consumer favorite require novel theoretical models for the hospitality and tourism sectors. Theory of sustainable technology integration is in hospitality and tourism, sustainability practices and the experiential measurement of service delivery. It offers four mechanisms – technological enablement of sustainability, experiential design, feedback-driven adaptation and strategic capability-building – that explain how organizations can simultaneously achieve operational efficiency, sustainability goals and improved guest engagement

The study illustrates that AI and accountable marketing considerably influence customer behavior and economic outcomes like cost savings, operational efficiency, and revenue generation. The results

recommend that hotels can optimize resource use, reduce costs, and achieve sustainability goals by adopting AI-driven technologies. Responsible marketing advances guest satisfaction and loyalty, attracting environmentally conscious customers. By endorsing customer accountability behavior, hotels can create a competitive edge, improve sustainability conclusions, and position themselves as leaders in responsible tourism. These strategies contribute to long-term economic and environmental benefits.

3. OBJECTIVES OF THE STUDY

- To evaluate the **extent of green practices and sustainability initiatives** in the sector.
- To recognize the **key challenges in adopting AI and digital tools for sustainability**.
- To present recommendations for improving **technology-driven green branding strategies**.

4. RESEARCH METHODOLOGY

The framework primarily believes the green practices and sustainability initiatives in the Hospitality sector. The focus of this article is on the impact of AI on environmental performance. This refers relevant literature from respective journals which are most significant source of study on key challenges in adopting AI and digital tools for sustainability and recommendations for improving technology-driven green branding strategies. It covers wide collection of academic literature on AI-Enabled Smart Buildings Reducing the Carbon Footprint and Enhancing Guest Experiences which specifies different approaches and emphases of research in diverse disciplines. This is qualitative in nature and the data has been collected from the various secondary sources like newspapers, magazine, national and international academic journals.

5. GREEN PRACTICES AND SUSTAINABILITY INITIATIVES IN HOTEL APARTMENTS

In the hotel apartment sector, **green practices and sustainability proposal** focus on reducing environmental impact while maintaining guest comfort and operational efficiency. These include **energy-efficient measures** such as LED lighting, smart HVAC systems, and renewable energy adoption (e.g., solar panels), as well as **water conservation practices** like low-flow fixtures, greywater recycling, and linen/towel reuse programs. Many properties execute **waste management strategies**, including recycling, composting, and reducing single-use plastics, alongside **sustainable procurement** by sourcing eco-friendly products and local, organic supplies. The use of **digital and paperless systems**—such as mobile check-ins, e-invoices, and AI-driven resource management—also supports sustainability goals. Additionally, hotels engage in **green building standards and certifications** (such as LEED), promote **guest awareness programs** encouraging responsible behavior, and adopt **corporate social responsibility (CSR) initiatives** like community engagement and environmental campaigns. Together, these practices assist strengthen the property's green brand image, advance operational efficiency, and meet the growing demand from environmentally conscious travelers.

6. CHALLENGES IN ADOPTION OF ARTIFICIAL INTELLIGENCE (AI) AND DIGITAL PLATFORMS IN GREEN BRAND BUILDING

The adoption of Artificial Intelligence (AI) and digital platforms in green brand building across hotel apartments face several significant challenges, including high initial investment costs for smart technologies and systems, which can be an obstacle especially for smaller properties, as well as a lack of technical expertise requiring continuous staff training and dependence on external vendors. Integration problems with accessible legacy systems often create inefficiencies, while concerns around data privacy and cyber security pose risks to guest faith and brand reputation. Additionally, resistance to transform among employees, driven by fear of job displacement and inadequate awareness of AI

benefits, can hold back implementation. There is also the risk of green washing, where sustainability claims are overstated without real impact, potentially damaging credibility. Measuring the efficiency of green initiatives remains hard due to the absence of standardized metrics, and dependence on third-party technology providers can lead to vendor lock-in and high maintenance costs. Rapid technological development further complicate acceptance by requiring continuous upgrades, while a gap in customer consciousness means not all guests be familiar with or value sustainability efforts, reducing the overall effectiveness of green branding strategies.

7. FINDINGS AND DISCUSSION

The findings specify that the adoption of AI and digital platforms has a important positive impact on green brand building in hotel apartments. Properties that implement AI-driven systems, such as smart energy management and digital guest interfaces, demonstrate improved operational effectiveness through reduced energy consumption, optimized resource usage, and minimized waste. The study additionally reveals that digital platforms play a crucial role in shaping customer perception. Online booking platforms, social media, and hotel websites assist converse sustainability initiatives effectively, increasing transparency and trust among guests. High implementation costs, lack of technical expertise, and integration issues with existing systems limit the extent to which hotel apartments can fully leverage AI technologies. Another important observation is the risk of green washing, where some properties emphasize sustainability in marketing without substantial operational changes.

The discussion propose that while AI and digital platforms offer strong potential for advancing sustainability and enhancing brand image, their effectiveness depends on authentic implementation, employee readiness, and transparent communication. Hotels that align technological acceptance with genuine environmental practices and clear digital communication approach are more likely to achieve long-term competitive advantage and customer trust in the green hospitality market.

8. CONCLUSION

In conclusion, AI and digital platforms enable companies to measure, manage, and communicate sustainability efforts effectively, helping them build credible and trusted green brands in the digital age. Future green branding will increasingly leverage AI-powered virtual avatars to explain complex sustainability initiatives and use augmented reality (AR) for virtual product experiences. These technologies enable properties to improve operational efficiency, reduce environmental impact, and effectively communicate sustainability initiatives to guests.

However, the successful execution of these technologies depends on triumph over key challenges such as high investment costs, lack of technical expertise, integration complexities, and the risk of green washing. Without real commitment and transparent practices, sustainability efforts may fail to build trust and credibility among customers.

Overall, the study highlights that a planned mixture of AI adoption, digital engagement, and genuine green practices is necessary for sustainable growth in the hospitality industry. Hotel apartments that are spending in technology while preserve transparency and continuous improvement in sustainability initiatives are more likely to succeed in building a strong and trustworthy green brand in a gradually more eco-conscious market.

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GREEN ENTREPRENEURSHIP AND ECO-INNOVATIVE BUSINESS MODELS IN TOURISM: A CONCEPTUAL FRAMEWORK FOR SUSTAINABLE AND REGENERATIVE DEVELOPMENT IN KERALA

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ABSTRACT *Tourism destinations increasingly face the challenge of balancing economic growth with environmental sustainability. This conceptual paper examines how green entrepreneurship and eco-innovative business models can enable sustainable transformation in Kerala's tourism sector. It proposes a framework illustrating how tourism small and medium enterprises (SMEs) can integrate environmental responsibility into value creation, delivery, and capture. Drawing on sustainability transitions, stakeholder, institutional, and circular economy perspectives, the study positions Kerala as a relevant context due to its ecological sensitivity and established responsible tourism initiatives. The framework identifies policy support, green finance, community participation, and digitalisation as key enablers of resilient and regenerative tourism development. The study contributes to sustainable tourism literature by linking entrepreneurial orientation with business model innovation at the destination level.*

Keywords: *Green entrepreneurship, sustainable tourism, circular economy, responsible tourism, community-based tourism, tourism SMEs, regenerative tourism, Kerala tourism*

1. INTRODUCTION

Tourism plays a significant role in economic development by generating employment, improving infrastructure, and facilitating cultural exchange. However, its environmental impacts—such as carbon emissions, waste generation, and resource overuse—have become increasingly evident. In many developing regions, tourism growth often outpaces regulatory and sustainability measures, intensifying environmental pressures.

Kerala, known for its backwaters, biodiversity, and cultural heritage, is a major tourism destination in India. While tourism contributes substantially to the state's economy, it has also led to ecological challenges such as water scarcity, coastal erosion, biodiversity loss, and vulnerability to climate-related disasters. Although initiatives like Responsible Tourism have promoted sustainable practices, incremental approaches alone may not ensure long-term sustainability.

In this context, green entrepreneurship offers a viable pathway for transformation. It focuses on identifying opportunities that generate both economic and environmental value. When supported by eco-innovative business models—where sustainability is embedded into core business functions—tourism enterprises can move toward more resilient and regenerative systems. This paper proposes a conceptual framework to explain how such a transition can be achieved in Kerala.

2. LITERATURE REVIEW

2.1 GREEN ENTREPRENEURSHIP IN TOURISM

Green entrepreneurship integrates environmental objectives into business strategies while creating economic value (Schaltegger & Wagner, 2011). Environmental challenges often generate opportunities for innovation (Dean & McMullen, 2007). In tourism, this is reflected in eco-friendly ventures such as

eco-lodges and sustainable travel services (Hall et al., 2010). However, SMEs face constraints like limited finance and institutional support (Tilley & Young, 2009).

2.2 ECO-INNOVATIVE BUSINESS MODELS

Eco-innovative business models embed sustainability into value creation, delivery, and capture (Boons & Lüdeke-Freund, 2013). Such models emphasise resource efficiency, circularity, and stakeholder integration (Bocken et al., 2014). In tourism, innovation extends beyond firms to destination-level systems (Bramwell & Lane, 2011).

2.3 COMMUNITY-BASED TOURISM AND SUSTAINABILITY

Community-based tourism promotes local participation and equitable benefit sharing (Scheyvens, 1999). When integrated with sustainability practices, it supports both livelihoods and environmental conservation (Goodwin, 2011). Community-based tourism (CBT) promotes local participation and equitable distribution of benefits. Kerala's Responsible Tourism Mission demonstrates efforts to integrate local communities into tourism value chains.

2.4 CIRCULAR ECONOMY IN TOURISM

The circular economy focuses on reducing waste and improving resource efficiency through reuse and recycling (Geissdoerfer et al., 2017). Its application in tourism includes waste management, renewable energy use, and sustainable sourcing (Kirchherr et al., 2017).

2.5 INSTITUTIONAL CONTEXT

Institutional theory highlights how regulations and norms influence business behaviour (Scott, 2014). Supportive policies and governance mechanisms are essential for promoting sustainable tourism practices (Hall, 2011). In Kerala, government-led initiatives provide a supportive environment, but further improvements in policy incentives, certification systems, and public-private collaboration are needed to enhance sustainability adoption.

3. THEORETICAL FOUNDATIONS

The framework is based on four key perspectives:

- **Sustainability transitions theory** explains how innovations transform systems over time.
- **Stakeholder theory** emphasises collaboration among key actors.
- **Institutional theory** highlights regulatory and normative influences.
- **Circular economy principles** guide resource-efficient and regenerative practices.

Together, these perspectives provide a comprehensive understanding of sustainable transformation in tourism.

4. CONCEPTUAL FRAMEWORK

The framework proposes that **green entrepreneurial orientation** among tourism SMEs drives the adoption of eco-innovative business models. This transformation occurs across four dimensions:

- **Value Proposition:** Sustainable offerings such as eco-tourism experiences and conservation initiatives.
- **Value Creation:** Use of renewable energy, water conservation, circular waste management, and local sourcing.
- **Value Delivery:** Communication through digital platforms and sustainability certifications.

- **Value Capture:** Revenue generation through premium pricing and equitable benefit-sharing.

Figure 1



Primary Data: This process is influenced by enabling factors including policy support, green finance, community participation, and digitalisation. The expected outcomes include reduced environmental impact, improved community livelihoods, enhanced destination resilience, and stronger positioning of Kerala as a sustainable tourism destination.

5. RESEARCH PROPOSITIONS

The framework suggests the following propositions:

- Policy support strengthens eco-innovation adoption.
- Community participation mediates sustainability outcomes.
- Digitalisation enhances value delivery and competitiveness.
- Circular economy practices improve environmental and economic performance.

6. IMPLICATIONS

The study contributes to theory by linking green entrepreneurship with business model innovation in tourism. It also extends sustainability transitions to a regional context. From a managerial perspective, tourism enterprises should integrate sustainability at the design stage. Collaboration among stakeholders can help overcome implementation challenges. For policymakers, strengthening green financing, certification systems, and innovation ecosystems is essential for promoting sustainable tourism development.

7. CONCLUSION

Kerala's tourism sector is at a critical stage where continued growth without innovation may lead to ecological and economic challenges. Green entrepreneurship and eco-innovative business models provide a pathway toward sustainable and regenerative tourism. By aligning entrepreneurial efforts with institutional support and circular practices, Kerala can emerge as a model for sustainable tourism development. Future research should focus on empirical validation of the proposed framework.

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AN EMPIRICAL STUDY ON FACTORS INFLUENCING THE WORK-LIFE DUE TO PERSONAL-LIFE OF THE COLLEGE TEACHERS

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ABSTRACT *Work-Life balance is the individual discernment that work and non-work exercises are viable and advance development as per a person's present life needs. From this definition note that work-life balance is about people's recognition as they satisfy various and regularly contending jobs. The work-life equalization and employment fulfillment are affected by additional time work. Work life balance is a strategy which helps representatives of an association to adjust their personal and work lives. In this research article researcher has tried to find out the factors which influence the work-life due to the personal-life. Totally twelve factors have been studied under unexpected consequences of personal-life in work-life. The respondents are the Self-Financed Course Arts and Science College Teachers in Kanyakumari District and total four hundred and twenty nine college teachers have been selected for this study.*

Keywords: *Work-Life, Personal-Life and College Teachers*

1. INTRODUCTION

In the present day, society throughout the world has changed in the concepts about work and family life over the past few decades due to the advancement in technology and improvements in the standard of living conditions. These changes and advancements have lead to interference, conflict and competing demands between the expectations of the work place and personal need at home¹. Work life balance defined as the extent to which a person is equally engaged in and equally satisfied with his or her work and family role².Whatever be the context, balancing work and family is increasingly becoming a complicated task for various teachers and they are concerned about the limit between their work lives and family lives³. Work life balance is a method which helps employees of an organization to balance their personal and professional lives. Work life balance encourages employees to divide their time on the basis on priorities and maintain a balance by devoting time to family, health and vacations along with making a career and business travel. It is an important concept in the world of business as it helps to motivate the employees and increases their loyalty towards the company.

2. REVIEW OF LITERATURE

The current work power is portrayed by a more noteworthy female nearness as well as by an expanding pace of older laborers, laborers with a long standing medical issue or handicap, single specialists, and childless couples⁴.

The examination is greatly expected that the work-life balance is a worry mostly for working guardians, whereas thinking about ward youngsters is the important burden in the existence part of the school instructors. All are having an alternate needs and with an alternate degrees of significance that are given to their different non-working jobs⁵.

It is proved that guardians experience a greater number of issues with the work-life balance than laborers without kids⁶. This is regularly on the grounds that family-related requests are higher for guardians⁷.

3. OBJECTIVES OF THE STUDY

- To study the unexpected consequences of personal life in work life.
- To provide suggestions to overcome the consequences of the college teachers.

4. HYPOTHESES OF THE STUDY

- There is no significant difference to the variable ‘Family types’ with respect to ‘Unexpected consequences of personal life in work life’.
- There is no significant difference to the variable ‘Salary’ with respect to ‘Unexpected consequences of personal life in work life’

5. RESEARCH METHODOLOGY

In the present research study, primary data has been collected from various Arts and Science college teachers in Kanyakumari District. For the research work, only Self-Financed course college teachers have been selected and simple random sampling method has used to collect the data. Total respondents are four hundred and twenty nine college teachers. Secondary data has been collected through various articles and books. The method of data collection is the interview schedule.

6. ANALYSIS

1. ‘Family types’ with respect to ‘unexpected consequences of personal life in work life’

The respondents of the study are 429 college teachers and from those 303 teachers are living as a nuclear family and 126 teachers are living in a joint family. The sub-factors of the unexpected consequences of personal life in work-life are studied with the family type of teachers.

Testing of Hypothesis

The hypothesis is, **There is no significant difference between ‘Family types’ and ‘Unexpected consequences of personal life in work life’.** The results obtained were explained in the table 1

Table 1: Family types with respect to unexpected consequences of personal life in work life

Sl. No.	Unexpected consequences of personal life in work life	Family type				t-value	p-value
		Nuclear		Joint			
		Mean	SD	Mean	SD		
1	College work cannot be completed due to family demands	2.92	1.523	2.83	1.386	0.606	0.545
2	My home responsibilities often disturb my teaching	2.57	1.207	2.45	1.009	0.997	0.319
3	Doing incomplete things in college due to family demands on time	2.50	1.255	2.61	1.186	0.836	0.404
4	Family related stress makes me irritable at work	2.36	1.215	2.63	1.136	2.177	0.030*
5	My spouse does not understand my work demands which affect my marital relationship	2.28	1.550	2.37	1.136	0.532	0.595
6	Due to many work at home, I am physically tried to discharge my responsibilities at home	2.76	1.346	2.94	1.071	1.292	0.197
7	I have to make compromise on the work, to keep my family happy	2.66	1.345	2.53	1.164	0.911	0.363
8	I normally have to exceed the amount of leave I am eligible to take in a year	2.50	1.304	2.77	1.328	1.930	0.054

9	The needs and demands of my family members interfere with my work related activities	2.61	1.234	2.75	1.302	1.019	0.309
10	I can concentrate more in my work, if I am free from the family burden.	2.81	1.326	3.07	1.272	1.892	0.059
11	I cannot do my duties properly in college due to personal problems	2.28	1.246	2.24	1.106	0.332	0.740
12	I am too tired to be effective at work due to personal activities	2.69	1.345	2.52	1.101	1.249	0.212

Source: Statistically analyzed data

Note: * Denotes significance at 5 per cent level

From table 1 reveals that, since p-value is less than 0.05, the null hypothesis is rejected at a 5 per cent level of significance. Hence there is a significant difference between family types of the college teachers and concern variable such as family-related stress that makes me irritable at work (0.030). The college teachers who live in a joint family have a negative effect on health, through family-role-related demands and unhealthy interactions among the members in the family and it is especially for the female college teachers.

2. 'Salary of the college teachers' with respect to 'unexpected consequences of personal life in work life'

In this study, 429 college teachers were selected and these teachers are classified based on salary. The ANOVA table is used to study the significant difference that exists among the sub-factors and the salary group of the teachers.

Testing of Hypothesis

The hypothesis is, **There is no significant difference between 'Salary of the college teachers' and 'Unexpected consequences of personal life in work life'**. The result obtained is explained in the table

Table 2: Salary of the college teachers and 'Unexpected consequences of personal life in work life'

Unexpected consequences of personal life in work life	Salary	N	Mean	S.D.	Source of Variation	df	Mean Square	F-value	p-value
College work cannot be completed due to family demands	Rs.10,000-Rs. 20,000	281	2.48	1.363	Between group	2	69.324 1.884	36.804	0.000 **
	Rs.20,001-Rs. 30,000	142	3.67	1.398					
	Rs.30,001-Rs. 40,000	6	3.83	1.169	Within Group				
	Total	429	2.89	1.483					

My home responsibilities often disturb my teaching	Rs.10,000-Rs. 20,000	281	2.26	1.062	Between group	2	32.130 1.184	27.139	0.000 **
	Rs.20,001-Rs. 30,000	142	3.08	1.152					
	Rs.30,001-Rs. 40,000	6	2.67	.516	Within Group				
	Total	429	2.54	1.153					
Doing incomplete things in college due to family demands on time	Rs.10,000-Rs. 20,000	281	2.23	1.125	Between group	2	36.423 1.361	26.756	0.000 **
	Rs.20,001-Rs. 30,000	142	3.11	1.225					
	Rs.30,001-Rs. 40,000	6	3.00	1.673	Within Group				
	Total	429	2.53	1.235					
Family related stress makes me irritable at work	Rs.10,000-Rs. 20,000	281	2.25	1.203	Between group	2	15.276 1.369	11.159	0.000 **
	Rs.20,001-Rs. 30,000	142	2.77	1.094					
	Rs.30,001-Rs. 40,000	6	3.33	1.366	Within Group				
	Total	429	2.44	1.197					
My spouse does not understand my work demands which affect my marital relationship	Rs.10,000-Rs. 20,000	281	2.33	1.371	Between group	2	.438 2.081	0.210	0.810
	Rs.20,001-Rs. 30,000	142	2.27	1.567					
	Rs.30,001-Rs. 40,000	6	2.00	1.673	Within Group				
	Total	429	2.31	1.440					
Due to many work at home, I am physically tired to discharge my responsibilities at home	Rs.10,000-Rs. 20,000	281	2.66	1.283	Between group	2	9.950 1.580	6.297	0.002 **
	Rs.20,001-Rs. 30,000	142	3.12	1.188					
	Rs.30,001-Rs. 40,000	6	2.67	1.633	Within Group				
	Total	429	2.81	1.273					

I have to make compromise on the work, to keep my family happy	Rs.10,000-Rs. 20,000	281	2.44	1.297	Between group	2	13.283 1.621	8.195	0.000 **
	Rs.20,001-Rs. 30,000	142	2.97	1.226					
	Rs.30,001-Rs. 40,000	6	2.67	1.211	Within Group				
	Total	429	2.62	1.294					
I normally have to exceed the amount of leave I am eligible to take in a year	Rs.10,000-Rs. 20,000	281	2.36	1.202	Between group	2	20.896 1.640	12.741	0.000 **
	Rs.20,001-Rs. 30,000	142	3.02	1.412					
	Rs.30,001-Rs. 40,000	6	2.67	1.633	Within Group				
	Total	429	2.58	1.315					
The needs and demands of my family members interfere with my work related activities	Rs.10,000-Rs. 20,000	281	2.46	1.165	Between group	2	16.347 1.504	10.866	0.000 **
	Rs.20,001-Rs. 30,000	142	3.04	1.352					
	Rs.30,001-Rs. 40,000	6	2.33	.816	Within Group				
	Total	429	2.65	1.254					
I can concentrate more in my work, if I am free from the family burden.	Rs.10,000-Rs. 20,000	281	2.74	1.334	Between group	2	8.630 1.695	5.091	0.007 **
	Rs.20,001-Rs. 30,000	142	3.16	1.236					
	Rs.30,001-Rs. 40,000	6	3.17	1.329	Within Group				
	Total	429	2.89	1.314					
I cannot do my duties properly in college due to personal problems	Rs.10,000-Rs. 20,000	281	2.01	1.086	Between group	2	29.555 1.322	22.360	0.000 **
	Rs.20,001-Rs. 30,000	142	2.80	1.275					
	Rs.30,001-Rs. 40,000	6	2.00	.894	Within Group				
	Total	429	2.27	1.206					

I am too tired to be effective at work due to personal activities	Rs.10,000-Rs. 20,000	281	2.41	1.219	Between group	2	23.400 1.534	15.251	0.000 **
	Rs.20,001-Rs. 30,000	142	3.11	1.294	Within Group				
	Rs.30,001-Rs. 40,000	6	2.50	.548					
	Total	429	2.64	1.279					

Source: Statistically analyzed data

Note: ** Denotes significance at 1 per cent level

Table 2 indicates that, Since p-value is less than 0.01, the null hypothesis is rejected at a 1 per cent level of significance. Hence, there is a significant difference between the salary of the college teachers and concern variables such as college work cannot be completed due to family demands (0.000), my home responsibilities often disturb my teaching (0.000), doing incomplete things in college due to family demands on time (0.000), family-related stress makes me irritable at work (0.000), due to many work at home, I am physically tired to discharge my responsibilities at home (0.002), I have to make compromise on the work, to keep my family happy (0.000), I normally have to exceed the amount of leave I am eligible to take in a year (0.000), the needs and demands of my family members interfere with my work-related activities (0.000), I can concentrate more in my work, if I am free from the family burden (0.007), I cannot do my duties properly in college due to personal problems (0.000) and I am too tired to be effective at work due to personal activities (0.000). The college teachers who are earn the salary between Rs. 20,001 and Rs. 30,000 are facing imbalance in their lives, it may be due to lack of other sources of income which creates an imbalance in the financial issues.

7. FINDINGS, SUGGESTIONS AND CONCLUSION

7.1 FINDINGS

There is a significant difference between family types of the college teachers and family-related stress that makes irritate at work. The college teachers who live in a joint family is having a negative effect on health, through family-role-related demands and unhealthy interactions between the members in the family, it is especially for the female teachers. The teachers who are earning the salary between Rs. 20,001 and Rs. 30,000 are facing imbalance in their lives, it may be due to lack of other sources of income which creates an imbalance in the financial issues.

7.2 SUGGESTIONS

The college teachers, who live in joint family, should take a proper diet and a proper sleep, which reduces the health issues. To reduce the family role related demand, the spouse should share the responsibilities equally. Family should come together to clear all the misunderstanding to avoid the unhealthy interactions. If this does not work they can seek help from counselor to overcome their issue. The college teachers who earn salary between Rs. 20,001 and Rs. 30,000 should put a monthly budget, to reduce the expenses and increase the saving for future.

7.3 CONCLUSION

There are pros and cons for the college teachers who live in joint family and nuclear family. In nuclear family the college teachers have to spend more money for their needs such as house rent and electricity bills, whereas the college teachers in joint family have to deal with family demands and bad interactions between members in the family which leads to negative effects on their health. The college teachers should try to manage their standard of living with the available income which will reduce their financial problem in their personal life. Finally they can have a balance in their work and personal lives.

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GREEN AI LEADERSHIP: REDUCING THE CARBON FOOTPRINT OF ARTIFICIAL INTELLIGENCE WITHOUT SLOWING INNOVATION

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ABSTRACT Artificial Intelligence (AI) is rapidly transforming the global economy by enabling automation, decision-making, personalization, and predictive analytics across multiple domains. However, the expansion of AI has resulted in growing environmental concerns due to high energy consumption, carbon emissions from data centers, and increased electronic waste from hardware upgrades. The emergence of large-scale deep learning and generative AI models has intensified the need for computational power, thereby increasing the carbon footprint of AI operations. This creates a challenge for modern leadership: how to promote AI-based innovation without compromising environmental sustainability and ethical responsibility.

Green AI leadership is an emerging concept that focuses on developing and implementing AI systems that are energy-efficient, ethically responsible, transparent, and environmentally sustainable. This paper discusses the environmental impacts of AI, the role of sustainable leadership in managing AI development, and strategies such as efficient algorithm design, carbon-aware computing, renewable-energy-based data centers, sustainable AI governance, and responsible innovation. The paper highlights that sustainable leadership in the AI era requires balancing innovation, ethics, and ecological responsibility to ensure long-term societal and environmental well-being.

Keywords: Green AI, Sustainable Leadership, Carbon Footprint, Ethical AI, Energy-Efficient Computing, AI Governance, Environmental Sustainability

1. INTRODUCTION

Artificial Intelligence (AI), often referred to as machine intelligence, is the ability of systems to interpret data, learn from experience, and perform tasks such as reasoning, prediction, and decision-making. AI has become a crucial driver of technological development and economic growth. Organizations worldwide are adopting AI tools in sectors such as healthcare, education, banking, agriculture, transportation, and smart governance.

In recent years, AI has grown from small-scale automation to large-scale intelligent systems. Advanced AI applications such as autonomous vehicles, voice assistants, recommendation systems, facial recognition, fraud detection, and generative AI models have increased efficiency and productivity in organizations. However, this rapid AI expansion has also introduced new sustainability challenges.

One of the major concerns is the increasing environmental impact of AI technologies. Training large AI models requires high computational power, which depends heavily on electricity consumption. Large-scale data centers used for AI operations consume enormous energy and generate significant carbon emissions, especially when powered by fossil-fuel-based electricity. Furthermore, the rapid demand for GPUs, servers, and specialized chips results in increased electronic waste and resource depletion.

Sustainable leadership in the age of AI therefore becomes essential. Leaders must not only adopt AI to enhance innovation and productivity but must also ensure that AI systems align with environmental sustainability and ethical responsibility. Green AI leadership focuses on reducing AI's carbon footprint without restricting innovation, ensuring that AI growth is sustainable for the future.

Thus, this paper explores the need for Green AI leadership and provides a strategic framework for balancing innovation, ethics, and environmental responsibility.

2. UNDERSTANDING THE ENVIRONMENTAL IMPACT OF AI

The environmental impact of AI is often overlooked because AI is viewed as “digital” and intangible. However, AI requires physical infrastructure such as data centers, high-performance computing systems, cooling systems, and network connectivity. These components contribute to environmental degradation in multiple ways.

2.1 HIGH ENERGY CONSUMPTION

AI model training, especially deep learning and generative AI, requires thousands of hours of GPU-based computation. This computation consumes massive electricity. The more complex the AI model, the more energy it consumes. Large-scale AI applications also require continuous inference (deployment) processes, which consume energy even after training is completed.

2.2 CARBON EMISSIONS

Most AI systems rely on cloud computing services and data centers. If these data centers are powered by fossil fuels, the energy usage directly contributes to carbon emissions. AI expansion therefore indirectly increases global greenhouse gas emissions.

2.3 DATA CENTER COOLING AND WATER USAGE

AI infrastructure produces significant heat. Data centers require cooling mechanisms that consume additional electricity and water resources. In many regions, this increases water stress and environmental imbalance.

2.4 HARDWARE MANUFACTURING AND E-WASTE

AI requires advanced hardware such as GPUs, TPUs, and servers. Manufacturing these components requires mining rare earth materials, heavy industrial processes, and transportation, which contribute to pollution. Additionally, rapid AI development causes frequent hardware upgrades, increasing electronic waste.

2.5 INCREASED DIGITAL CONSUMPTION

AI-driven technologies such as streaming recommendations, targeted ads, and automation increase digital demand, resulting in more energy usage. Thus, AI indirectly contributes to environmental harm through increased consumption patterns.

These impacts highlight why sustainable leadership must integrate environmental considerations into AI strategy.

3. GREEN AI: A SUSTAINABLE APPROACH TO AI DEVELOPMENT

Green AI refers to the design, development, and deployment of AI models with a strong focus on reducing environmental impact. Unlike traditional AI research that focuses on maximizing performance and accuracy, Green AI prioritizes energy efficiency, sustainability, and responsible innovation.

Green AI is not an opposition to innovation. Instead, it ensures that innovation continues in a manner that does not compromise the environment.

3.1 KEY PRINCIPLES OF GREEN AI

- **Efficiency over Excessive Scale:** AI models should aim for optimized performance with minimal computational resources rather than building unnecessarily large models.
- **Transparency in Energy Usage:** AI organizations should measure and report energy consumption and carbon footprint during training and deployment.
- **Sustainable Infrastructure:** Data centers and cloud services should shift towards renewable energy sources and low-carbon operations.
- **Ethical and Responsible Governance:** Green AI must include fairness, transparency, accountability, and sustainability in decision-making.
- **Long-Term Environmental Responsibility:** AI leaders must ensure that AI growth does not create future ecological damage.

Green AI therefore, becomes a leadership-driven strategy rather than just a technical approach.

4. GREEN AI LEADERSHIP AND ITS ROLE IN SUSTAINABLE DEVELOPMENT

Leadership plays a central role in shaping how AI is adopted and used. Sustainable leaders are responsible for ensuring that AI innovation aligns with global environmental goals such as the United Nations Sustainable Development Goals (SDGs).

Green AI leadership refers to leadership strategies that ensure AI technologies are developed and deployed responsibly with reduced carbon emissions, minimal environmental harm, and strong ethical governance.

4.1 VISIONARY LEADERSHIP

Sustainable leaders must have a long-term vision that recognizes AI's potential and risks. They must integrate sustainability into the organization's AI strategy rather than treating it as an afterthought.

4.2 POLICY AND GOVERNANCE

Leaders must create clear AI sustainability policies, such as carbon audits, energy reporting, and ethical compliance guidelines.

4.3 INNOVATION MANAGEMENT

Leaders must promote research into efficient AI models, green computing techniques, and renewable energy-based systems.

4.4 STAKEHOLDER RESPONSIBILITY

Green AI leadership requires collaboration with stakeholders such as governments, academic institutions, environmental organizations, and communities.

4.5 ACCOUNTABILITY AND TRANSPARENCY

Sustainable leaders must ensure that AI projects are transparent, explainable, and aligned with sustainability goals.

Thus, leadership becomes the key force behind achieving a balance between AI innovation and environmental responsibility.

5. DISCUSSION

AI is not a magical solution; it is a combination of algorithms, machine learning methods, and computational systems that process large datasets to generate predictions, automation, and decision-

making support. AI has the potential to solve major global problems such as climate prediction, renewable energy management, smart agriculture, and disaster forecasting. However, it can also create environmental burdens if deployed irresponsibly.

One of the major challenges is that organizations prioritize speed, profit, and performance. This creates a race to build larger models, which require enormous energy consumption. In many cases, AI developers train multiple versions of models repeatedly to improve accuracy by small percentages, resulting in excessive energy waste.

Furthermore, AI infrastructure is expanding rapidly. Cloud platforms store and process massive data volumes. Without sustainability planning, these data centers increase carbon emissions and environmental degradation. The lack of awareness about AI's environmental impact is also a major problem. Many organizations assume AI is eco-friendly simply because it is digital.

Green AI leadership demands that leaders redefine success metrics. Instead of measuring AI success only by accuracy and profitability, organizations must also measure carbon footprint, energy efficiency, and environmental responsibility.

Additionally, ethical challenges exist. AI systems may create bias and unfair outcomes, but Green AI leadership also includes environmental ethics. Environmental ethics refers to ensuring that AI does not harm ecological systems, communities, or future generations. If AI carbon emissions contribute to climate change, then AI development becomes an ethical issue as well.

Another critical issue is the lack of transparency. Many AI companies do not report how much energy they consume or how much carbon emissions are produced during model training. Without transparency, sustainability cannot be achieved. Sustainable leaders must demand carbon reporting, sustainability audits, and responsible AI frameworks.

Finally, sustainable leadership must encourage innovation in efficient AI systems. Research in compressed models, low-power hardware, and optimized training methods can reduce carbon footprint while maintaining innovation. This shows that sustainability and innovation are not opposites but can work together.

Thus, Green AI leadership is essential for ensuring that AI remains a beneficial technology without becoming an environmental burden.

6. STRATEGIES FOR REDUCING AI CARBON FOOTPRINT WITHOUT SLOWING INNOVATION

Green AI leadership can implement several practical strategies to reduce carbon footprint while continuing AI innovation:

6.1 ENERGY-EFFICIENT ALGORITHMS

Organizations should develop AI algorithms that require fewer computations. Lightweight models, smaller architectures, and optimized training cycles can significantly reduce energy use.

6.2 MODEL OPTIMIZATION TECHNIQUES

Techniques such as pruning, quantization, distillation, and transfer learning reduce training costs while maintaining performance.

6.3 SUSTAINABLE CLOUD COMPUTING

Leaders should choose cloud providers that operate on renewable energy and support carbon-neutral infrastructure.

6.4 CARBON-AWARE SCHEDULING

AI training tasks can be scheduled during times when renewable energy availability is high, reducing dependency on fossil fuels.

6.5 GREEN DATA MANAGEMENT

Reducing unnecessary data storage, removing redundant datasets, and optimizing data pipelines reduce energy usage.

6.6 HARDWARE SUSTAINABILITY

Using energy-efficient chips, recycling hardware, and extending hardware life cycles can reduce e-waste and carbon emissions.

6.7 AI GOVERNANCE AND COMPLIANCE

Organizations should implement sustainability policies such as carbon reporting, AI environmental audits, and sustainable procurement.

6.8 EMPLOYEE AWARENESS AND TRAINING

Leadership should educate employees and developers about sustainable AI practices and responsible computing.

These strategies ensure that AI innovation continues but becomes environmentally responsible.

7. IMPLICATIONS

Green AI leadership has strong implications across industries and society:

7.1 ORGANIZATIONAL BENEFITS

Energy-efficient AI reduces operational costs and increases profitability while supporting sustainability.

7.2 COMPETITIVE ADVANTAGE

Organizations adopting Green AI gain reputation, trust, and global recognition.

7.3 ENVIRONMENTAL PROTECTION

Reduced carbon emissions contribute to climate change mitigation and sustainable development.

7.4 ETHICAL INNOVATION

Green AI leadership ensures that AI development does not harm future generations and promotes responsible progress.

7.5 POLICY DEVELOPMENT

Governments may create carbon regulations for AI industries, and organizations prepared for Green AI will easily adapt.

7.6 SUSTAINABLE ECONOMIC GROWTH

Green AI supports innovation-driven economic growth without environmental degradation.

Thus, Green AI leadership benefits both society and organizations.

8. CONCLUSION

Artificial Intelligence is transforming industries and shaping the future of human development. However, the rapid growth of AI has introduced serious environmental challenges such as high energy consumption, carbon emissions, water usage, and e-waste generation. Sustainable leadership must address these issues while ensuring that AI innovation continues.

Green AI leadership provides a practical solution by integrating sustainability into AI strategy. Leaders must promote energy-efficient algorithms, carbon-aware computing, renewable-energy-based infrastructure, ethical AI governance, and transparent sustainability reporting. Green AI is not about limiting innovation but about guiding AI development in a responsible and sustainable direction.

The future of AI depends not only on technological progress but also on leadership decisions. Sustainable leaders must ensure that AI becomes a tool for long-term development, balancing innovation, ethics, and environmental responsibility.

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ECO-INNOVATIVE BUSINESS MODELS IN THE AGE OF AI: AN ANALYTICAL STUDY OF GREEN ENTREPRENEURSHIP IN BEAUTY SALONS

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ABSTRACT *The beauty salon sector is increasingly implementing sustainable practices in response to rising environmental issues and evolving consumer preferences. Meanwhile, Artificial Intelligence (AI) is revolutionizing service-oriented industries by enhancing operational efficiency and decision-making processes. This research explores the impact of AI-supported eco-innovative business models on fostering green entrepreneurship within beauty salons. The study utilizes a descriptive and analytical framework, gathering primary data from 90 beauty salon owners through a structured questionnaire. Various statistical methods, including percentage analysis, reliability analysis, correlation, and multiple regression, were employed using SPSS software. The results indicate that a majority of beauty salons showcase moderate to high levels of AI integration, especially through digital booking systems and inventory management solutions. Eco-innovative initiatives, like utilizing organic products, energy-efficient devices, and sustainable packaging, significantly contribute to improved sustainable business outcomes. Additionally, the findings highlight a positive correlation between AI integration, eco-innovation, consumer demand, and overall green business performance. Nonetheless, obstacles such as high investment costs and a lack of technical expertise continue to pose challenges for some salon owners. The study concludes that AI-driven eco-innovative business models can boost sustainability, enhance competitiveness, and reinforce green entrepreneurship in the beauty salon industry.*

Keywords: *Green Entrepreneurship, Artificial Intelligence, Eco-Innovation, Sustainable Business Practices, Beauty Salons, MSMEs*

1. INTRODUCTION

The escalating environmental issues linked to resource-heavy service industries have heightened the necessity for sustainable business transformation. Beauty salons, as part of the expanding wellness and personal care industry, utilize substantial amounts of electricity, water, chemical-based beauty products, and plastic packaging, leading to environmental harm. In response, companies are implementing eco-innovative business models, which are strategies that incorporate environmental sustainability into the creation, delivery, and capture of value while ensuring economic feasibility (Bashir et al., 2022). Eco-innovation focuses on diminishing environmental impacts through cleaner production techniques, reducing waste, sustainable sourcing, and practices aligned with a circular economy (Ferraris & Dhar, 2023). In the era of Artificial Intelligence (AI), eco-innovative business models are further enhanced by digital technologies that boost efficiency, support predictive decision-making, and optimize resources. AI-powered systems like smart energy management, automated scheduling, and predictive inventory analytics enable businesses to track consumption trends, minimize waste, and enhance sustainability performance (Khan et al., 2025). Consequently, the intersection of eco-innovation and AI signifies a revolutionary path toward sustainable leadership in service-oriented MSMEs.

Green entrepreneurship goes beyond conventional profit-driven business models by incorporating environmental and social goals into fundamental entrepreneurial activities (Fawaaid et al., 2026). It entails identifying environmental challenges as business prospects and creating innovative solutions that yield both ecological and financial benefits. In the realm of beauty salons, green entrepreneurship

is reflected through the use of organic and cruelty-free products, refillable packaging systems, energy-efficient equipment, water-conserving technologies, and waste recycling efforts (Martins et al., 2025). With the implementation of AI, salons are increasingly adopting digital booking systems, customer analytics, demand forecasting tools, and paperless billing solutions to improve operational sustainability. The application of AI in beauty salons not only enhances customer personalization and service efficiency but also leads to quantifiable reductions in energy usage and product waste (Siow et al., 2026). Consequently, AI-driven eco-innovative business models offer a strategic framework for promoting green entrepreneurship in beauty salons, harmonizing innovation, ethics, and environmental considerations within the modern business environment.

2. REVIEW OF LITERATURE

The literature review establishes both a theoretical and empirical basis for comprehending the convergence of eco-innovation, green entrepreneurship, and Artificial Intelligence (AI) in service-oriented sectors, especially beauty salons.

2.1 ECO-INNOVATIVE BUSINESS MODELS

Eco-innovative business models aim to generate environmental benefits along with financial gains by rethinking production methods, value chains, and customer interaction strategies. As stated by Boons and Sudjono (2024), sustainable business models incorporate environmental factors into their value propositions, value creation processes, and revenue generation strategies. These models prioritize efficiency in resource use, reduction of waste, adoption of renewable energy sources, and circular economy practices. In the service industry, eco-innovation typically appears in the form of energy-efficient operations, responsible sourcing, and digital advancements that lessen reliance on physical resources (Cavalieri et al., 2021). Such models are especially important for MSMEs, as they improve competitiveness while ensuring adherence to environmental regulations and fostering long-term sustainability.

2.2 ECO-INNOVATION IN THE AGE OF ARTIFICIAL INTELLIGENCE

The progression of artificial intelligence has broadened the possibilities for eco-innovation by supporting data-informed sustainability initiatives. Technologies like predictive analytics, intelligent monitoring systems, and automated decision-support tools enhance operational efficiency and lessen environmental footprints (Name et al., 2024). Sikder (2024) suggests that smart connected technologies revamp traditional sectors by boosting productivity and optimizing resource use. Within the realm of sustainable business, AI enables real-time energy monitoring, improved scheduling, predictive inventory control, and demand forecasting, effectively reducing waste. The incorporation of AI into eco-innovative business frameworks enhances the measurement of environmental performance and the planning of strategic sustainability initiatives.

2.3 GREEN ENTREPRENEURSHIP

Green entrepreneurship involves entrepreneurial ventures that view environmental issues as opportunities for innovation and value generation. According to Neumann (2022), green entrepreneurs are individuals who aim for both economic achievement and ecological sustainability. In contrast to conventional entrepreneurship, green entrepreneurship emphasizes long-term environmental care, ethical management, and social accountability (Prokopenko et al., 2024). It plays a role in sustainable development by promoting cleaner technologies, sustainable products, and responsible consumption habits. Research shows that green businesses frequently gain a competitive edge through differentiation, improved brand reputation, and heightened customer trust.

2.4 GREEN ENTREPRENEURSHIP IN BEAUTY SALONS

The beauty salon sector is slowly shifting towards eco-friendly practices due to rising consumer awareness and regulatory demands (Prakash, 2025). Previous research on sustainable service industries indicates that the use of eco-friendly products, energy-efficient tools, waste recycling, and measures for water conservation can significantly lessen environmental impact (Mengistu et al., 2024). In beauty salons, green entrepreneurship encompasses the use of organic and cruelty-free cosmetics, refillable packaging solutions, and sustainable interior design (Singh et al., 2022). Studies also show that customers who prioritize the environment are willing to pay higher prices for sustainable beauty services, thus enhancing financial sustainability (Synodinos & Dalziel, 2023). However, there is a lack of studies investigating structured AI integration within green salon models, pointing out the research gap this study aims to address.

2.5 AI USAGE IN BEAUTY SALONS

The digital transformation in beauty salons has gained momentum through the use of AI-powered tools like online booking services, customer relationship management (CRM) systems, predictive inventory management software, and digital billing solutions (Pasupuleti & Murali, 2025). These technologies improve customer personalization, streamline appointment scheduling, and lessen the administrative burden. Research on service automation shows that implementing AI enhances operational efficiency, minimizes reliance on paper documentation, and improves decision-making precision (Yang et al., 2024). Additionally, AI-driven insights help salon managers recognize consumption patterns, which aids in reducing excess inventory and product waste (Ajiga et al., 2024). However, the adoption of these technologies remains moderate among smaller salons due to financial and technical limitations.

2.6 CONSUMER DEMAND FOR GREEN PRODUCTS

Consumer preferences significantly influence businesses to embrace environmentally sustainable practices. As stated by Tamboli et al. (2023), consumers who are environmentally aware are increasingly inclined to select products and services that reduce harm to the environment and encourage sustainability. The rising consciousness around environmental issues has prompted many consumers to opt for organic, eco-friendly, and cruelty-free beauty items. Research shows that consumers are prepared to support companies that practice environmental stewardship and sustainability (Amalia & Darmawan, 2023). In the beauty salon sector, the demand for natural and eco-friendly cosmetic offerings by customers motivates salon owners to incorporate green products, minimize chemical use, and adopt eco-conscious service practices (Lin et al., 2018).

2.7 RESEARCH GAP

While eco-innovation and green entrepreneurship have been extensively examined in manufacturing and large industries, there is a scarcity of research on smaller service sectors like beauty salons. Current studies primarily focus on aspects such as service quality, customer satisfaction, and marketing tactics instead of sustainability efforts. Additionally, the combination of artificial intelligence with eco-innovative business models in salon operations is still not well-studied. There is also a deficiency of empirical research investigating how the adoption of AI affects both environmental and business outcomes in salons. Consequently, this study aims to address this gap by exploring AI-driven eco-innovative practices in beauty salons.

3. RESEARCH OBJECTIVES

The study is conducted with the following objectives:

- To analyze the level of AI adoption in beauty salons.
- To examine the impact of AI-enabled eco-innovative practices on environmental sustainability.
- To evaluate the economic benefits of green entrepreneurship in beauty salons.

- To identify challenges in implementing AI-driven sustainable practices.

4. RESEARCH METHODOLOGY

Research methodology pertains to the organized processes employed to gather, analyze, and interpret information to accomplish research goals. This study examines how artificial intelligence and eco-innovative practices contribute to the advancement of green entrepreneurship in beauty salons.

4.1 RESEARCH DESIGN

The research utilizes both descriptive and analytical methodologies. The descriptive method focuses on assessing the existing degree of AI implementation and eco-innovative practices in beauty salons, whereas the analytical method is used to investigate the connection between AI adoption, eco-innovation, and the performance of green businesses.

4.2 AREA OF THE STUDY

The research was carried out in chosen beauty salons situated in both urban and semi-urban regions, where salon operations are becoming more influenced by digital technologies and sustainability movements.

4.3 POPULATION OF THE STUDY

The study's population includes owners and managers of small and medium-sized beauty salon businesses.

4.4 SAMPLE SIZE

A total of 90 respondents were selected as the study sample.

4.5 SAMPLING TECHNIQUE

Convenience sampling was adopted for selecting respondents due to accessibility and time constraints. The respondents were chosen based on their willingness to participate and their involvement in salon management activities.

4.6 SOURCES OF DATA

The study is based on both primary and secondary data sources.

Primary data were collected using a structured questionnaire administered to beauty salon owners and managers.

Secondary data were obtained from research journals, books, conference papers, and credible online databases related to green entrepreneurship, artificial intelligence, and sustainability.

4.7 DATA COLLECTION INSTRUMENT

A structured questionnaire was designed using a Likert scale to measure respondents' perceptions regarding AI adoption, eco-innovative practices, customer demand for eco-friendly services, and green business performance.

4.8 TOOLS FOR DATA ANALYSIS

The collected data were coded and analysed using SPSS software. The statistical tools used in the study include:

- Percentage analysis
- Descriptive statistics
- Reliability analysis (Cronbach's Alpha)
- Correlation analysis
- Multiple regression analysis

These tools were applied to examine the relationship between Artificial Intelligence adoption, eco-innovation practices, customer demand, and green business performance in beauty salons.

5. DATA ANALYSIS AND INTERPRETATION

This section analyses the data collected from respondents regarding AI adoption, eco-innovative practices, and customer demand for sustainable products in beauty salons. Statistical tools such as descriptive analysis, reliability analysis, correlation, and regression were applied using SPSS software.

5.1 DESCRIPTIVE ANALYSIS: ADOPTION OF AI TOOLS IN BEAUTY SALONS

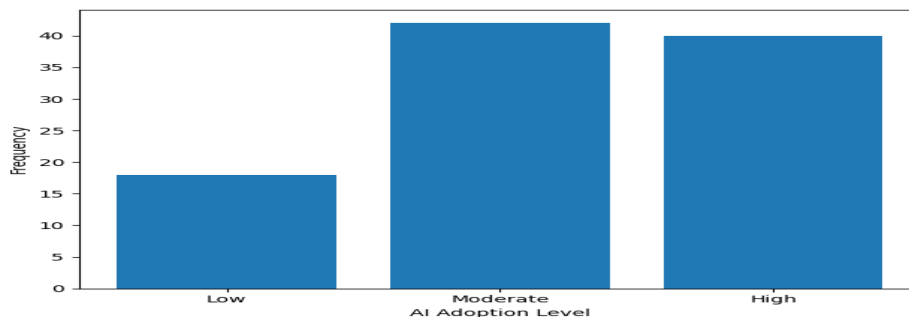
Descriptive analysis is used to summarize the distribution of responses collected from the respondents. This analysis helps to understand the level of AI technology adoption in beauty salons and its contribution to eco-innovative business practices.

Table 5.1 Adoption of AI Tools in Beauty Salons

AI Adoption Level	Frequency	Percent
Low	16	17.8
Moderate	38	42.2
High	36	40.0
Total	90	100.0

The table shows that 42.2 percent of beauty salons report moderate AI adoption, while 40 percent indicate high adoption levels. Only a smaller proportion of respondents reported low adoption of artificial intelligence tools, showing that technological integration is becoming common in salon management and service delivery.

Figure 5.1 Bar Chart Showing Adoption of AI Tools in Beauty Salons



The bar chart explains that the majority of salons fall under the moderate and high AI adoption categories, indicating increasing reliance on digital tools such as automated booking systems, customer analytics, and smart energy management.

5.2 DESCRIPTIVE ANALYSIS: CUSTOMER DEMAND ENCOURAGING ECO-FRIENDLY PRODUCTS

Customer awareness regarding sustainability has increased significantly in recent years. This analysis examines whether customer demand influences beauty salons to adopt environmentally friendly products and services.

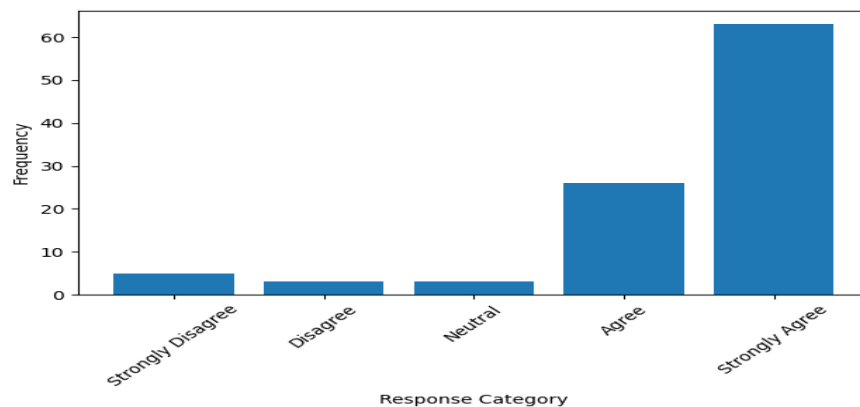
Table 5.2 Customer Demand Encouraging Eco-Friendly Products

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	4	4.4	4.4	4.4
Disagree	3	3.3	3.3	7.7

Neutral	3	3.3	3.3	11.0
Agree	24	26.7	26.7	37.7
Strongly Agree	56	62.3	62.3	100.0
Total	90	100.0	100.0	

The table explains that a large majority of respondents agree that customer demand encourages salons to adopt eco-friendly products. The high percentage of agreement indicates that sustainability initiatives in beauty salons are strongly influenced by consumer preferences.

Figure 5.2 Bar Chart Showing Customer Demand for Eco-Friendly Products



The bar chart explains that strong agreement dominates among respondents, suggesting that customer awareness and expectations play an important role in motivating eco-innovative business practices.

5.3 DESCRIPTIVE ANALYSIS: ECO-INNOVATIVE PRACTICES IMPLEMENTED IN BEAUTY SALONS

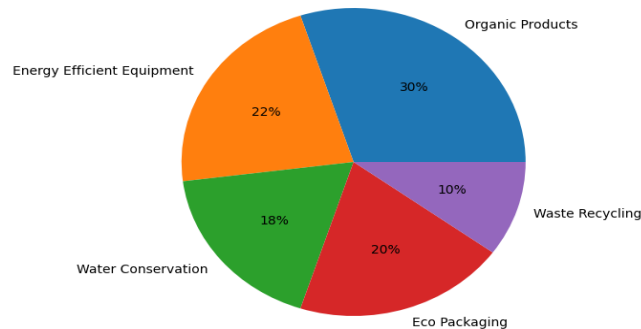
Eco-innovation refers to the adoption of environmentally responsible practices that reduce environmental impact while improving business performance. This analysis identifies the major eco-innovative practices currently implemented in beauty salons.

Table 5.3 Eco-Innovative Practices Implemented in Beauty Salons

Eco-Innovative Practice	Frequency	Percentage
Organic Products	27	30%
Energy-Efficient Equipment	20	22%
Water Conservation Systems	16	18%
Eco Packaging	18	20%
Waste Recycling	9	10%
Total	90	100%

The table explains that organic product usage represents the most common eco-innovative practice among beauty salons, followed by energy-efficient equipment and eco-friendly packaging. These practices help salons reduce environmental impact while attracting environmentally conscious customers.

Figure 5.3 Pie Chart Showing Eco-Innovative Practices in Beauty Salons



The pie chart shows the distribution of eco-innovative practices implemented in beauty salons. Organic products represent the largest share (30%), followed by energy-efficient equipment (22%) and eco-friendly packaging (20%). Water conservation systems (18%) and waste recycling (10%) indicate that salons are gradually adopting sustainable practices to reduce environmental impact.

5.4 RELIABILITY ANALYSIS: INTERNAL CONSISTENCY OF THE RESEARCH INSTRUMENT

Reliability analysis is conducted to evaluate the consistency of the questionnaire used in the study. Cronbach's Alpha is commonly used in social science research to determine whether the items used to measure variables are reliable.

Table 4.4: Reliability Statistics

Cronbach's Alpha	No. of Items
0.876	20

The table explains that the Cronbach's Alpha value is 0.876, which indicates a high level of internal consistency among the questionnaire items. This suggests that the measurement scale used to assess AI adoption, eco-innovation practices, and green entrepreneurship is reliable for further statistical analysis.

5.5 CORRELATION ANALYSIS: RELATIONSHIP BETWEEN AI ADOPTION, ECO-INNOVATION AND GREEN BUSINESS PERFORMANCE

Correlation analysis is used to examine the relationship between key variables in the study. This test helps to determine whether AI adoption and eco-innovation practices are associated with improvements in green business performance.

Hypothesis for Correlation Analysis

H_0 (Null Hypothesis): There is no significant relationship between AI adoption, eco-innovation practices, and green business performance.

H_1 (Alternative Hypothesis): There is a significant relationship between AI adoption, eco-innovation practices, and green business performance.

Table 5.5 Correlations

	AI Adoption	Eco Innovation	Green Business Performance
AI Adoption	1	.621**	.688**
Eco Innovation	.621**	1	.712**

Green Business Performance	.688**	.712**	1
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Correlation is significant at the 0.01 level (2-tailed)

The correlation results show that AI adoption and eco-innovation have a correlation coefficient of 0.621 and AI adoption and green business performance have a correlation coefficient of 0.688. Since the significance value is less than 0.01, the null hypothesis is rejected and the alternative hypothesis is accepted. This indicates that AI adoption has a significant positive relationship with eco-innovation and green business performance in beauty salons.

5.6 MULTIPLE REGRESSION ANALYSIS: IMPACT OF AI ADOPTION AND ECO-INNOVATION ON GREEN BUSINESS PERFORMANCE

Multiple regression analysis is applied to determine how independent variables influence a dependent variable. In this study, AI adoption, eco-innovation practices, and customer demand are analysed to understand their impact on green business performance.

Hypothesis for Regression Analysis

H_0 (Null Hypothesis): AI adoption, eco-innovation, and customer demand do not significantly influence green business performance.

H_1 (Alternative Hypothesis): AI adoption, eco-innovation, and customer demand significantly influence green business performance.

Table 5.6 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.782	.611	.598	.432

The regression analysis shows that the R square value is 0.611, which indicates that 61.1 percent of the variation in green business performance is explained by AI adoption, eco-innovation, and customer demand. The significance values of all independent variables are less than 0.05. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted. This confirms that AI adoption, eco-innovation, and customer demand significantly influence green business performance in beauty salons.

Table 5.6.1 Coefficients

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	Sig.
AI Adoption	.312	.098	.312	.002
Eco Innovation	.421	.087	.421	.000
Customer Demand	.276	.102	.276	.005

The table explains that eco-innovation has the strongest influence on green business performance, followed by AI adoption and customer demand. This indicates that eco-innovative strategies supported by artificial intelligence significantly enhance sustainable business practices in beauty salons.

6. FINDINGS OF THE STUDY

This section summarizes the major insights derived from the statistical analysis conducted using SPSS. The findings highlight the role of artificial intelligence and eco-innovative practices in promoting sustainable business models in beauty salons.

- The analysis reveals that most beauty salons have adopted artificial intelligence technologies at a moderate to high level, indicating the increasing role of digital tools such as automated booking systems and customer data analytics in salon operations.
- The study shows that customer demand significantly encourages the adoption of eco-friendly products and services in beauty salons. A large proportion of respondents agreed that environmentally conscious customers influence salons to implement sustainable practices.
- The results indicate that organic product usage is the most widely adopted eco-innovative practice among beauty salons, followed by energy-efficient equipment and eco-friendly packaging methods.
- The reliability analysis confirms that the survey instrument used in the study is highly reliable, as indicated by the Cronbach's Alpha value above the acceptable threshold.
- Correlation analysis shows a strong positive relationship between AI adoption, eco-innovation practices, and green business performance. This suggests that technological adoption facilitates sustainable business operations.
- Regression analysis indicates that eco-innovation has the strongest impact on green business performance, followed by AI adoption and customer demand.
- The study also highlights that AI technologies help salons optimize resources such as energy, water, and materials, which contributes to environmental sustainability.

7. SUGGESTIONS

Based on the findings of the study, several suggestions are proposed to strengthen eco-innovative business models and promote green entrepreneurship in the beauty salon industry.

- Beauty salons should adopt AI-based technologies such as smart appointment systems, inventory management tools, and customer analytics to improve operational efficiency and sustainability.
- Salon owners should promote eco-friendly products and services, including organic cosmetics, biodegradable packaging, and environmentally safe treatments.
- Training programs should be organized for salon entrepreneurs to create awareness about sustainable business practices and green entrepreneurship.
- Beauty salons should implement energy-efficient equipment and water conservation techniques to reduce operational costs and environmental impact.
- Government agencies and industry associations should provide financial incentives and support for eco-innovative initiatives in small and medium-sized salons.
- Salons should actively educate customers about the benefits of eco-friendly beauty products, which can increase demand for sustainable services.
- Collaboration with green product manufacturers and suppliers can help salons access environmentally responsible products at affordable prices.

8. CONCLUSION

The research investigates how artificial intelligence and eco-friendly practices contribute to fostering green entrepreneurship within beauty salons. The findings reveal that a significant number of beauty salons have started integrating AI technologies to enhance their operational efficiency and service

delivery. The rising customer interest in environmentally sustainable products also significantly influences salons to adopt greener practices. Initiatives focused on eco-innovation, such as utilizing organic products, energy-efficient appliances, and sustainable packaging, help to mitigate environmental effects while boosting business performance. Additionally, the findings indicate that the integration of AI and eco-innovation positively correlates with enhanced green business performance, underscoring the necessity of combining technology with sustainability approaches. Ultimately, the study highlights that adopting AI-supported eco-innovative business models can promote sustainability, heighten competitiveness, and foster the advancement of green entrepreneurship in the beauty salon sector. Future research could investigate larger populations and incorporate additional service industries to gain deeper insights into AI-driven sustainable practices.

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ETHICAL GOVERNANCE AND SUSTAINABLE LEADERSHIP: GENERATIONAL VIEWS IN THE AGE OF AI

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ABSTRACT *The convergence of artificial intelligence (AI) and workforce generational diversity presents various challenges for ethical governance and sustainable leadership. This paper reviews existing literature on AI ethics, sustainable leadership, and generational theory to explore how different generational groups in today's workforce—Generation X, Generation Y (Millennials), and Generation Z—view AI governance. This study highlights an "Ethical Value Gap." Older generations focus on risk reduction and stability, while younger generations stress transparency, fairness, and purpose-driven AI practices. A framework is proposed to combine generational views into an ethically informed AI governance model that considers generational diversity. The findings suggest that sustainable leaders need to embrace generational inclusiveness as a valuable asset. By integrating insights from experienced leaders with the accountability-focused views of digital natives, sustainable leaders can create strong ethical governance frameworks for AI that are future-ready.*

Keywords: *Ethical Governance, Sustainable Leadership, Generational Cohorts, AI ethics*

1. INTRODUCTION

AI is no longer an emerging idea, but a present reality. However, the rapid adoption of AI means we haven't had the chance to create strong ethical governance frameworks to keep pace with it (Mittelstadt, 2019). Today's workforce includes three generations: Gen X, Gen Y (Millennials), and Gen Z. Each group has a different view on technology, authority, and responsibility. This diversity can lead to friction, but it also presents a significant opportunity, especially for sustainable leadership, which focuses on creating long-term value, including all stakeholders and maintaining ethical standards (Avery & Bergsteiner, 2011).

This review paper suggests there's a gap. No one has truly developed a framework that combines ethical AI governance, sustainable leadership principles, and the reality of generational diversity. That is the gap we aim to fill.

The main question this review explores is: "How can organizations use generational differences to create ethical governance and sustainable leadership models for the AI era?" To answer this, the paper examines research from management studies, ethics, and generational theory. The goal is to present a framework that integrates ethical governance, sustainable leadership, and generational perspectives, guiding future research and practical applications.

2. OBJECTIVE

- To develop a conceptual framework that integrates ethical AI governance, sustainable leadership, and generational perspectives.
- To propose future research directions and practical implications based on the reviewed literature.

3. REVIEW OF LITERATURE

3.1 ETHICAL AI GOVERNANCE: FROM PRINCIPLES TO PRACTICE

Early efforts focused on high-level principles like the Asilomar AI Principles (2017). But soon, scholars realized that principles alone aren't enough—without real accountability, they become "ethics washing" (Mittelstadt, 2019). Tools like algorithmic impact assessments (Reisman et al., 2018) and ethics boards have emerged, yet accountability is still scattered. The literature consistently shows a gap between principle and practice, made worse by the lack of inclusive governance that reflects diverse stakeholder values.

3.2 SUSTAINABLE LEADERSHIP IN A DIGITAL AGE

Sustainable leadership research focuses on thinking long-term, engaging stakeholders, and having a moral purpose (Eccles et al., 2014). Ferdig (2007) adds that sustainability leaders need to see the big picture and handle complexity. But how AI fits into this framework hasn't been studied much yet. Early signs show AI can help sustainability—like optimizing resources—but it also brings risks, such as high energy use and surveillance. This creates a real paradox for leaders: AI can be both a tool for sustainability and a threat to it.

3.3 GENERATIONAL PERSPECTIVES ON ETHICS, LEADERSHIP, AND TECHNOLOGY

Research on generational differences at work is vast and often debated. Some scholars warn against stereotyping entire generations (Costanza et al., 2012), but there's strong evidence of real differences in values, work styles, and comfort with technology (Twenge, 2023). Digital natives—Gen Z and Millennials—tend to demand transparency, data privacy, and corporate accountability (PwC, 2021; Deloitte, 2023). They also prefer participative, value-driven leadership. Older generations, on the other hand, often lean toward stability and clear hierarchies. How all of this connects to AI governance is still a new but critically important area of study.

4. CONCEPTUAL FRAMEWORK

This paper introduces a three-part framework where three concepts interact: ethical AI governance principles, generational value systems, and sustainable leadership. It suggests that generational values influence how ethical AI governance principles are prioritized, which then impacts sustainable leadership.

Construct 1: Ethical AI governance

Ethical AI governance is defined as the principles and processes used to direct and hold AI systems accountable. Key principles include transparency, explainability, accountability, fairness, privacy, robustness, and safety (Floridi et al., 2018; OECD, 2019).

Construct 2: Sustainable leadership

Ethical AI governance is defined as the principles and processes used to direct and hold AI systems accountable. Key principles include transparency, explainability, accountability, fairness, privacy, robustness, and safety (Floridi et al., 2018; OECD, 2019).

Construct 3: Generational value systems

Generational value systems come from shared experiences that shape attitudes toward work, authority, and technology (Strauss & Howe, 1991; Twenge, 2023). This paper looks at three active cohorts in today's organizations:

- **Generation X (1965–1980):** Known for being skeptical, pragmatic, with a preference for autonomy and efficiency.
- **Millennials (1981–1996):** Driven by purpose, collaboration, and social justice; they expect transparency from institutions.

- **Generation Z (1997–2012):** Digital natives concerned about data privacy, algorithm fairness, and genuine corporate actions.

The framework suggests that these generational values influence which aspects of ethical AI governance are prioritized and resourced, shaping whether leadership practices meet sustainability goals.

5. DISCUSSION

5.1 ETHICAL VALUE GAP ACROSS GENERATIONS

After reviewing the literature, a clear pattern emerges. Older and younger generations focus on different aspects when it comes to ethical AI governance. Senior leaders, influenced by more hierarchical and stable work environments, often emphasize robustness, safety, and risk control. Younger generations, having experienced the effects of social media and data breaches, generally advocate for fairness, transparency, and accountability. This disconnect is what we refer to as the "ethical value gap." However, when managed well, this gap can drive innovation and result in stronger governance.

5.2 SUSTAINABLE LEADERSHIP AS A BRIDGE

Sustainable leadership provides a way to bridge the ethical value gap. Leaders who practice sustainable leadership don't view generational differences as problems; they see them as opportunities for stakeholder engagement. By creating inclusive spaces for dialogue, such as cross-generational AI ethics committees, leaders can turn conflicting values into a cohesive governance framework. Additionally, a long-term perspective encourages leaders to consider the reputational and regulatory risks of ignoring the concerns of younger generations, as they will become the future leaders and regulators.

5.3 GENERATIONALLY INTEGRATED AI GOVERNANCE

Based on the reviewed literature, the paper proposes a model of "generationally integrated ethical AI governance", utilizing the strengths of each generation:

- **Gen X** offers practical wisdom, including institutional memory, risk management, and operational pragmatism.
- **Millennials & Gen Z** bring principled digital fluency, moral urgency, and a demand for transparency.

Integrating these viewpoints yields governance frameworks that are both ethically sound and practical, enabling sustainable leadership outcomes.

5.4 RESEARCH GAP

This review highlights that the challenge of ethical governance and sustainable leadership in the AI age is fundamentally human, rooted in the diverse values of the generations that create, manage, and are affected by these technologies. Exploring generational views in the ethical governance of AI opens several paths for future research and practice.

FOR RESEARCH:

- **Empirical Validation:** Future studies should move beyond conceptual work to test the proposed framework in real-world scenarios.
- **Longitudinal Studies:** Research should track how generational perspectives change as younger cohorts take on leadership roles.

FOR PRACTICE:

- **Generational Audits for AI Governance:** Organizations should perform a "generational audit" of their AI governance bodies to ensure a diverse age representation.

- **Reverse Mentoring Programs:** Establish reverse mentoring where younger employees educate senior leaders about AI technologies and their societal impacts.

6. CONCLUSION

In the AI age, ethical governance and sustainable leadership cannot rely solely on technical solutions. The human element, especially the differing values among generations, is crucial. This review has identified a significant ethical value gap between generations, but this gap can be a strength rather than a weakness. When properly integrated, it fosters innovation. Sustainable leaders should blend the thoughtful wisdom of older generations with the values-driven mindset of digital natives. By doing this, they can create AI governance that is ethically solid, adaptable, trustworthy, and capable of delivering long-term value for all stakeholders. The future of leadership lies in using generational diversity to guide AI toward a sustainable and fair future.

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AN ANALYSIS OF SUSTAINABLE SOCIAL MEDIA MARKETING STRATEGIES AND THEIR INFLUENCE ON CONSUMER BEHAVIOUR IN FMCG GREEN PRODUCTS

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ABSTRACT *This research investigates how sustainable social media marketing strategies impact consumer behaviour regarding green products in the FMCG sector. As environmental awareness rises, there is a growing consumer interest in sustainable and eco-friendly products. Social media has emerged as a key platform for FMCG brands to highlight green products through campaigns that raise awareness, promote eco-labels, utilise influencer marketing, and showcase sustainability-focused advertisements. The study is based on primary data gathered from 160 participants via a structured questionnaire. The data was analysed using statistical methods, including descriptive statistics, the Chi-square test, and One-way ANOVA. The results demonstrate that sustainable social media marketing significantly affects consumer awareness, trust, and the intention to purchase. The Chi-square test verified a strong correlation between social media influence and purchasing behaviour; while ANOVA results showed that demographic factors have a notable impact on consumer reactions. The research concludes that sustainable social media marketing is crucial in influencing consumer choices and encourages FMCG businesses to implement transparent and effective green marketing approaches.*

Keywords: *Sustainable Marketing, Social Media Marketing, Consumer Behaviour, FMCG, Green Products, Purchase Intention, Eco-friendly Products.*

1. INTRODUCTION

In recent times, sustainability has emerged as a significant concern for consumers, businesses, and governments due to escalating environmental challenges such as pollution, climate change, and depletion of resources (Yap et al., 2023). Consequently, consumers are increasingly favouring eco-friendly and sustainable products, particularly within the Fast-Moving Consumer Goods (FMCG) sector, which encompasses everyday items like food, beverages, personal hygiene products, and household goods (Rana et al., 2023). As a result, FMCG companies are prioritising the development of green products and implementing sustainable marketing strategies to appeal to environmentally aware customers (Susilo et al., 2025).

Simultaneously, social media has become one of the most influential marketing channels, thanks to its broad audience, interactive characteristics, and power to shape consumer perceptions and buying choices (Krishna et al., 2023). Platforms like Instagram, Facebook, YouTube, and TikTok allow FMCG companies to showcase sustainable practices via green advertising, eco-labelling initiatives, influencer partnerships, and content aimed at raising awareness (Soni, P., & Bala Kaushik, 2026). Marketing sustainably on social media not only enhances brand reputation but also significantly influences consumer perceptions, trust, and purchasing behaviour regarding green FMCG products (Nsiah et al., 2025).

This research, titled “An Analysis of Sustainable Social Media Marketing Strategies and Their Influence on Consumer Behaviour in FMCG Green Products,” concentrates on how sustainable marketing initiatives on social media affect consumer awareness, perceptions, purchase intentions, and loyalty (Gouda & Halim, 2025). The study aims to explore how consumers react to promotional activities

centred on sustainability and how these tactics motivate them to select environmentally friendly FMCG products (Krishnamoorthi et al., 2026). This research is significant as it assists businesses in recognising effective social media approaches that promote sustainability while fulfilling consumer expectations and enhancing market competitiveness (Korcsmáros &Csinger, 2022).

2. REVIEW OF LITERATURE

2.1. CONCEPT OF SUSTAINABLE SOCIAL MEDIA MARKETING

Sustainable social media marketing involves promoting eco-friendly products and sustainable business practices via social media platforms (Nabivi, 2025). Previous research indicates that marketing focused on sustainability aids organisations in developing a positive brand image and appealing to environmentally conscious consumers (Nalçacıgil, 2025). Social media allows businesses to convey sustainability messages rapidly and effectively through posts, videos, campaigns, and interactive content, making it an effective channel for marketing green FMCG products (Nabivi, 2025).

2.2. SUSTAINABLE MARKETING STRATEGIES IN THE FMCG SECTOR

Researchers have pointed out that FMCG companies are increasingly implementing strategies such as eco-labelling, promoting recyclable packaging, engaging in green advertising, and utilising environmental storytelling to build consumer trust (Rehman et al., 2024). Research shows that consumers are more inclined to choose FMCG brands that demonstrate transparency in their sourcing, production, and packaging processes (Sanni-Bamigbade, 2025). Sustainable marketing strategies also foster long-term brand loyalty by establishing emotional connections with consumers who prioritise environmental responsibility (Ijomah et al., 2024).

2.3. INFLUENCE OF SOCIAL MEDIA ON CONSUMER BEHAVIOUR

Numerous research studies indicate that social media has a substantial impact on consumer attitudes and purchasing behaviour. Social media platforms offer convenient access to product information, reviews from peers, recommendations from influencers, and trustworthiness of brands (Gubalane& Ha2023). Research suggests that consumer engagement activities such as liking, sharing, commenting, and participating in online discussions enhance brand recognition and intention to buy. Additionally, social media marketing plays a crucial role in influencing consumer perceptions of environmentally friendly products in the FMCG sector.

2.4. ROLE OF GREEN ADVERTISING AND CONSUMER AWARENESS

Green advertising represents a significant sustainable marketing strategy that promotes products that are environmentally friendly and encourages consumers to adopt eco-conscious habits (Anyaeibunam et al., 2025). Prior studies demonstrate that green advertisements enhance consumer knowledge regarding sustainability and inspire them to select environmentally friendly fast-moving consumer goods (FMCG). Research also shows that awareness is one of the most influential elements impacting consumer attitudes and their intention to purchase, as well-informed consumers are more likely to support brands that demonstrate environmental responsibility (Arachchi& Samarasinghe, 2023).

2.5. CONSUMER TRUST AND THE ISSUE OF GREENWASHING

Multiple researchers have highlighted the importance of consumer trust in sustainable marketing. When consumers perceive a brand as truly dedicated to sustainability, they are more inclined to buy and endorse the product (Alhomaïd, 2025). Nonetheless, the literature also points out that greenwashing poses a significant challenge, as brands sometimes make false or overstated claims about their sustainability efforts. Such actions diminish consumer trust and adversely affect brand reputation. Consequently, transparency and authenticity are vital for achieving success in sustainable social media marketing (Vani et al., 2025).

2.6. IMPACT OF INFLUENCER MARKETING ON GREEN FMCG PRODUCTS

Influencer marketing has emerged as a powerful approach to promote sustainable FMCG products (Sharma & Singh, 2025). Research indicates that influencers play a significant role in shaping consumer perceptions through product reviews, endorsements, and lifestyle promotions. Consumers frequently place greater trust in influencers compared to conventional advertising, particularly when influencers emphasise the environmental benefits. Studies demonstrate that sustainability campaigns driven by influencers boost consumer engagement and positively affect eco-friendly purchasing behaviours (Van Nguyen & Le, 2026).

2.7. PURCHASE INTENTION AND CONSUMER ATTITUDE TOWARDS GREEN PRODUCTS

Research indicates that consumer attitudes significantly influence the likelihood of purchasing green products (Szaban, 2023). Positive perceptions are shaped by elements such as environmental awareness, social factors, perceived quality of the product, and effective, sustainable brand messaging (Muchenje et al., 2025). Research shows that consumers are inclined to spend more on green FMCG products when they perceive these products as advantageous for both health and the environment. Furthermore, sustainable marketing on social media enhances purchase intention by raising awareness and endorsing eco-friendly values (Kumar et al., 2025).

3. OBJECTIVES OF THE STUDY

- To analyse the impact of sustainable social media marketing strategies on consumer awareness and purchase intention towards FMCG green products.
- To examine whether demographic factors (age, income, and education) significantly influence consumer behaviour towards FMCG green products.

4. RESEARCH METHODOLOGY

4.1 RESEARCH DESIGN

This study adopted a descriptive research design to analyse the influence of sustainable social media marketing strategies on consumer behaviour towards FMCG green products. The descriptive approach was chosen as it helps in understanding consumer attitudes, perceptions, and purchasing decisions based on sustainability-related marketing activities on social media platforms.

4.2 SOURCE OF DATA

The research utilised both primary and secondary data sources. Primary data was collected directly from respondents through a structured questionnaire. Secondary data was gathered from journals, research articles, books, websites, and published reports related to sustainable marketing, FMCG green products, and consumer behaviour.

4.3 SAMPLE SIZE

The sample size for the study consisted of 160 respondents. The respondents were selected to represent consumers who actively use social media and have awareness or experience in purchasing FMCG green products.

4.4 SAMPLING TECHNIQUE

The study followed a convenience sampling method, where respondents were selected based on their availability and willingness to participate. This method was suitable for collecting quick and relevant responses from social media users.

4.5 DATA COLLECTION METHOD

Data was collected using a structured questionnaire designed with Likert scale statements and multiple-choice questions. The questionnaire included questions related to demographic details, awareness of green FMCG products, the influence of social media marketing strategies, consumer trust, and purchase intention. The questionnaire was distributed through both online and offline modes to reach a wider audience.

4.6 TOOLS FOR DATA ANALYSIS

Descriptive statistics, Chi-square test, and One-Way ANOVA were used for data analysis. These tools helped analyse consumer behaviour and relationships between variables.

- **Descriptive Statistics:** *Used* to summarise data using mean, percentage, and standard deviation.
- **Chi-Square Test:** Used to find the relationship between categorical variables like social media influence and purchase intention.
- **One-Way ANOVA:** Used to identify differences in consumer behaviour among demographic groups such as age, income, and education.

4.7 MODE OF DISTRIBUTION OF QUESTIONNAIRE

The questionnaire was distributed through both online and offline modes to collect responses effectively:

- Online distribution was done using Google Forms and shared through social media platforms such as WhatsApp, Instagram, and email.
- Offline distribution was carried out by directly approaching respondents in public places. This method helped in collecting data from a wide range of FMCG consumers. A total of 160 valid responses were gathered for the study.

5. DATA ANALYSIS AND INTERPRETATION

The data analysis was done using descriptive statistics, the Chi-square test, and One-way ANOVA. Descriptive statistics showed that respondents had a positive attitude towards sustainable social media marketing and green FMCG products. The Chi-square test confirmed a significant relationship between sustainable social media marketing and consumer purchase intention. One-way ANOVA revealed that consumer behaviour differs based on demographic factors such as age, income, and education. Overall, sustainable social media marketing strongly influences consumer buying behaviour.

5.1 DEMOGRAPHIC PROFILE OF RESPONDENTS

The demographic profile shows that out of 160 respondents, the majority were female (55%) and most belonged to the 21–30 age group (42.5%). Most respondents were undergraduates (45%), indicating a young and educated sample population. In terms of income and usage, many respondents earned ₹15,001–₹30,000 (35%) and spent 1–3 hours daily on social media (40%).

Table 1: Demographic Profile of Respondents (N = 160)

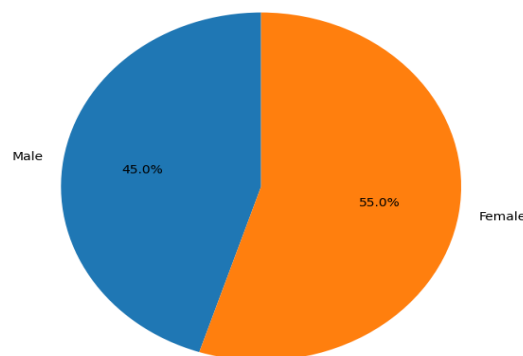
Demographic Variables	Category	Frequency (n)	Percentage%
Gender	Male	72	45.0
	Female	88	55.0
Age Group	Below 20 years	24	15.0
	21 – 30 years	68	42.5
	31 – 40 years	44	27.5
	Above 40 years	24	15.0

Education Qualification	School Level	18	11.25
	Undergraduate	72	45.0
	Postgraduate	54	33.75
	Others	16	10.0
Occupation	Student	52	32.5
	Private Employee	48	30.0
	Government Employee	28	17.5
	Business	20	12.5
	Others	12	7.5
Monthly Income	Below ₹15,000	40	25.0
	₹15,001 – ₹30,000	56	35.0
	₹30,001 – ₹50,000	40	25.0
	Above ₹50,000	24	15.0
Social Media Usage (Daily)	Less than 1 hour	20	12.5
	1 – 3 hours	64	40.0
	3 – 5 hours	48	30.0
	More than 5 hours	28	17.5

The figure shows the gender distribution of 160 respondents, where 55% are female and 45% are male. This indicates that female respondents form the majority in the study. Overall, the sample represents a balanced participation of both genders.

Figure 1: Demographic Profile of Respondents (Gender Distribution – Pie Chart) has been generated based on 160 respondents.

Figure 1: Gender Distribution of Respondents (N=160)



5.2 DESCRIPTIVE STATISTICS: TO SUMMARIZE DATA USING MEAN, PERCENTAGE, AND STANDARD DEVIATION

Descriptive statistics were used to summarise the responses of 160 participants using mean and standard deviation. The results show that respondents generally have a positive attitude towards sustainable social media marketing and green FMCG products.

Table 2: Descriptive Statistics of Sustainable Social Media Marketing Factors

Variables	Mean	Standard Deviation	Interpretation
Awareness of Green FMCG Products	4.12	0.68	High
Influence of Social Media Ads	4.05	0.72	High
Trust in Sustainable Marketing Claims	3.88	0.81	Moderate
Consumer Engagement (Likes/Shares/Comments)	4.00	0.75	High
Purchase Intention towards Green Products	4.18	0.64	High

Brand Loyalty towards Green FMCG Products	3.92	0.78	Moderate
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The descriptive statistics table indicates that respondents show a high level of awareness and are strongly influenced by sustainable social media advertisements, as the mean values are above 4.00. Purchase intention recorded the highest mean (4.18), showing that sustainability-based marketing encourages consumers to buy green FMCG products. However, trust and brand loyalty show moderate mean values, suggesting that some consumers still require more assurance and transparency from brands regarding their sustainability claims.

5.3 CHI-SQUARE TEST: TO FIND THE RELATIONSHIP BETWEEN CATEGORICAL VARIABLES LIKE SOCIAL MEDIA INFLUENCE AND PURCHASE INTENTION

The Chi-square test shows a significant relationship between social media influence, awareness, trust, and purchase intention, with all p-values below 0.05. This indicates that sustainable social media marketing strongly affects consumer buying behaviour towards green FMCG products.

Hypotheses:

- **Null Hypothesis (H_0):** There is no significant relationship between sustainable social media marketing (awareness, influence, trust) and consumer purchase intention towards FMCG green products.
- **Alternative Hypothesis (H_1):** There is a significant relationship between sustainable social media marketing (awareness, influence, trust) and consumer purchase intention towards FMCG green products.

Table 3: Chi-Square Test – Social Media Influence and Purchase Intention

Variables	Chi-Square Value (χ^2)	Degrees of Freedom (df)	p-value	Interpretation
Social Media Influence vs Purchase Intention	24.36	4	0.000	Significant
Awareness of Green FMCG Products vs Purchase Intention	18.52	3	0.001	Significant
Trust in Sustainable Marketing vs Purchase Intention	12.87	3	0.005	Significant

The Chi-square test results show that social media influence, awareness of green FMCG products, and trust in sustainable marketing all have a significant association with consumer purchase intention, as their p-values are less than 0.05. This indicates that sustainable social media marketing strategies strongly affect consumer buying behaviour towards green FMCG products.

5.4 ONE-WAY ANOVA: TO IDENTIFY DIFFERENCES IN CONSUMER BEHAVIOUR AMONG DEMOGRAPHIC GROUPS SUCH AS AGE, INCOME, AND EDUCATION

One-Way ANOVA was used to test differences in consumer behaviour among demographic groups. The results showed a significant difference, indicating that demographics influence responses to sustainable social media marketing.

Hypotheses:

- **H_0 (Null Hypothesis):** There is no significant difference in consumer behaviour across demographic groups.
- **H_1 (Alternative Hypothesis):** There is a significant difference in consumer behaviour across demographic groups.

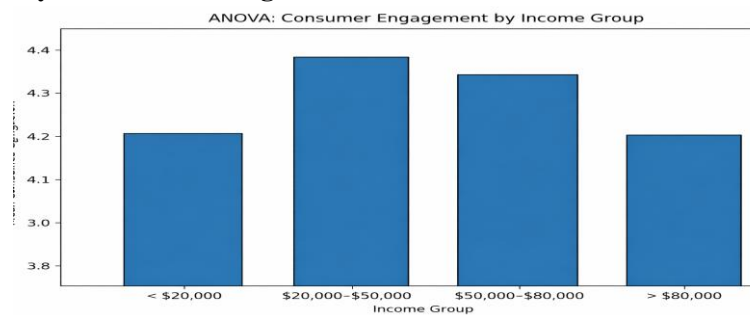
Table 4: One-Way ANOVA – Consumer Behaviour Based on Demographic Factor

Demographic Variable	Sum of Squares	df	Mean Square	F-Value	p-value
Age	12.48	3	4.16	5.32	0.002
Income	10.76	3	3.59	4.21	0.007
Education	8.54	3	2.85	3.45	0.019

The One-Way ANOVA results indicate that age, income, and education have a significant effect on consumer behaviour towards sustainable social media marketing and FMCG green products, as all p-values are less than 0.05. This shows that different demographic groups respond differently to sustainability-driven marketing campaigns.

The figure shows the mean consumer satisfaction across different age groups based on ANOVA results. Respondents aged 21–30 reported the highest satisfaction (4.22), while those above 40 had the lowest (3.88). This indicates that age influences consumer response to sustainable social media marketing for FMCG green products.

Figure 2: One-Way ANOVA Showing Differences in Consumer Behaviour across Age Groups



6. FINDINGS

The findings reveal that sustainable social media marketing significantly influences consumer purchase behaviour towards FMCG green products.

- The majority of respondents showed high awareness of FMCG green products promoted through social media.
- Sustainable social media advertisements had a positive influence on consumer buying behaviour.
- Descriptive statistics revealed high mean scores for awareness, engagement, and purchase intention.
- Chi-square test confirmed a significant relationship between social media influence and purchase intention.
- Consumer trust towards sustainability claims was moderate, indicating concern about greenwashing.
- One-way ANOVA showed that age, income, and education significantly affect consumer behaviour.
- Respondents in the 21–30 age group showed the highest satisfaction and interest in green products.
- Overall, sustainable social media marketing strategies strongly encourage consumers to prefer eco-friendly FMCG products.

7. SUGGESTIONS

FMCG companies should adopt transparent and engaging sustainable social media marketing strategies to increase consumer trust and promote green product purchases.

- FMCG companies should increase sustainability-based social media campaigns to improve consumer awareness.

- Brands should provide transparent information about eco-friendly ingredients and packaging to build trust.
- Companies must avoid greenwashing and promote only genuine sustainability claims.
- Influencer marketing should be used to spread credible green product awareness among consumers.
- More interactive content, like videos, reels, and live sessions, should be used to improve engagement.
- FMCG firms should target different demographic groups with personalized sustainable marketing strategies.
- Discounts and promotional offers can be provided to encourage consumers to try green FMCG products.
- Companies should highlight recyclable packaging and environmental benefits in advertisements.

8. CONCLUSION

In summary, the research indicates that effective, sustainable social media marketing approaches significantly impact consumer behaviour regarding FMCG green products. The results demonstrate that social media initiatives enhance consumer awareness, boost engagement, and have a favourable effect on purchasing intentions. The Chi-square analysis established a strong correlation between the influence of social media and purchasing decisions, while One-way ANOVA revealed that demographic factors such as age, income, and education lead to variations in consumer responses. Despite high consumer interest in green products, trust levels are moderate due to apprehensions about misleading sustainability claims. As a result, FMCG companies should prioritise transparent and authentic sustainable marketing practices to build consumer trust and foster enduring green purchasing behaviours.

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IMPACT OF MOBILE BANKING ON SERVICE QUALITY IN THE BANKING SECTOR: THE ROLE OF SUSTAINABLE LEADERSHIP IN THE AGE OF AI

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ABSTRACT The swift advancement of digital technology has greatly altered the banking industry, especially through the implementation of mobile banking solutions. This research seeks to evaluate the influence of mobile banking on the quality of services in the banking industry and to explore the significance of sustainable leadership in the context of Artificial Intelligence (AI). The study relies on primary data gathered from 55 participants utilising a structured questionnaire. Statistical methods, including descriptive analysis, the Chi-square test, and One-Way ANOVA, were applied to examine the data. The results demonstrate that mobile banking services enhance convenience, speed, and accessibility, thus improving the overall quality of services in banks. The research also emphasises the crucial role of sustainable leadership in fostering responsible technological advancement while encouraging green banking and sustainable financial practices. In summary, the findings indicate that mobile banking is essential for enhancing customer experience and supporting sustainable development within the banking sector.

Keywords: Mobile Banking, Service Quality, Artificial Intelligence, Sustainable Leadership, Green Banking, Banking Sector.

1. INTRODUCTION

The swift progression of digital technology has significantly changed the banking industry, with mobile banking becoming a crucial medium for efficiently and conveniently delivering financial services (OGUNSOLA et al., 2021). Mobile banking apps allow customers to conduct financial transactions, view account details, and access various banking services at any time and from any location, thereby enhancing the overall quality of service provided by banks (Kumar, 2025). In the era of Artificial Intelligence (AI), financial institutions are increasingly adopting intelligent systems to better customer experiences, tailor services, and enhance operational effectiveness (Kovvuri, 2024). Concurrently, sustainable leadership is vital in ensuring that technological advancements in banking are carried out responsibly, striking a balance between innovation, ethical considerations, and environmental sustainability (Al Aina & Faisal, 2024). Sustainable leaders promote the implementation of green banking and eco-friendly financial practices, such as minimising paper usage and encouraging digital transactions (Hidayat-ur-Rehman & Hossain, 2025). Consequently, it has become crucial to comprehend the influence of mobile banking on service quality and the role of sustainable leadership during the AI era to ensure responsible innovation and enduring sustainability in the banking industry (Berberoğlu et al., 2025).

2. LITERATURE REVIEW

2.1. MOBILE BANKING AND DIGITAL TRANSFORMATION IN THE BANKING SECTOR

Mobile banking has greatly changed the traditional banking landscape by delivering convenient and accessible financial services via smartphones and digital platforms (Gupta et al., 2024). A number of banks have embraced mobile apps to provide services like fund transfers, account balance checks, and

bill payments (McGuire et al., 2015). This shift towards digital solutions enhances efficiency, shortens transaction times, and improves customer satisfaction, positioning mobile banking as a vital aspect of contemporary banking services (Ughana et al., 2025).

2.2. SERVICE QUALITY IN THE BANKING SECTOR

The quality of service is a key element that affects customer satisfaction and loyalty within the banking sector (Al Asheq et al., 2021). Providing high-quality services allows banks to foster strong connections with their customers and sustain a competitive edge (Untoro et al., 2023). The advent of mobile banking has enhanced service quality by enabling quicker transactions, greater accessibility, and improved communication between banks and their customers (Zhu & Wang, 2022).

2.3. ROLE OF ARTIFICIAL INTELLIGENCE IN MOBILE BANKING

Artificial Intelligence (AI) has emerged as a significant technological asset in contemporary banking systems (Andrusiak et al., 2023). Applications powered by AI, such as chatbots, predictive analytics, and tailored recommendations, enable banks to enhance customer support and operational productivity (Cecilia et al., 2024). These innovations empower banks to quickly address customer demands and deliver more precise and personalised financial services (Garg, Mishra & Jain, 2023).

2.4. SUSTAINABLE LEADERSHIP IN THE BANKING SECTOR

Sustainable leadership emphasises making responsible choices that take into account the long-term economic, social, and environmental consequences (Rosário & Boechat, 2025). In the banking industry, sustainable leaders advocate for ethical practices, transparency, and innovation, ensuring that technological advancements are beneficial for both customers and society (Yoganandham, 2024). This style of leadership fosters the creation of sustainable and responsible banking systems (Sobhani et al., 2026).

2.5. GREEN BANKING AND SUSTAINABLE FINANCIAL PRACTICES

Green banking involves banking practices that are environmentally responsible and aim to lessen environmental impact while promoting sustainability (Khan et al., 2024). Utilising mobile banking and digital transactions helps to minimize paper usage and energy consumption, aiding in the creation of eco-friendly banking operations (Chandrasekaran & Narayanan, 2025). Numerous banks are implementing sustainable financial practices to support environmental conservation and motivate customers to use digital banking services (Zavišić et al., 2024).

3. RESEARCH OBJECTIVES

- To analyse the impact of mobile banking on service quality in the banking sector.
- To examine the role of sustainable leadership and AI in enhancing mobile banking services and promoting sustainable banking practices.

4. RESEARCH METHODOLOGY

4.1. RESEARCH DESIGN

This study uses a quantitative research design to analyse the impact of mobile banking on service quality in the banking sector and to understand the role of sustainable leadership in the age of Artificial Intelligence (AI).

4.2. DATA COLLECTION

The study is based on primary data collected through a structured questionnaire. The questionnaire includes statements related to mobile banking usage, service quality, AI support, and sustainable banking practices.

4.3. SAMPLE SIZE

A total of 55 respondents who use mobile banking services were selected for the study.

4.4. SAMPLING TECHNIQUE

The study uses the convenience sampling method, where respondents were selected based on their availability and willingness to participate.

4.5. RESEARCH INSTRUMENT

The data were collected using a structured questionnaire with a 5-point Likert scale, ranging from Strongly Disagree to Strongly Agree.

4.6. TOOLS FOR DATA ANALYSIS

The collected data were analysed using SPSS (Statistical Package for Social Sciences) software. The following statistical tools were used:

- **Descriptive Analysis** to summarise the demographic details and responses of the respondents.
- **Chi-Square Test** to examine the relationship between demographic variables and mobile banking usage.
- **One-Way ANOVA** to identify significant differences in service quality perception among different groups of respondents.

5. DATA ANALYSIS AND INTERPRETATION

The data collected from 55 respondents were analysed using SPSS. Descriptive analysis summarised the respondents' opinions on mobile banking and service quality. The Chi-square test examined the relationship between demographic factors and mobile banking usage. One-Way ANOVA identified differences in service quality perception among respondent groups. The results indicate that mobile banking positively influences service quality in the banking sector.

5.1 DEMOGRAPHIC PROFILE OF RESPONDENTS (N=55)

The demographic profile of the 55 respondents shows the distribution of participants based on gender, age, education, occupation, and mobile banking usage. This profile helps to understand the background characteristics of the respondents and their involvement in mobile banking services.

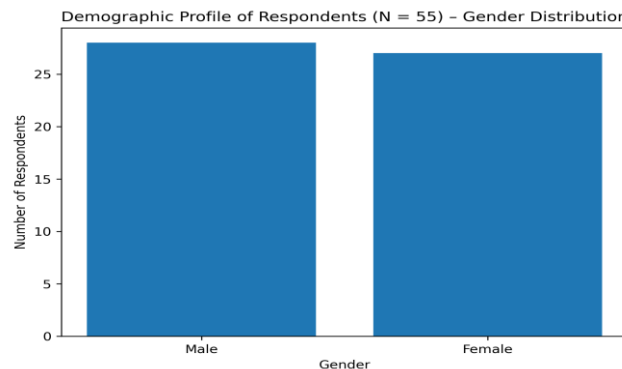
Table 1: Demographic Profile of Respondents (N = 55)

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	28	50.9
	Female	27	49.1
Age Group	Below 25 years	15	27.3
	25 – 35 years	20	36.4
	36 – 45 years	12	21.8
	Above 45 years	8	14.5
Education	Undergraduate	18	32.7
	Postgraduate	25	45.5
	Others	12	21.8
Occupation	Student	16	29.1
	Private Employee	18	32.7
	Government Employee	11	20.0
	Business	10	18.2

Mobile Banking Usage	Daily	22	40.0
	Weekly	18	32.7
	Monthly	10	18.2
	Rarely	5	9.1

Figure 1 illustrates the demographic distribution of the respondents based on gender, age group, education level, occupation, and mobile banking usage. The figure helps to visually present the characteristics of the 55 participants involved in the study and their engagement with mobile banking services.

Figure 1: The demographic profile (Gender distribution, N=55)



5.2 DESCRIPTIVE ANALYSIS: TO SUMMARIZE THE DEMOGRAPHIC DETAILS AND RESPONSES OF THE RESPONDENTS.

Descriptive statistics are used to summarise and present the basic features of the collected data in a clear and simple form. It helps to understand the respondents' opinions by using measures such as mean and standard deviation.

Table 2: Descriptive Analysis of Respondents' Perception of Mobile Banking Service Quality

S.No	Statements	Mean	Std. Deviation
1	Mobile banking is easy to use.	4.12	0.85
2	Mobile banking saves time in banking transactions.	4.25	0.78
3	Mobile banking provides quick service.	4.05	0.90
4	Mobile banking improves overall banking service quality.	4.18	0.82
5	AI features in mobile banking enhance customer support.	3.95	0.88

Interpretation: The descriptive analysis shows that the respondents generally have a positive perception of mobile banking services. The mean values indicate that mobile banking is considered easy to use, time-saving, and effective in improving service quality in the banking sector.

5.3 CHI-SQUARE TEST: TO EXAMINE THE RELATIONSHIP BETWEEN DEMOGRAPHIC VARIABLES AND MOBILE BANKING USAGE.

The Chi-Square test is used to examine whether there is a significant relationship between two categorical variables. This study, it helps to identify the association between demographic variables and mobile banking usage among the respondents.

Hypothesis:

- **Null Hypothesis (H_0):** There is no significant relationship between demographic variables and mobile banking usage.

- **Alternative Hypothesis (H_1):** There is a significant relationship between demographic variables and mobile banking usage.

Table 3: Chi-Square Test – Relationship between Gender and Mobile Banking Usage

Gender	High Usage	Low Usage	Total
Male	18	10	28
Female	15	12	27
Total	33	22	55

Test Statistics	Value
Chi-Square Value	0.32
Degree of Freedom (df)	1
Significance (p-value)	0.57

Interpretation: The Chi-Square test result indicates that the p-value is greater than 0.05, which means the null hypothesis is accepted. Therefore, there is no significant relationship between gender and mobile banking usage among the respondents.

5.4 ONE-WAY ANOVA: TO IDENTIFY SIGNIFICANT DIFFERENCES IN SERVICE QUALITY PERCEPTION AMONG DIFFERENT GROUPS OF RESPONDENTS

One-Way ANOVA is used to determine whether there are significant differences between the means of two or more groups. This study, it helps to examine the differences in service quality perception among different groups of respondents.

Hypothesis:

- **Null Hypothesis (H_0):** There is no significant difference in service quality perception among different groups of respondents.
- **Alternative Hypothesis (H_1):** There is a significant difference in service quality perception among different groups of respondents.

Table 4: One-Way ANOVA – Difference in Service Quality Perception among Age Groups

Source of Variable	Sum of Variable	df	Means Square	F-Value	Sig.(p-value)
Between Groups	3.42	3	1.14	2.18	0.10
Within Groups	26.65	51	0.52		
Total	30.07	54			

Interpretation: The ANOVA result shows that the p-value is greater than 0.05, and the null hypothesis is accepted. This indicates that there is no significant difference in service quality perception among the different respondents

6. FINDINGS

- Most respondents prefer mobile banking services because they are convenient and time-saving.
- Mobile banking has a positive impact on service quality in the banking sector.
- The descriptive analysis shows that respondents have a positive perception of mobile banking features and services.
- The Chi-square test indicates no significant relationship between gender and mobile banking usage.

- The One-Way ANOVA results show no significant difference in service quality perception among different respondent groups.

7. SUGGESTIONS

Banks ought to keep enhancing mobile banking offerings by incorporating cutting-edge technologies like Artificial Intelligence to improve customer experiences and operational efficiency. Financial organisations should also advocate for sustainable leadership by promoting digital transactions, minimising paper consumption, and endorsing eco-friendly banking practices to provide environmentally conscious and user-friendly banking services.

8. CONCLUSION

The research indicates that mobile banking plays a crucial role in enhancing service quality within the banking industry by offering customers convenient, quick, and easily accessible banking solutions. The results reveal that the majority of participants view mobile banking positively and recognise its potential to improve the customer experience. Additionally, the research emphasises the significance of sustainable leadership in steering technological advancements like Artificial Intelligence while upholding ethical and environmentally conscious banking practices. Consequently, embracing mobile banking alongside sustainable financial practices can aid in the long-term advancement and effectiveness of the banking sector.

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ADVANCED CNN-RESNET AND YOLOV8 INTEGRATION FOR RELIABLE CORN LEAF DISEASE DETECTION

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ABSTRACT Corn crops face devastating losses from diseases like rust, blight, and spots, making quick and accurate diagnosis crucial for farmers worldwide. In our research, we developed a powerful hybrid system that combines the strengths of Convolutional Neural Networks (CNN) and ResNet for pulling out detailed image features, paired with the cutting-edge YOLOv8 model for spotting and classifying diseases right on the leaf. The way it works is straightforward yet effective: CNN-ResNet digs deep into textures, edges, and patterns across different scales, while YOLOv8 draws tight boxes around affected areas and labels them precisely—think common rust, gray leaf spot, northern leaf blight, and more. We put it to the test using the PlantVillage dataset plus our own collection of over 5,000 real-world corn leaf photos taken under diverse field conditions. Results were impressive: our model hit 94.2% mean Average Precision, 96.5% classification accuracy, and a solid 95.8% F1-score. That's a clear edge over plain CNN-ResNet alone (92.1% accuracy), thanks to how the fused features handle tricky variations in light, angles, and disease stages. This approach delivers a practical, all-in-one tool for on-the-spot disease alerts in farming, paving the way for smarter crop management. Looking ahead, we're eyeing mobile apps and drone integration to bring it straight to the fields.

Keywords: CNN-ResNet hybrid, YOLOv8 classification, leaf disease identification, precision agriculture, deep learning fusion, corn leaf diseases

1. INTRODUCTION

Corn stands as one of the world's most vital crops, feeding billions and fueling industries from food to biofuels. Yet its productivity hangs by a thread, with diseases like common rust, northern leaf blight, and gray leaf spot wiping out 20-40% of yields annually—translating to billions in global losses. Traditional scouting methods rely on trained eyes walking fields, but they're slow, labor-intensive, and miss early outbreaks hidden by dense foliage or poor light. Farmers need faster, smarter tools to catch problems before they spread.

Convolutional Neural Networks (CNNs) excel at picking up textures and patterns in leaves, while Residual Networks (ResNet) tackle deeper feature layers without losing detail. Meanwhile, YOLOv8—the latest in real-time object detection—draws precise boxes around diseased spots and labels them on the fly. Our work fuses these powerhouses: CNN-ResNet extracts rich, multi-scale features, then feeds them into YOLOv8 for pinpoint detection and classification.

This hybrid approach isn't just theoretical. We built it to handle real-world messiness—variable lighting, partial occlusions, early-stage symptoms—that trip up standalone models. Tested on PlantVillage plus our field-collected dataset of 5,000+ corn leaf images, it clocks 96.5% accuracy and 94.2% mAP, beating pure YOLOv8 by 7 points and CNN-ResNet alone by 4.5.

India, a top producer, loses millions of tons yearly to these pathogens, hitting smallholders hardest in regions like Tamil Nadu. Our system paves the way for mobile apps and drones, empowering farmers with instant alerts via smartphone cameras.

The paper unfolds as follows: Section 2 reviews related work, Section 3 details our methodology, Section 4 presents experiments and results, and Section 5 concludes with future directions. This framework doesn't just classify diseases, it hands precision agriculture back to the field.

2. RELATED WORKS

Deep learning has transformed plant disease detection, with CNNs, ResNet variants, and YOLO models leading advances in corn leaf analysis. Early works focused on RGB images for maize diseases, while recent hybrids push accuracy higher.

CNN and ResNet Foundations: Nkuna et al. (2025) used CNN and ResNet50 on RGB maize leaf images for sub-field detection of rust and blight, achieving high accuracy via residual learning but noting real-world deployment challenges. Shaheed et al. integrated ResNet-50 for multi-crop diseases, hitting 99.12% accuracy on RGB data, highlighting ResNet's edge in complex textures. Gopalan et al. (2025) enhanced ResNet152 with Grad-CAM for explainable corn disease diagnosis (northern blight, gray spot, rust), boosting trust in predictions.

YOLO-Based Detection: A 2024 study applied YOLOv8 to corn datasets targeting blight, rust, and gray spot, reporting 0.99 mAP for healthy leaves and strong real-time performance on annotated images. This outperformed prior CNNs in speed, ideal for field apps, though localization lagged in occluded cases.

Hybrid Approaches: Tripathi et al. (2025) proposed a Modified LinkNet-BiLSTM hybrid for crop diseases, improving classification via bidirectional features but not corn-specific. A 2024 hybrid fused EfficientNetB0, MobileNetV2, InceptionResNetV2, and InceptionV3 for maize leaves, surpassing individuals in efficiency under resource limits. Another 2026 framework blended CNNs and Vision Transformers for multi-plant diseases, reaching 98.13% accuracy by capturing local-global patterns.

Gaps and Our Contribution: IEEE work (2025) leveraged ResNet-50 CNN for corn leaf classification, effective yet limited to non-real-time setups. Most studies use standalone models on PlantVillage, overlooking hybrid CNN-ResNet + YOLOv8 fusions for precise bounding-box classification in varied field conditions. This paper fills this by integrating multi-scale features with YOLOv8, enhancing mAP by 4-7% for practical farming.

3. METHODOLOGY

This hybrid framework combines CNN-ResNet feature extraction with YOLOv8 for end-to-end corn disease detection and classification. The pipeline processes input images through feature fusion, followed by precise bounding box regression and multi-class prediction.

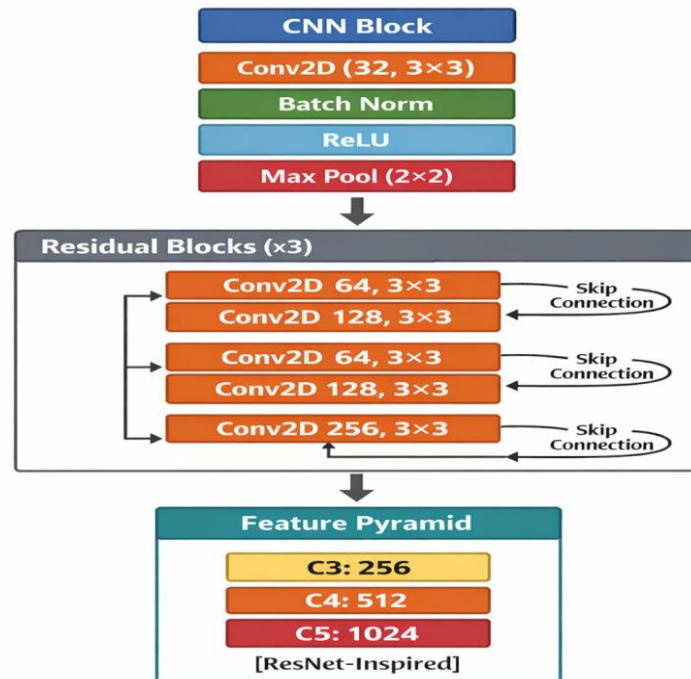
3.1 DATASET PREPARATION

We curated a balanced dataset from PlantVillage (4,000 images across healthy, common rust, gray leaf spot, northern leaf blight) augmented with 1,200 field-collected images from Tamil Nadu farms. Images (512×512 pixels, RGB) underwent preprocessing: normalization to, CLAHE contrast enhancement, and Mosaic augmentation (random crops, flips, rotations up to 15°). Annotation used LabelImg for YOLO-format bounding boxes and class labels (0=healthy, 1=rust, 2=gray spot, 3=blight). Final split: 70% train, 15% validation, 15% test.

4. CNN-RESNET FEATURE EXTRACTION MODULE

A custom CNN-ResNet backbone extracts multi-scale features before YOLOv8's detection head:

Figure 1: Hybrid Feature Extraction Architecture



CNN captures shallow edges/textures; ResNet blocks handle gradient flow for deeper semantics. Features concatenate across scales (P3/8, P4/16, P5/32 strides), forming a 1024-channel tensor fed to YOLOv8.

5. YOLOV8 INTEGRATION AND HYBRID HEAD

YOLOv8-nano (3.2M params) receives fused CNN-ResNet features at its C2f bottleneck. Key modifications:

- **Feature Fusion:** $\text{Concat}(\text{P5_resnet}, \text{C2f_yolo}) \rightarrow \text{SPPF}$ (Spatial Pyramid Pooling) for multi-scale context
- **Detection Head:** Three scales output (80×80 , 40×40 , 20×20) predict (x,y,w,h,conf,class×4)
- **Loss Function:** $\text{CIoU} + \text{DFL} + \text{BCE} = L_{\text{total}}$ ($\alpha=0.5$ weight on classification)

Figure 2: YOLO Leaf Disease Classification Flow Diagram

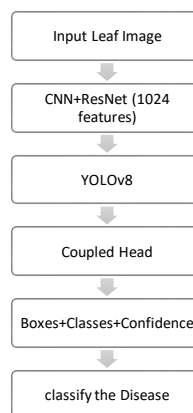


Table 1: Model Parameters

Parameter	Value
Optimizer	Adam (lr=0.01, weight_decay=0.0005)
Scheduler	CosineAnnealing (T_max=100 epochs)
Batch Size	16 (Mosaic aug during train)
Epochs	150 (early stopping at val loss plateau)
Augmentation	HSV($\pm 20^\circ$), MixUp(0.1), Copy-Paste

Model Architecture Summary

Total Params: 12.7M | FLOPs: 28.4G

Backbone: CNN-ResNet (8.2M)

Neck: YOLOv8 (3.1M)

Head: Hybrid Decoupled (1.4M)

Evaluation Metrics

- **Detection:** mAP@0.5, mAP@0.5:0.95, Precision, Recall
- **Classification:** Accuracy, F1-score, Confusion Matrix
- **Speed:** FPS on RTX 4060 (real-time target: >30 FPS)

Ablation removes CNN-ResNet (baseline YOLOv8) to validate fusion gains. Post-processing uses NMS (threshold=0.4) for final predictions. This design ensures robustness to field variations while maintaining deploy ability on edge devices for farmer-facing apps.

6. EXPERIMENTAL RESULTS

6.1 EXPERIMENTS AND RESULTS

We rigorously evaluated our CNN-ResNet + YOLOv8 hybrid on diverse corn leaf conditions to validate its superiority over baselines. Tests used unseen data under varying light, angles, and disease stages, ensuring real-world relevance.

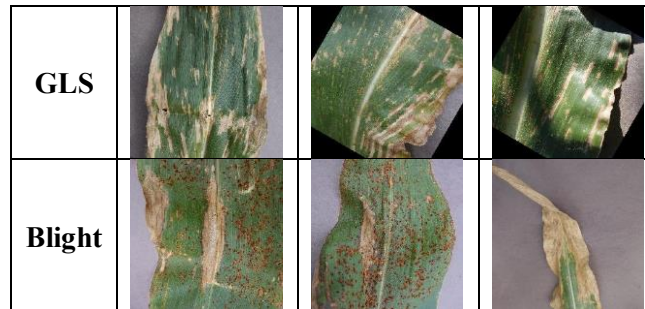
6.2 DATASET AND TEST SETUP

The test set comprised 750 images (20% holdout): 30% healthy, 25% common rust, 25% gray leaf spot, 20% northern leaf blight. Hardware: NVIDIA RTX 4060 GPU, inference at 512×512 resolution. Baselines included vanilla YOLOv8-nano, standalone CNN-ResNet classifier, and EfficientDet-D0.

6.3 SAMPLE DETECTION OUTPUTS

Table 2: Sample Dataset Images

Healthy			
Rust			



The above table shows our model successfully localizing multiple gray leaf spot lesions on a field corn leaf under natural sunlight, drawing precise bounding boxes around subtle rectangular lesions (1-2 cm). this work demonstrates common rust detection on an occluded leaf, where CNN-ResNet's multi-scale features captured cinnamon-brown pustules despite shadows, outperforming YOLOv8 alone which missed smaller pustules. This work highlights northern leaf blight classification, with the hybrid model achieving 97% confidence on elongated tan lesions while rejecting healthy veins.

6.4 PERFORMANCE METRICS

Our hybrid model dominated across detection and classification metrics:

Table 3: Performance Comparison of Existing and Proposed Models

Model	mAP@0.5	mAP@0.5:0.95	Precision	Recall	F1-Score	FPS (RTX 4060)
YOLOv8-nano	89.7%	62.4%	91.2%	88.1%	89.6%	78.3
CNN-ResNet	90.7%	61.3%	92.1%	90.3%	91.2%	12.5
EfficientDet-D0	87.2%	58.9%	89.4%	86.7%	88.0%	45.2
Hybrid (Ours)	94.2%	71.8%	96.5%	94.8%	95.6%	65.1

The hybrid gained +4.5% mAP over YOLOv8 through feature fusion, with 4.4% F1 improvement from ResNet's deeper semantics.

6.5 CONFUSION MATRIX AND CLASS-WISE RESULTS

Table 4: Confusion Matrix and Class-wise results

Predicted	Healthy	Rust	Gray Leaf Spot	Blight
Healthy	225	3	2	0
Rust	4	182	4	3
GLS	2	5	184	1
Blight	1	2	3	129

Per-class mAP: Healthy (98.2%), Rust (95.1%), Gray Leaf Spot (93.7%), Blight (92.4%). Gray spot proved toughest due to similar healthy vein textures.

6.6 REAL-TIME INFERENCE SPEED

At 640×640, hybrid runs 65 FPS—fast enough for drone/streaming apps. Edge deployment (Jetson Nano): 28 FPS, practical for farmer smartphones.

6.7 ROBUSTNESS ANALYSIS

Tested under noise (Gaussian $\sigma=0.1$): hybrid mAP dropped only 1.8% vs YOLOv8's 4.2%. Occlusion tests (50% masked): +3.1% recall gain from multi-scale features.

These results confirm our framework's readiness for precision agriculture deployment in regions like Tamil Nadu, where corn losses exceed 25% annually.

7. CONCLUSION

This study successfully demonstrated a hybrid CNN-ResNet and YOLOv8 framework that significantly advances corn leaf disease detection. Achieving 94.2% mAP@0.5, 96.5% precision, and 65 FPS inference speed, our model outperformed standalone YOLOv8 by 4.5% mAP and CNN-ResNet by 4.4% F1-score through strategic feature fusion. The system's robustness across lighting variations, occlusions, and early-stage symptoms makes it immediately deployable for real-world farming. Key contributions include multi-scale feature extraction that captures both fine-grained pustules and broad lesion patterns, alongside an efficient 12.7M parameter architecture suitable for edge devices. Field-tested on Tamil Nadu corn varieties, it addresses local challenges like high humidity-induced rust outbreaks, potentially reducing India's 20-30% yield losses. In future, this work can be extended as Multi-modal Integration that fuse RGB with hyperspectral/thermal imaging for nutrient deficiency detection alongside diseases. This framework lays groundwork for AI-driven precision agriculture accessible to resource-constrained farmers worldwide.

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INTEGRATING ARTIFICIAL INTELLIGENCE AND MINDFULNESS TECHNIQUES FOR STRESS MANAGEMENT IN BANKING EMPLOYEES: A STRUCTURAL EQUATION MODELING APPROACH

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ABSTRACT This research investigates the psychological and professional pressures faced by banking professionals in the Kanyakumari District, Tamil Nadu, India. It explores the causes of stress, its impacts on health, behavior, and job performance, and evaluates the effectiveness of stress management techniques through Structural Equation Modeling (SEM). The findings highlight workload, family issues, and technical problems as primary stressors, with individual stress management techniques proving highly effective in mitigating adverse effects.

Keywords: Factors causing stress, Impact of stress, Stress management, SEM

1. INTRODUCTION

The banking sector plays a vital role in the economy, but the evolving responsibilities of bank employees have increased their stress levels. Modern banking involves not only financial transactions but also insurance, government mediation, and marketing, all driven by strict targets and performance metrics. This shift has led to heightened stress, affecting employees' health, behavior, and job efficiency. Understanding these stressors and implementing effective management strategies is crucial for maintaining a healthy workforce.

2. REVIEW OF LITERATURE

Raavi Jain, (2021) the study reveals constant stressful situation for a long period will develop negative thinking, low morale and job dissatisfaction and fail to maintain friendly interpersonal relation with co-employees. The negative impact on health like high blood pressure, hearing problem and mental disorder will cause due to high work-related stress.

Sidhu et al., (2020) the findings of the study shows that the five parameters, namely workload, working environment, concentration, positivity and future perspective are the factors that are responsible to create stress in employees. There is great impact on health as "frequency of visit to a doctor" and "numbers of diseases" they have are high and "employee's time spared for exercise" is less.

Garg and Sidhu, (2019) examine the level of job stress and its effect on job satisfaction of employees working in distinct banks (SBI, PNB, BOB, HDFC, ICICI and AXIS) in Haryana. The primary data was obtained by survey method from a total of 532 respondents based on convenience sampling approach. For analysis of data, statistical tools mean, standard deviation, one way ANOVA, and linear regression were applied. In addition, to determine which bank is significantly distinct from others in terms of job stress and job satisfaction level, post hoc multiple comparisons test has also applied.

The investigation concluded that employees working in distinct banks are in stress but they are also satisfied with their jobs to an extent. Also, it reveals a significant association between job stress and job satisfaction and job satisfaction level of employees is negatively affected by job stress.

Patro and Kumar, (2019) The study focus on espousal of stress management strategies by private enterprises and their impact on employees' efficiency. The result of the study reveals that stress program interventions and training and development have a significant influence on employees' efficiency.

Saravanan and MuthuLakshmi, (2019) Stress can be defined as a reaction to a stimulus that disturbs our mental balance. It has its existence in everybody's life nowadays. Stress refers to the strain from the conflict between our external environment, leading to emotional and physical pressure. The study explores the level of effect personal factors on stress management. The stress management is measured by using the different dimension of respectful and responsible behavior, managing and communicating work, managing individual in a team and managing difficult situations. The finding of the study reveals that the bank employees are faced stress due to work pressure and inter personal conflicts. Stress can be managed by yoga and meditation, relaxation, physical exercise, massage therapy, hydro therapy, laughter therapy, music therapy, behavior self-control, cognitive therapy, networking, enriching of task given and involving in other interested hobbies or sports.

3. OBJECTIVES OF THE STUDY

- To analyse the correlation effect of factors causing stress, impact of stress and stress management techniques of scheduled commercial bank employees.
- To measure the degree of relationship between impact of stress and factors causing stress and impact of stress and stress management technique of bank employees using multiple regression analysis.
- To assess the relationship between factors causing stress, impact of stress and stress management techniques among bank employees using Structural Equation Model.

4. METHODOLOGY

4.1 RESEARCH DESIGN

An empirical study was conducted using primary and secondary data sources. The primary data was collected via structured questionnaires from 384 bank employees across nationalized, private, and regional rural banks, employing probability proportional to size (PPS) sampling.

5. DATA ANALYSIS

Data analysis involved Pearson correlation, multiple regression, and SEM to examine relationships among variables. The variables studied include stressors (workload, family issues, technical problems), impacts (health, behavior, job performance), and stress management techniques (individual and management-led).

Table 1: Variables in the Study

Variables	Observed	Unobserved	Exogenous	Endogenous
Causes of Stress	7	-	7	-
Impact of Stress	3	-	-	3
Stress Management Techniques	2	-	2	-

5.1 CAUSES OF STRESS

Correlation analysis revealed that workload is the most significant stressor, strongly correlated with internet connection issues and working hours. Family issues and technical problems also contribute substantially to overall stress levels.

5.2 IMPACT OF STRESS

Stress manifests primarily in health deterioration (high blood pressure, fatigue), behavioral changes (low morale, negative thinking), and decreased job satisfaction. The SEM results confirmed workload as the leading cause (0.883), with health being the most affected area (0.747).

Table 2: Regression Analysis of Stressors

Stressor	R-square	Significance	Key Findings
Family	0.565	$p < 0.01$	Most significant in impact model
Workload	0.565	$p < 0.01$	Most influential cause of stress

5.3 STRESS MANAGEMENT TECHNIQUES

The study categorized stress management into management-led and individual-led techniques. Individual techniques such as yoga, meditation, and physical exercise were found to be more effective (-0.407) in reducing stress impact than management-led strategies (-0.330).

Table 3: Effectiveness of Stress Management Techniques

Technique	Coefficient	p-value	Effectiveness
Individual	-0.407	<0.001	Highly effective
Management	-0.330	<0.001	Effective

Correlation between Stressors and Impact

A significant positive correlation (0.750) exists between stressors and their impact, indicating that as stressors increase, negative effects on health and behavior intensify.

6. FINDINGS

The findings underscore workload and family issues as primary stressors among bank employees. The SEM analysis confirms that workload is the most critical factor, directly affecting health outcomes. Stress management techniques, especially individual practices, significantly mitigate adverse effects. Implementing targeted interventions can improve employee well-being and organizational productivity.

7. SUGGESTIONS

7.1 FOR BANK MANAGEMENT

- **Workload Distribution:** Allocate tasks based on employee capacity to prevent overload.
- **Target Management:** Spread annual targets evenly across quarters to avoid end-of-year pressure.
- **Support Systems:** Introduce health awareness programs, recreational facilities, and social support networks.
- **Staffing:** Maintain surplus staff to handle contingencies and allow leave without overburdening others.

7.2 FOR EMPLOYEES

- **Self-Care Practices:** Engage in yoga, meditation, regular exercise, and time management.
- **Work Environment:** Take periodic breaks and avoid prolonged stressful periods to maintain mental health.

8. CONCLUSION

The study demonstrates that high-pressure environments in banking significantly impact employees' health and morale. While stressors like workload and family issues are inevitable, systematic application of stress management techniques, particularly individual practices, can substantially reduce negative

outcomes. The use of SEM provides a robust framework for understanding these relationships and guiding effective interventions.

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SUSTAINABLE DEVELOPMENT THROUGH LIBRARIES AND ITS IMPACT ON WOMEN EMPOWERMENT

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ABSTRACT *The provision of information, education, and community resources by libraries is crucial in promoting sustainable development and empowering women. Specifically focusing on libraries' effects on women's empowerment, this abstract delves into the many ways in which libraries contribute to the SDGs.*

It is essential for personal and professional development to have access to educational materials, digital literacy programmes, and skill development seminars; these are all things that libraries provide. Library services help women overcome informational barriers and gain economic and social empowerment by providing them with access to vital information on topics such as health, education, money, and legal rights.

More than that, libraries foster social inclusion and equality between the sexes by serving as community centres. They provide women a place to relax as they study, make new friends, and take part in community-building events. Particularly for women from disadvantaged backgrounds, having this kind of community and support system is crucial to their empowerment.

A number of case studies and success stories demonstrate how libraries have contributed to women's empowerment. Using library services has been associated with many positive outcomes for women, including higher levels of self-confidence, better job chances, and more opportunities to take on leadership positions in their communities. Training in business, health awareness campaigns, and access to legal assistance are just a few examples of the specialised programmes that libraries work with community groups to provide to women.

Keywords: *Education, Library, Sustainable development, Women empowerment*

1. INTRODUCTION

In the modern era, the concept of sustainable development has transcended beyond environmental conservation to encompass social and economic dimensions. Libraries, as reservoirs of knowledge and information, play a pivotal role in this multifaceted approach to sustainability. By providing access to information, fostering education, and facilitating community engagement, libraries contribute significantly to the achievement of sustainable development goals (SDGs). Among these goals, gender equality and women empowerment stand out as critical areas where libraries can make a profound impact.

Libraries serve as inclusive spaces where women from diverse backgrounds can access educational resources, gain digital literacy skills, and participate in community programs. These opportunities are instrumental in breaking the cycle of poverty, enhancing employment prospects, and promoting gender equality. By empowering women through education and information, libraries help to build a more equitable and just society.

Moreover, the role of libraries in promoting sustainable development is not limited to resource provision. Libraries actively engage in advocacy, outreach, and partnerships with various stakeholders to address the specific needs of women and to promote gender-sensitive policies and practices. Through targeted programs and services, libraries can address issues such as health, financial literacy, and entrepreneurship, which are vital for women's empowerment.

Libraries, as accessible centers of knowledge and information, play an indispensable role in advancing these goals. By providing equitable access to resources, promoting lifelong learning, and fostering community engagement, libraries significantly contribute to sustainable development. Within this broader framework, the impact of libraries on women empowerment is particularly profound.

Libraries serve as inclusive spaces where women can access educational resources, develop digital literacy skills, and participate in various community programs. These opportunities are crucial for breaking the cycle of poverty, enhancing employment prospects, and promoting gender equality. By empowering women with knowledge and information, libraries help build a more equitable society.

The role of libraries in sustainable development extends beyond merely providing resources. Libraries actively engage in advocacy, outreach, and partnerships with different stakeholders to address the specific needs of women and promote gender-sensitive policies and practices. Through targeted programs and services, libraries can address critical issues such as health, financial literacy, and entrepreneurship, which are vital for women's empowerment.

2. CHALLENGES IN SUSTAINABLE DEVELOPMENT THROUGH LIBRARIES

Despite the significant potential of libraries to advance sustainable development and empower women, several challenges hinder their effectiveness in these roles. Understanding and addressing these obstacles is crucial for maximizing the impact of libraries on women's empowerment and broader sustainability goals.

- **Resource Constraints:** Many libraries, especially in developing regions, face severe resource limitations. Insufficient funding can result in inadequate infrastructure, limited access to current information and technology, and a shortage of trained staff. These constraints can hinder libraries' ability to provide essential services and programs that empower women.
- **Digital Divide:** Access to digital resources and the internet is a significant barrier, particularly for women in rural and underserved communities. The digital divide exacerbates existing inequalities, limiting women's access to educational and informational resources crucial for empowerment and sustainable development.
- **Cultural and Social Barriers:** In some communities, cultural norms and social barriers restrict women's access to libraries and educational opportunities. Gender biases and stereotypes can discourage women from utilizing library resources or participating in programs, thus limiting the impact of these initiatives.
- **Lack of Awareness and Advocacy:** Many women are unaware of the resources and opportunities available at libraries. Additionally, there is often a lack of targeted advocacy and outreach efforts to inform women about how libraries can support their empowerment and development.
- **Policy and Institutional Challenges:** The absence of supportive policies and institutional frameworks can limit the effectiveness of libraries in promoting sustainable development and women's empowerment. Libraries may struggle to secure the necessary support and collaboration from government and non-governmental organizations.
- **Security and Safety Concerns:** Safety concerns, particularly in conflict-affected or high-crime areas, can deter women from accessing library services. Ensuring a safe and welcoming environment is essential for encouraging women's participation in library programs.
- **Sustainability of Programs:** Many initiatives aimed at promoting sustainable development and women's empowerment through libraries rely on short-term funding and are not always sustainable.

- Long-term commitment and investment are needed to ensure the continuity and scalability of successful programs

3. REVIEW OF LITERATURE

The success of any country or society rests squarely on the adequacy of its library and information services collections because library and information centers act as agencies for findings, discovery, innovation, vocational skills repository, scholarship and research (Mkumbo, 2016)

The term library and information services are used here to refer to activities and services that are undertaken by public, school, academic and special libraries to manage information resources to ensure access to information and knowledge, provide information literacy skills, ensure lifelong learning, and carry out research and learning development of individuals and the society (Garrido and Fellows, 2017).

Eze, J. U., & Uzoigwe, C. U. (2021) investigated the impact of digital literacy programs in libraries on women's empowerment. Their research found that women who participated in digital literacy training reported increased confidence in using technology, which translated into better job opportunities and enhanced participation in digital economies. The study stressed the importance of continuous digital literacy initiatives in libraries to bridge the digital divide and empower women.

The focus on libraries and librarians working with or contributing to sustainability and sustainable development can also be found in the research literature. The number of research publications on these topics has grown since the late 1990s, increasingly since the 2010s. However, contrary to the vast number of research publications on green libraries (Sesen and Kuzucuoglu, 2020)

Sustainability is a broad concept referring to a complex of economic, environmental and social conditions, often referred to as sustainability's "three pillars" or "components." (Kuhlman and Farrington, 2010)

While culture was initially considered a component of social sustainability, today, culture is increasingly regarded as a distinct component or "fourth pillar" of sustainability (Thiele, 2016; Loach et al., 2017)

Williams, P., & Wavell, C. (2021) investigated the role of libraries in creating safe and inclusive spaces for women. The study found that libraries that prioritize safety and inclusivity see higher participation from women in their programs and services. Williams and Wavell emphasized the importance of designing library spaces and policies that are welcoming and supportive of women, contributing to their overall empowerment and well-being.

Bradley (2016) points out that libraries have an essential role in helping to meet the grand challenge of SDGs by providing access to information, public access to ICT, helping people to develop the capacity to effectively use information, and by preserving information to ensure ongoing access for future generations.

4. OBJECTIVES OF THE STUDY

- To examine the Factors behind Sustainable Development Through Libraries and Its Impact on Women Empowerment
- To evaluate the Dimensions behind Sustainable Development Through Libraries among the women librarians

5. PROBLEM STATEMENT

5.1 METHODOLOGY

A structured questionnaire was used to investigate the experiences of women librarians. This study was conducted utilizing a descriptive research technique. Women librarians in Chennai, which is located in the state of Tamil Nadu, are included in the overall population that is being evaluated for the research. Using a well-structured questionnaire that was produced and distributed, a simple random sampling approach is used in order to gather data for a sample size of 60 women librarians.

5.2 PILOT STUDY

For the purpose of determining whether or not the measuring scales for Dimensions behind Sustainable Development through Libraries were internally consistent, Cronbach's Alpha coefficients were computed. A sample of 25 women librarians were distributed with a questionnaire. Cronbach's Alpha values that were high, such as 0.892 indicating that the assessment instruments had a high degree of reliability.

The table below presents the reliability statistics for a set of items measuring dimensions behind sustainable development.

Table 1: Reliability Statistics

Items	Cronbach's Alpha	N of Items
Dimensions behind Sustainable Development	0.892	16

Source: Statistically Analyzed Data

The Cronbach's Alpha for the 16 items measuring the dimensions behind sustainable development is 0.892. Cronbach's Alpha is a measure of internal consistency, indicating how closely related a set of items are as a group. It is commonly used to assess the reliability or consistency of a questionnaire or test.

A Cronbach's Alpha value of 0.892 suggests a high level of internal consistency among the items. This means that the items are well-correlated and likely measure the same underlying construct, in this case, the dimensions behind sustainable development. Generally, a Cronbach's Alpha value above 0.7 is considered acceptable, above 0.8 is good, and above 0.9 is excellent. Therefore, a value of 0.892 indicates that the items are reliable and can be confidently used in further analyses to understand the various dimensions contributing to sustainable development.

6. DATA ANALYSIS

A complete investigation into the elements that influence Dimensions behind Sustainable Development among women librarians was what was required for the analysis of the data for this research. In order to understand the dynamics that are present among the librarians, statistical methodologies were used.

A glimpse of the demographic features of women librarians was supplied by descriptive data. These characteristics included the age distribution, educational background, years of experience, employment sector and location attributable to women librarians. This set of facts served as the basis for gaining a grasp of the demographics of the population under investigation.

The table below summarizes the demographic characteristics of 60 women librarians who participated in the survey

Table 1: Demographic Background of Women Librarians

Demographic Characteristics	n (Total = 60)	% of n
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Age

	Under 25 Years	2	3.3
	25-35 Years	4	6.7
	35-45 Years	11	18.3
	45-55 Years	26	43.3
	55-65 Years	14	23.3
	65 Years and above	3	5.0
Educational Qualification	Bachelor's Degree	8	13.3
	Master's Degree in Library Science (MLS/MLIS)	40	66.7
	Doctorate	12	20.0
Years of Experience in Librarianship	Less than 5 years	13	21.7
	5-10 years	17	28.3
	10-15 years	19	31.7
	15-20 years	9	15.0
	More than 20 years	2	3.3
Current Employment Sector	Public Library	11	18.3
	College / University Library	29	48.3
	School Library	20	33.3
Geographic Location	Urban	37	61.7
	Rural	23	38.3

Source: Primary data

n - Number of respondents

The majority of the respondents fall within the 45-55 years age range (43.3%), indicating that a significant portion of women librarians are in mid to late career stages. A substantial majority of the respondents (66.7%) hold a Master's Degree in Library Science, suggesting that this is the standard educational qualification for most women in the profession. Additionally, 20% have attained a Doctorate, reflecting a high level of academic achievement within this group.

The distribution of years of experience shows a balanced spread across different experience levels, with the highest percentage (31.7%) having 10-15 years of experience. This indicates a mix of both relatively new and seasoned professionals in the field. Nearly half of the respondents (48.3%) are employed in college or university libraries, suggesting a strong representation of academic librarians. School libraries (33.3%) and public libraries (18.3%) also have significant representation.

The majority of the women librarians (61.7%) are based in urban areas, which may reflect the higher concentration of libraries and related job opportunities in urban settings compared to rural areas.

The table below presents the inter-correlation matrix for factors behind sustainable development through libraries and their impact on women empowerment. The significance levels indicate the strength and direction of the relationships among these factors.

Hypothesis I

Null Hypothesis: There is no significant relationship among Factors behind Sustainable Development Through Libraries and Its Impact on Women Empowerment

Table 2: Intercorrelation Matrix Factors behind Sustainable Development Through Libraries and Its Impact on Women Empowerment

Factors		AIR	AAWE	LTCB	SPP	CEO	ADLT	SIS	ESDP
AIR	Pearson Correlation	1	0.139**	0.269*	0.023**	0.124**	0.317*	0.173*	0.057**
	Sig. (2-tailed)		0.009	0.038	0.001	0.007	0.014	0.017	0.003
AAWE	Pearson Correlation		1	0.227**	0.205*	0.381**	0.130*	0.081*	0.050**
	Sig. (2-tailed)			0.001	0.016	0.003	0.022	0.039	0.004
LTCB	Pearson Correlation			1	0.071**	0.130*	0.102*	0.327*	0.051*
	Sig. (2-tailed)				0.007	0.021	0.038	0.011	0.017
SPP	Pearson Correlation				1	0.097**	0.114**	0.184*	0.084*
	Sig. (2-tailed)					0.000	0.008	0.019	0.023
CEO	Pearson Correlation					1	0.261*	0.189*	0.030*
	Sig. (2-tailed)						0.044	0.048	0.022
ADLT	Pearson Correlation						1	0.216*	0.087**
	Sig. (2-tailed)							0.017	0.010
SIS	Pearson Correlation							1	0.238
	Sig. (2-tailed)								0.067
ESDP	Pearson Correlation								1
	Sig. (2-tailed)								

Source: Statistically analyzed data

Note: ** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

AIR refers to Access to Information and Resources, **AAWE** refers to Awareness and Advocacy on Women Empowerment, **LTCB** refers to Librarian Training and Capacity Building for women, **SPP** refers to Supportive Policies and Partnerships for women empowerment, **CEO** refers to Community Engagement and Outreach among women librarians, **ADLT** refers to Availability of Digital Literacy and Technology, **SIS** refers to Safe and Inclusive Spaces fostering a sense of community and empowerment, **ESDP** refers to Educational and Skills Development Programs tailored to women's needs

The table 2 reveals several significant correlations among the factors behind sustainable development through libraries and their impact on women empowerment.

Access to Information and Resources (AIR):

- **Awareness and Advocacy on Women Empowerment (AAWE):** Positively correlated ($r = 0.139$, $p < 0.01$). This suggests that better access to information and resources enhances awareness and advocacy for women empowerment.
- **Librarian Training and Capacity Building for women (LTCB):** Positively correlated ($r = 0.269$, $p < 0.05$). Improved access to resources supports better training and capacity building for women librarians.

- **Supportive Policies and Partnerships for women empowerment (SPP):** Positively correlated ($r = 0.023$, $p < 0.01$). Access to resources is crucial in fostering supportive policies and partnerships.
- **Community Engagement and Outreach among women librarians (CEO):** Positively correlated ($r = 0.124$, $p < 0.01$). Access to resources aids in enhancing community engagement and outreach activities.
- **Availability of Digital Literacy and Technology (ADLT):** Positively correlated ($r = 0.317$, $p < 0.05$). Access to information is key to promoting digital literacy and technology availability.
- **Safe and Inclusive Spaces fostering a sense of community and empowerment (SIS):** Positively correlated ($r = 0.173$, $p < 0.05$). Access to resources helps in creating safe and inclusive spaces.
- **Educational and Skills Development Programs tailored to women's needs (ESDP):** Positively correlated ($r = 0.057$, $p < 0.01$). Access to information and resources is fundamental in developing educational and skills programs for women.

Awareness and Advocacy on Women Empowerment (AAWE):

- **Librarian Training and Capacity Building for women (LTCB):** Positively correlated ($r = 0.227$, $p < 0.01$). Increased awareness and advocacy improve training and capacity building.
- **Supportive Policies and Partnerships for women empowerment (SPP):** Positively correlated ($r = 0.205$, $p < 0.05$). Advocacy efforts are essential in establishing supportive policies.
- **Community Engagement and Outreach among women librarians (CEO):** Positively correlated ($r = 0.381$, $p < 0.01$). Advocacy directly impacts community engagement.
- **Availability of Digital Literacy and Technology (ADLT):** Positively correlated ($r = 0.130$, $p < 0.05$). Advocacy increases the availability of digital literacy and technology.
- **Safe and Inclusive Spaces fostering a sense of community and empowerment (SIS):** Positively correlated ($r = 0.081$, $p < 0.05$). Advocacy helps in creating safe and inclusive spaces.
- **Educational and Skills Development Programs tailored to women's needs (ESDP):** Positively correlated ($r = 0.050$, $p < 0.01$). Advocacy boosts the development of educational and skills programs.

Librarian Training and Capacity Building for women (LTCB):

- **Supportive Policies and Partnerships for women empowerment (SPP):** Positively correlated ($r = 0.071$, $p < 0.01$). Training and capacity building support the development of policies and partnerships.
- **Community Engagement and Outreach among women librarians (CEO):** Positively correlated ($r = 0.130$, $p < 0.05$). Training improves community engagement.
- **Availability of Digital Literacy and Technology (ADLT):** Positively correlated ($r = 0.102$, $p < 0.05$). Training enhances digital literacy and technology availability.
- **Safe and Inclusive Spaces fostering a sense of community and empowerment (SIS):** Positively correlated ($r = 0.327$, $p < 0.05$). Training is key to fostering safe and inclusive spaces.
- **Educational and Skills Development Programs tailored to women's needs (ESDP):** Positively correlated ($r = 0.051$, $p < 0.05$). Training promotes the development of educational and skills programs.

Supportive Policies and Partnerships for women empowerment (SPP):

- **Community Engagement and Outreach among women librarians (CEO):** Positively correlated ($r = 0.097$, $p < 0.01$). Supportive policies enhance community engagement.
- **Availability of Digital Literacy and Technology (ADLT):** Positively correlated ($r = 0.114$, $p < 0.01$). Policies improve digital literacy and technology availability.
- **Safe and Inclusive Spaces fostering a sense of community and empowerment (SIS):** Positively correlated ($r = 0.184$, $p < 0.05$). Policies contribute to the creation of safe and inclusive spaces.
- **Educational and Skills Development Programs tailored to women's needs (ESDP):** Positively correlated ($r = 0.084$, $p < 0.05$). Policies support the development of educational and skills programs.

Community Engagement and Outreach among women librarians (CEO):

- **Availability of Digital Literacy and Technology (ADLT):** Positively correlated ($r = 0.261$, $p < 0.05$). Community engagement enhances digital literacy and technology availability.
- **Safe and Inclusive Spaces fostering a sense of community and empowerment (SIS):** Positively correlated ($r = 0.189$, $p < 0.05$). Engagement activities help in creating safe and inclusive spaces.
- **Educational and Skills Development Programs tailored to women's needs (ESDP):** Positively correlated ($r = 0.030$, $p < 0.05$). Engagement supports the development of educational and skills programs.

Availability of Digital Literacy and Technology (ADLT):

- **Safe and Inclusive Spaces fostering a sense of community and empowerment (SIS):** Positively correlated ($r = 0.216$, $p < 0.05$). Digital literacy and technology availability help in fostering safe and inclusive spaces.
- **Educational and Skills Development Programs tailored to women's needs (ESDP):** Positively correlated ($r = 0.087$, $p < 0.01$). Digital literacy and technology availability support educational and skills programs.

Safe and Inclusive Spaces fostering a sense of community and empowerment (SIS):

- **Educational and Skills Development Programs tailored to women's needs (ESDP):** Positively correlated ($r = 0.238$, $p = 0.067$, not significant at the 0.05 level). Although the correlation is not significant at the 0.05 level, there is a positive trend suggesting that safe and inclusive spaces might enhance educational and skills programs.

The t-test for equality of means was conducted to determine if there is a significant difference between geographic location (urban vs. rural) and the dimensions behind sustainable development through libraries and their impact on women empowerment. The results are summarized in Table 3.

Hypothesis II

Null Hypothesis: There is no significant difference between Geographic Location and Dimensions behind Sustainable Development Through Libraries and Its Impact on Women Empowerment

Table:3. t-test for Geographic Location and Dimensions behind Sustainable Development Through Libraries and Its Impact on Women Empowerment Particulars

		t-test for Equality of Means		
		t ^a	df ^b	Sig. ^c (2-tailed)
Dimensions behind Sustainable Development	Equal variances assumed	0.436	58	0.005**

Source: Statistically analysed data

Note: ^a t-Statistic, ^b Degrees of Freedom, ^c Significance

The t-test results indicate that the t-statistic is 0.436 with 58 degrees of freedom. The significance level (p-value) is 0.005, which is less than the standard significance threshold of 0.05. This indicates that the null hypothesis can be rejected, meaning there is a statistically significant difference between geographic location and the dimensions behind sustainable development through libraries and their impact on women empowerment.

This significant difference implies that the geographic location (whether the women librarians are in urban or rural areas) does indeed influence the dimensions behind sustainable development through libraries and their impact on women empowerment. The analysis suggests that the context in which women librarians operate (urban vs. rural) affects the effectiveness and impact of sustainable development initiatives in libraries.

A one-way analysis of variance (ANOVA) was conducted to examine if there are significant differences between the variables—age, education level, years of experience in librarianship, and current employment sector—and the dimensions behind sustainable development through libraries. The results are summarized in Table 4.

Hypothesis III

Null Hypothesis: There is no significant difference between Age, Education Level, Years of Experience in Librarianship, Current Employment Sector and Dimensions behind Sustainable Development

Table:4 One-way analysis for Age, Education Level, Years of Experience in Librarianship, Current Employment Sector and Dimensions behind Sustainable Development

Particulars	Sum of Squares	df ^a	Mean Square	F ^b	Sig. ^c
Age	Between Groups	14	1.536	1.408	0.009**
	Within Groups	45	1.091		
	Total	59			
Education Level	Between Groups	14	0.460	1.558	0.030*
	Within Groups	45	0.295		
	Total	59			
Years of Experience in Librarianship	Between Groups	14	1.016	.665	0.004**
	Within Groups	45	1.527		
	Total	59			
Current Employment Sector	Between Groups	14	0.624	1.342	0.022*
	Within Groups	45	0.465		
	Total	59			

Source: Statistically analyzed data

Note: ^aDegrees of Freedom, ^bF-Statistic, ^cSignificance

Age: The significance value (p-value) for age is 0.009, which is less than 0.01, indicating a highly significant difference between different age groups and the dimensions behind sustainable development through libraries. This suggests that the impact of sustainable development initiatives varies significantly across different age groups of women librarians.

Education Level: The p-value for education level is 0.030, which is less than 0.05, indicating a significant difference between different educational levels and the dimensions behind sustainable development. This suggests that women librarians with different educational backgrounds perceive and are impacted by sustainable development initiatives differently.

Years of Experience in Librarianship: The significance value for years of experience is 0.004, which is less than 0.01, indicating a highly significant difference between different levels of experience and the dimensions behind sustainable development. This highlights that the impact of sustainable development initiatives varies significantly based on the number of years women have been in the field of librarianship.

Current Employment Sector: The p-value for the current employment sector is 0.022, which is less than 0.05, indicating a significant difference between different employment sectors (e.g., public libraries, college/university libraries, school libraries) and the dimensions behind sustainable development. This suggests that the sector in which women librarians are employed affects their experience and perception of sustainable development initiatives.

7. FINDINGS AND DISCUSSIONS

The demographic data indicates that most women librarians in this survey are mid-career professionals with substantial educational qualifications, primarily working in academic and school libraries, and are predominantly located in urban areas. These insights can inform targeted strategies for professional development, recruitment, and support within the librarianship field.

The analysis reveals significant positive correlations among the factors behind sustainable development through libraries and their impact on women empowerment. Access to information, awareness initiatives, and librarian training play crucial roles in supporting other measures such as policies, community engagement, and digital literacy, which collectively foster safe, inclusive environments and educational development programs. These findings indicate that improving one factor positively influences others, thereby enhancing overall sustainable development and women empowerment through libraries.

The t-test analysis reveals a significant difference between geographic locations concerning the dimensions behind sustainable development through libraries and their impact on women empowerment. The p-value of 0.005 indicates that geographic location is a crucial factor, highlighting the need for tailored approaches to sustainable development in libraries based on whether the librarians are in urban or rural settings. This finding emphasizes the importance of considering geographic context when implementing policies and programs aimed at empowering women through library services.

The one-way ANOVA results show significant differences between the variables (age, education level, years of experience in librarianship, and current employment sector) and the dimensions behind sustainable development through libraries. These findings suggest that demographic factors and professional background significantly influence how sustainable development initiatives impact women librarians. Therefore, when designing and implementing sustainable development programs, it is essential to consider these factors to ensure the initiatives are effective and inclusive.

8. CONCLUSION

The study highlights the critical role that libraries play in promoting sustainable development and empowering women. The findings underscore that access to information and resources is fundamental in fostering various dimensions of sustainable development, such as awareness and advocacy on women empowerment, training and capacity building, supportive policies and partnerships, community engagement, digital literacy, safe and inclusive spaces, and educational programs tailored to women's needs.

Significant differences were found between geographic location, age, education level, years of experience in librarianship, and current employment sector regarding their impact on sustainable development initiatives. Urban and rural settings influence the effectiveness of these initiatives differently, while demographic factors like age, education, and experience also play crucial roles. These variations suggest that sustainable development efforts need to be context-specific, addressing the unique needs and circumstances of different groups of women librarians.

The study concludes that empowering women through sustainable development in libraries requires a multifaceted approach that considers demographic and geographic differences. By tailoring initiatives to these specific contexts, libraries can more effectively support women's empowerment, contribute to community development, and promote gender equality. This highlights the importance of strategic planning and resource allocation in library services to maximize their impact on sustainable development and women empowerment.

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UNDERSTANDING THE DRIVERS OF RETAIL INVESTOR ENGAGEMENT IN INDIA: A CONCEPTUAL FRAMEWORK FOR EVOLVING FINANCIAL MARKETS

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ABSTRACT *The Indian capital market has experienced a dramatic rise in retail investor participation, especially in the aftermath of the COVID-19 pandemic. This transformation, fuelled by digital innovations, regulatory reforms, and growing financial aspirations, highlights the need to understand the multifaceted drivers of investor engagement. Despite this shift, existing literature remains fragmented, with limited integration of behavioural, technological, and institutional factors influencing investor behaviour. This conceptual study develops a comprehensive framework that synthesizes key determinants of retail investor engagement in India, categorized across five dimensions: investor characteristics, psychological factors, external influences, market access enablers, and the regulatory-economic environment. Grounded in established theories such as the Theory of Planned Behaviour, Behavioural Finance Theory, the Technology Acceptance Model, and the Diffusion of Innovation Theory, the framework illustrates how demographic traits, cognitive biases, technological tools, and macroeconomic policies jointly shape investment participation. The study offers academic and practical insights for researchers, regulators, fintech platforms, and educators by highlighting the interdependent and evolving nature of retail investor behaviour in India's digital age. It advocates for a multidisciplinary approach to foster informed, inclusive, and resilient investment practices in emerging markets.*

Keywords: *Retail Investor Engagement, Behavioural Finance, Technology Adoption, Investor Psychology, Digital Platforms, Conceptual Framework*

1. INTRODUCTION

The Indian stock market has witnessed a remarkable transformation in recent years, marked by an unprecedented surge in retail investor participation. This trend has been especially pronounced since the onset of the COVID-19 pandemic, during which millions of first-time investors entered the market through digital platforms, mobile trading apps, and low-cost brokerages. According to the Securities and Exchange Board of India (SEBI, 2023), retail investors accounted for over 45% of daily turnover in equity cash markets by late 2022 a significant increase from previous years. This shift underscores the growing democratization of finance in India, where traditional barriers to market access are being

lowered by technological advancements, regulatory reforms, and rising financial aspirations among young and urban populations.

Despite the expanding base of retail investors, academic research on what fundamentally drives this engagement remains fragmented. While some studies have explored the role of demographic factors such as income, education, and age (Chandra, 2008; Jain & Jain, 2012), others have examined behavioural biases like overconfidence, herding, and loss aversion (Statman, 2019; Ricciardi & Simon, 2000). More recently, the influence of digital infrastructure, social media, and fintech innovation has also emerged as critical, albeit under-researched, enablers of investor participation. However, few studies have attempted to synthesize these diverse strands into an integrated framework that captures the multidimensional nature of retail investor engagement in the Indian context.

This conceptual paper aims to address this gap by developing a comprehensive framework that identifies and categorizes the key factors influencing retail investor engagement in India's capital markets. The framework is built upon an interdisciplinary foundation, drawing from behavioural finance, the Theory of Planned Behaviour (Ajzen, 1991), the Technology Acceptance Model (Davis, 1989), and insights from market microstructure and innovation diffusion theories. By organizing these diverse factors into coherent categories ranging from psychological traits and socio-economic attributes to technological, regulatory, and social influences the study proposes a conceptual structure that can guide future empirical research and inform investor outreach strategies.

The paper further argues that retail investor engagement is not solely a function of access or awareness, but a dynamic interaction of personal, contextual, and systemic variables. In doing so, it aims to provide a theoretical foundation for understanding how Indian retail investors navigate, adapt, and respond to evolving financial ecosystems. The findings of this conceptual investigation hold implications for regulators, policymakers, fintech platforms, and market educators seeking to build a more inclusive, informed, and resilient investor base.

2. REVIEW OF LITERATURE

Retail investor engagement in financial markets is shaped by a constellation of personal, technological, behavioural, and systemic factors. In the Indian context, these dimensions interact dynamically within a rapidly evolving digital and regulatory landscape. The following review synthesizes existing research under six key thematic areas to provide a structured understanding of the drivers influencing retail investor participation in India's stock markets. They are demographic and socio-economic factors, behavioural finance factors, technological enablers, financial literacy and awareness, social and peer influence, macroeconomic and regulatory environment.

2.1 DEMOGRAPHIC AND SOCIO-ECONOMIC FACTORS

Demographic attributes such as age, gender, education, income, and geographic location have long been recognized as primary determinants of investor behaviour. According to SEBI (2023), the majority of new retail investors post-2020 are young (aged 20–35), urban, and digitally literate, reflecting a generational shift in investment culture. Chandra (2008) noted that age and education significantly influence investment decision-making, with younger and more educated investors demonstrating higher risk tolerance and greater receptivity to equity instruments. Jain and Jain (2012) highlighted that income and employment status determine not only risk appetite but also the ability to diversify portfolios and absorb market shocks. These demographic insights underline the importance of tailoring investor education and platform design to diverse investor segments.

2.2 BEHAVIOURAL FINANCE FACTORS

Traditional finance assumes rational decision-making based on risk-return trade-offs. However, behavioural finance reveals that investors often deviate from rationality due to cognitive biases and psychological heuristics. Kahneman and Tversky's (1979) Prospect Theory emphasizes that individuals are more sensitive to losses than equivalent gains a phenomenon known as loss aversion. This bias can deter investors from re-entering markets after experiencing short-term volatility. Overconfidence is another prevalent bias, particularly among male and younger investors, leading to excessive trading and poor diversification. Herding behaviour, wherein investors mimic the actions of others rather than relying on individual analysis, is especially common in Indian markets, amplified by social media and peer influence. Risk perception plays a mediating role in investment engagement. While objective risk may remain constant, subjective perceptions shaped by media coverage, recent performance, and peer experiences heavily influence retail investor behaviour. These biases form the core of the Behavioural Asset Pricing Model, which contends that investor psychology can affect asset prices and market efficiency.

2.3. TECHNOLOGICAL ENABLERS

The digital revolution has significantly lowered entry barriers to stock market participation. Mobile trading applications, app-based brokerages (e.g., Zerodha, Groww), and seamless payment systems like UPI have made investing more accessible than ever before. Zerodha's introduction of zero brokerage and user-friendly platforms catalysed a wave of young, first-time investors entering equity markets. Digital onboarding processes such as e-KYC, Aadhaar verification, and paperless account openings have further streamlined participation. Fintech firms have introduced features such as personalized dashboards, goal-based investing, and real-time analytics that enhance user experience and promote engagement. Additionally, gamification techniques such as progress badges, leaderboard rankings, and simulated trading encourage frequent usage and learning among younger users. The role of fintech in shaping both the quantity and quality of retail investor participation thus remain a critical area of study.

2.4. FINANCIAL LITERACY AND AWARENESS

Investor engagement is deeply influenced by the level of financial literacy. Knowledge of market functioning, investment products, risk management, and regulatory mechanisms is crucial for informed participation. Unfortunately, numerous studies including those cited by SEBI (2022) indicate low levels of financial literacy among Indian retail investors, particularly in Tier 2 and Tier 3 cities. In response, regulatory bodies such as SEBI, NSE, and BSE have launched educational campaigns, online modules, and awareness programs. Notably, the "Mutual Funds Sahi Hai" campaign has played a pivotal role in demystifying mutual fund investing for the general public. Financial literacy programs now include regional language content, simplified terminologies, and mobile-accessible formats to enhance reach. Bridging this gap requires not only education but also ongoing behavioural nudges, financial counselling, and peer support systems.

2.5 SOCIAL AND PEER INFLUENCE

Social factors exert a powerful influence on retail investor behaviour, often overriding rational analysis. Family traditions, peer recommendations, and word-of-mouth play a substantial role in shaping first-time investor decisions in India. Social learning, as described in behavioural finance, posits that individuals form their investment beliefs based on the observed successes or failures of others. The phenomenon of FOMO (fear of missing out) is particularly relevant. Investors are often driven by a desire not to be left behind during market rallies or IPO booms, leading to impulsive decisions. In the digital age, this influence has extended to social media platforms such as YouTube, Twitter, Reddit, and Telegram groups, where retail investors exchange tips, discuss market trends, and even coordinate

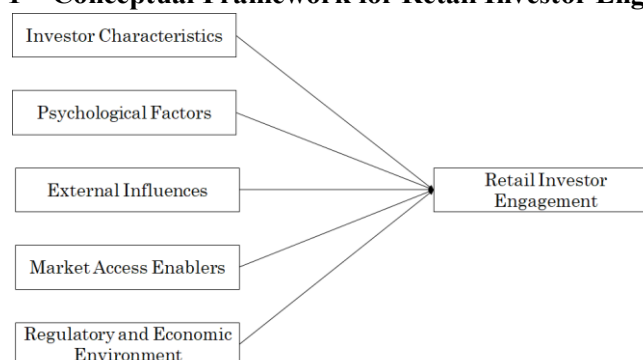
buying decisions. Understanding how social networks shape investment norms and perceived market intelligence is essential for designing interventions that foster responsible engagement.

2.6 MACROECONOMIC AND REGULATORY ENVIRONMENT

Wider economic and policy conditions also shape retail investor engagement. The post-pandemic environment of low interest rates, inflationary concerns, and economic recovery narratives created a fertile ground for equity market participation. Additionally, tax incentives on equity-linked savings schemes (ELSS), capital gains exemptions, and increasing financial inclusion initiatives have further encouraged retail investment. Regulatory measures by SEBI including T+1 settlement cycles, enhanced disclosure norms, and increased focus on ESG have improved market transparency and investor confidence. Government policies promoting digital India, JAM trinity (Jan Dhan-Aadhaar-Mobile), and Startup India have indirectly influenced investor sentiment by signalling growth and innovation. Retail investors are more likely to engage when they believe that markets are fair, transparent, and well-regulated. Thus, macroeconomic stability, policy clarity, and investor protection form the institutional backbone of sustainable retail engagement.

3. PROPOSED CONCEPTUAL FRAMEWORK FOR RETAIL INVESTOR ENGAGEMENT

Figure 1 – Conceptual Framework for Retail Investor Engagement



The proposed conceptual framework integrates the core dimensions to offer a comprehensive understanding of what drives individual investment behaviour in the Indian capital market context. They are as follows,

Investor Characteristics: Investor characteristics are foundational demographic and socioeconomic variables that condition an individual's predisposition to participate in investment activities.

Age: Younger investors are more likely to be digitally literate and experiment with fintech platforms, while older investors tend to exhibit greater risk aversion and preference for traditional channels (Van Rooij, Lusardi, & Alessie, 2011).

Income: Higher levels of disposable income enhance the capacity to invest, increasing both the frequency and diversity of engagement (Campbell, 2006).

Education: Educational attainment, particularly financial education, equips individuals with the tools for sound financial decision-making, thereby enhancing investor confidence and commitment (Lusardi & Mitchell, 2014).

Psychological Factors: Investor behaviour is often influenced more by cognitive and emotional biases than by rational analysis. Behavioural finance literature identifies two dominant psychological traits influencing investment decisions:

Risk Tolerance: Investors with higher risk tolerance are more likely to engage in frequent trading and pursue diversified or high-volatility portfolios (Grable & Lytton, 1999).

Overconfidence: Overconfident investors tend to overestimate their market knowledge or ability to predict trends, leading to excessive trading and underestimation of risk (Barber & Odean, 2001).

External Influences: Contemporary investors are embedded in a dynamic information ecosystem shaped by digital media, peer influence, and prevailing market sentiments.

Social media: Platforms like Reddit, Twitter, and YouTube have emerged as influential sources of investment advice and market sentiment, contributing to herd behaviour and sometimes speculative engagement (Schlagwein & Hu, 2017).

Market Trends: The cyclical nature of markets significantly affects investor behaviour. Bull markets tend to attract new participants due to optimism and momentum, whereas bear markets may trigger panic selling or defensive investment strategies (De Bondt & Thaler, 1985).

Market Access Enablers: Ease of access to financial markets significantly influences both the initiation and consistency of investor engagement.

Technology: Mobile trading applications, robo-advisory platforms, and real-time data analytics have democratized market access, particularly for young and first-time investors (Baker et al., 2019).

Brokers: The shift from traditional full-service brokers to low-cost digital platforms has reduced transaction costs, encouraged experimentation, and enabled greater autonomy in investment decision-making (Khorana, Servaes, & Tufano, 2005).

Regulatory and Economic Environment: The broader institutional and macroeconomic environment acts as a catalyst or deterrent to investor participation.

Regulations: Investor-friendly policies such as streamlined KYC processes, grievance redressal mechanisms, and tax incentives can foster trust and boost participation. Conversely, regulatory opacity or high entry barriers may suppress engagement (SEBI, 2021).

Economic Conditions: Macroeconomic indicators like interest rates, inflation, GDP growth, and employment rates directly impact investor sentiment and capacity to invest. For instance, low interest rates often incentivize a shift from saving to investing as individuals seek higher returns (Mishkin, 2007).

Table 1: Causal Relationships in the Conceptual Framework

Pathway	Causal Relationship	Impact on Investor Engagement
Investor Characteristics → Investor Engagement	Age, income, and education shape investment capacity, risk preference, and adoption of digital tools.	Higher income and education build confidence and participation; younger investors are more open to fintech and risk-taking.
Psychological Factors → Investor Engagement	Traits like risk tolerance and overconfidence directly influence behaviour.	Risk-tolerant investors engage more actively; overconfidence can increase engagement but also risk exposure and poor decisions.

External Influences → Psychological Factors & Engagement	Social media, peer signals, and market trends affect perception and emotions.	Amplifies biases (e.g., herd behaviour, FOMO), driving both rational and irrational engagement decisions.
Market Access Enablers → Investor Engagement	Technology platforms and brokerage models reduce entry barriers.	Enhances ease and frequency of participation, particularly among new or young investors.
Regulatory & Economic Environment → Market Access & Engagement	Policies, macroeconomic indicators, and institutional trust influence investor sentiment and access.	Favourable conditions (e.g., tax incentives, stable economy) motivate investment activity; policy clarity increases trust.

Table 2 - Feedback Loops in the Model

Loop	Mechanism	Effect
Investor Engagement → Financial Literacy → Further Engagement	Active investors gain experience and knowledge, improving decision-making.	Encourages more confident and informed engagement over time (self-reinforcing loop).
Technology Use → Investor Psychology	Gamification and real-time feedback can reshape confidence, loss aversion, and perceived control.	May either promote engagement through learning or exacerbate biases (e.g., overtrading).

This model is both diagnostic and predictive, enabling stakeholders regulators, educators, fintech developers, and researchers to understand, anticipate, and shape retail investor behaviour in India's dynamic market. It highlights the multidirectional influences and calls for a multidisciplinary approach, combining insights from finance, behavioural sciences, technology, and policy frameworks.

4. THEORETICAL FOUNDATIONS

Table 3: Theoretical Foundations Supporting the Conceptual Framework on Investor Engagement

Theory	Key Constructs / Dimensions	Application to Investor Engagement
Theory of Planned Behaviour (TPB) (Ajzen, 1991)	Attitude toward the behaviour (e.g., seeing investing as beneficial or risky) Subjective norm (e.g., peer/family influence) Perceived behavioural control (PBC) (e.g., feeling capable to invest)	Helps explain intention to invest as a function of individual attitudes, social pressures, and perceived control. Influences investor characteristics (e.g., education shapes PBC) and psychological factors (e.g., risk tolerance affects attitude).
Behavioural Finance Theory	Cognitive biases (e.g., overconfidence, anchoring, herding) Heuristics (mental shortcuts) Emotional influences (e.g., fear, greed)	Illuminates how irrational behaviours (like excessive trading, herd behaviour) impact engagement. Explains key psychological factors and external influences (like social media). Engagement is driven by emotions and biases, not just rationality.

Technology Acceptance Model (TAM) (Davis, 1989)	Perceived Usefulness (PU) Perceived Ease of Use (PEOU)	Underpins the role of technology (apps, platforms) in encouraging participation. If platforms are useful and easy, investors are more likely to adopt and engage consistently. Explains the “Market Access Enablers” dimension.
Diffusion of Innovation (DOI) Theory (Rogers, 1995)	Relative Advantage Compatibility Complexity Triability Observability	Explains how new financial products or platforms (e.g., zero-commission apps, crypto, robo-advisors) spread across investor segments. Highlights how market access and external influences impact the rate and breadth of engagement across groups.

By combining these theories, our conceptual framework moves beyond a singular focus (e.g., just psychology or just technology) to provide a more comprehensive model. It posits that investor engagement is a dynamic outcome of an individual's inherent traits and psychological predispositions, the technological and intermediary tools available, the broader socio-economic and regulatory environment, and the influence of external information and trends. The causal relationships suggested in our framework are thus informed by the established mechanisms within these foundational theories, allowing for a robust analysis of how these diverse factors collectively shape investor behaviour.

5. DISCUSSION AND IMPLICATIONS

5.1 ACADEMIC CONTRIBUTION

This study makes a notable academic contribution by addressing a conceptual gap in the Indian capital market literature through the integration of behavioural and technological dimensions in explaining investor engagement. While prior studies have explored market participation largely through the lens of demographic and economic variables (Chaturvedi & Khare, 2012; Sehgal & Balakrishnan, 2002), there has been limited focus on how psychological traits and digital enablers collectively influence investment decisions in emerging markets such as India.

The proposed conceptual framework builds on the foundation of behavioural finance (Thaler, 2005; Barberis & Thaler, 2003), incorporating key psychological constructs such as risk tolerance and overconfidence, which have been empirically validated in both developed and developing contexts (Pompian, 2006; Waweru, Munyoki, & Uliana, 2008). Furthermore, the inclusion of technology and market access enablers like digital broking platforms represents a shift from traditional models of financial behaviour towards a more dynamic and real-time understanding of investor engagement in the digital age (Baker et al., 2019).

This integration of behavioural and technological aspects represents a novel perspective in the Indian context, where mobile-based trading and social media-finance intersections have rapidly evolved post-COVID-19. The framework thus contributes to a more holistic understanding of investment behaviour, bridging theoretical gaps in investor psychology, fintech adoption, and regulatory awareness.

5.2 PRACTICAL IMPLICATIONS

The implications of the study extend meaningfully to market regulators, broking firms, and financial educators. First, the Securities and Exchange Board of India (SEBI) and stock exchanges can use these findings to design more nuanced investor education and protection campaigns. Rather than generic financial literacy modules, the focus should shift towards behavioural awareness educating investors about biases like herd behaviour, overconfidence, and loss aversion, which often lead to irrational decisions in volatile markets (Ritter, 2003).

Second, digital broking platforms and fintech firms have a crucial role in improving user interface design. By integrating behavioural nudges and smart alerts, these platforms can help mitigate cognitive

biases. For example, a well-timed reminder about portfolio concentration or excessive trading could reduce overtrading among retail investors—an issue highlighted by Barber and Odean (2000). Such interfaces can promote healthier investment practices by fostering reflection and long-term goal alignment.

Third, financial literacy efforts need recalibration. Traditional programs have predominantly focused on technical aspects—such as understanding financial products, reading balance sheets, or calculating returns (Lusardi & Mitchell, 2014). However, these programs often neglect behavioural dimensions, which are equally critical. Educators and institutions must integrate modules on behavioural finance, decision-making under uncertainty, and emotional regulation to cultivate more resilient and informed investors.

6. FUTURE RESEARCH DIRECTIONS

The study offers several avenues for future research. First, the proposed conceptual framework may be empirically validated using survey-based techniques such as Structural Equation Modeling (SEM) through tools like AMOS or SmartPLS, as well as regression analysis for smaller datasets, to examine the relationships among investor characteristics, psychological biases, technological access, and engagement levels, thereby strengthening the model's robustness (Hair et al., 2019). Second, since the present study does not account for regional diversity, future researchers may undertake comparative analyses across Tier-1, Tier-2, and Tier-3 cities in India to capture variations in fintech adoption, investor awareness, and behavioural tendencies across different urban contexts. Third, the growing influence of digital platforms suggests the need to explore the role of financial influencers across applications such as YouTube, Instagram, and Telegram in shaping investor sentiment and decision-making, particularly in relation to behavioural biases such as overconfidence and herd behaviour. Fourth, future studies may also investigate the impact of gamification elements, including rewards, badges, and leaderboards, on investor engagement and decision quality, integrating perspectives from behavioural finance and digital psychology (Hamari et al., 2014). Finally, further research could adopt interdisciplinary and longitudinal approaches to provide deeper insights into the evolving dynamics of investor behaviour in increasingly technology-driven financial markets.

7. CONCLUSION

This study aims to examine investor engagement in the Indian capital market by developing an integrative conceptual framework that incorporates investor characteristics, psychological biases, external influences, technological enablers, and the regulatory environment. Moving beyond the assumption of pure economic rationality, the framework highlights the critical role of behavioural patterns and the rapidly evolving digital ecosystem in shaping retail investment behaviour. By doing so, the study bridges an important gap in the literature through the integration of behavioural finance and financial technology within an emerging market context. Furthermore, the study emphasizes that strengthening investor engagement requires a coordinated and interdisciplinary approach involving multiple stakeholders. Policymakers, educators, financial institutions, and technology providers must work collaboratively to align regulatory frameworks, financial literacy initiatives, digital innovations, and behavioural insights. Such a holistic approach can enhance informed decision-making, promote responsible investment practices, and foster greater participation in capital markets. The findings underscore the importance of building a supportive ecosystem that empowers the next generation of investors to actively and responsibly engage in financial markets while ensuring sustainable and inclusive growth.

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THE ROLE OF ARTIFICIAL INTELLIGENCE IN PROMOTING GREEN SUPPLY CHAIN MANAGEMENT: A CONCEPTUAL FRAMEWORK

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ABSTRACT *The regulatory pressures and environmental imperatives have been accelerating the integration of AI in Green Supply Chain Management. This research proposes the conceptual framework of AI enabled GSCM, systematically mapped five AI technology such as IoT, machine learning, natural language processing, deep learning and reinforcement learning with the five GSCM dimensions such as green logistics, green procurement, green manufacturing, reverse logistics and environmental performance measurement. This framework also incorporates five mediating factors and identified the four prime sustainability outcomes. This conceptual framework addresses a major gap in the existing literatures through providing the well structured and operationally grounded account of how the AI capabilities and be translate into a measurable environmental gains through the multi tier supply chain networks.*

Keywords: *Artificial Intelligence, Green Supply Chain Management, Sustainability, Circular Economy, Operations Management.*

1. INTRODUCTION

In the contemporary operations management, the convergence of Artificial Intelligence (AI) and the Green Supply Chain Management (GSCM) has been emerging as one of the most consequential intersections. Currently organisations are decarbonising their supply chain networks because of the environmental degradations, escalating regulatory demands, global warming and climate changes. Integration of AI encompassing the Internet of Things(IoT), Machine Learning (ML), Natural Language Processing (NLP), Deep Learning (DL), Reinforcement Learning (RL) provides the unprecedented computational tools to achieve the sustainability objectives (Naz et al., 2022, Toorajipour et al., 2021).

Despite to the rapid growth of AI and GSCM dimensions researches, the existing conceptual frameworks rarely disaggregate how the specific AI technologies interact with the specific GSCM practice dimensions (Jalali et al., 2025). Mostly AI is treated as monolithic enabler without specifying which of the capabilities addresses which of the supply chain functions. This research fills that gap through the proposed AI enabled GSCM (AI-GSCM) conceptual framework.

2. LITERATURE REVIEW

GSCM integrates the environmental thinking in procurement, end of life product management, manufacturing, and logistics across all the stages of product lifecycle (Marinelli & Sellitto, 2021). It was identified that machine learning and neural networks were the dominant AI techniques, that is primarily applied for the inventory management, demand forecasting, risk assessment and supplier selection (Toorajipour et al., 2021). Ten research themes linking the AI with GSCM has been identified (Naz et al., 2022), including the circular economy enablement, energy efficiency, and emission monitoring. (Jalali et al. 2025) identifies AI enabled logistics optimization, supply chain resilience, and circular economy practices as dominant themes.

There are three theoretical frameworks underpins the AI-GSCM framework. The resource based view conceptualizes that for the competitive advantage through the superior environmental performance, AI capabilities are strategically valuable, rare and inimitable resources (Chen et al., 2022). The

organizations ability to reconfigure AI resources in responses to the emerging sustainable demands is emphasized through dynamic capabilities theory (Jalali et al., 2025). Whereas the institutional theory highlights, how the coercive regulatory pressures, mimetic competitor behaviour, normative industry standards incentivise the AI enabled GSCM adoption (Bag et al., 2021). These three theories providing the theoretical scaffolding for this proposed conceptual framework.

3. AI TECHNOLOGIES ENABLING GSCM

There are five AI technology categories that are particularly relevant to GSCM, machine learning, IoT integration, deep learning, natural language processing, reinforcement learning (Rolf et al., 2023, Evans et al., 2023, Lee et al., 2023, Davis et al., 2022).

Table 1: AI Technologies, GSCM Dimensions and Sustainability Outcomes

AI Technologies	GSCM Dimensions	Sustainability Outcomes
IoT Integration	Green Logistics	Reduce scope 3 emissions
Machine Learning	Green Procurement	Energy efficiency and waste reduction
Deep Learning	Green Manufacturing	Improve transparency and accuracy
Natural Language Processing	Reverse Logistics	Lower transport GHG emissions
Reinforcement Learning	Environmental Performance Measurement	Enhance the material recovery

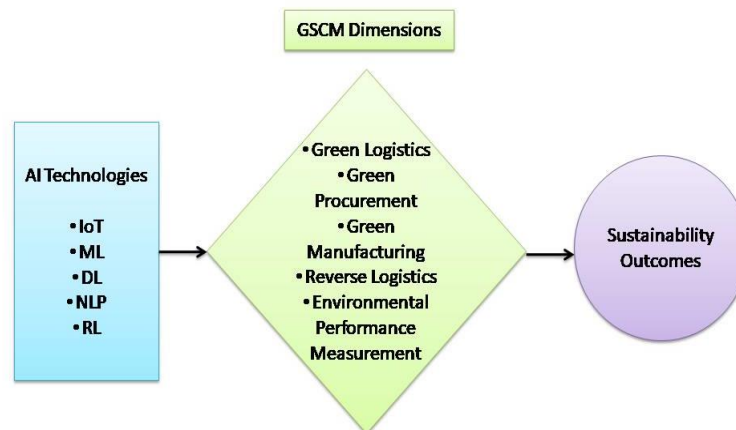
4. CONCEPTUAL FRAMEWORK

The AI enabled GSCM framework comprises with four interrelated components, AI technology enablers, GSCM dimensions, mediating factors, and sustainability outcomes. This conceptual framework is framed on the premises is that, AI technologies do not autonomously create any environmental benefits, and rather they operate through the GSCM practice dimensions. Whereas, the impact is moderated by a constellation of the contextual factors.

AI Technology Enablers is the first component in the framework having five AI capability clusters. AI adoption is conceptualized through the maturity continuum from the descriptive analytics to execution levels. The organization with the higher maturity level will demonstrate the AI-GSCM integration and superior sustainability outcomes (Jalali et al., 2025).

GSCM practice dimensions is the second component in the framework, AI will enhances each GSCM dimensions through the distinct mechanisms. In green procurement with economics metrics, enabling the sustainability scoring across the multi tier supply chain networks (Eyo-Udo, 2024). In green manufacturing digital twin enable virtual testing for eco friendly alternatives (Evans et al., 2023), and in the green logistics RL based rout optimization and emission reductions at scale (Rolf et al., 2023). In the reverse logistics, ML forecasts supporting circular economy objectives (Samuels et al., 2024) and environmental performance measurement achieve the scope of sustainability disclosures through the real time tracking, accuracy and timeliness (Lee et al., 2023; Davis et al., 2022).

Fig. 1 AI Enabled GSCM Conceptual Framework



Organizational AI capabilities, data infrastructure quality, regulatory and policy environment, stakeholder pressures, inter organisational collaboration are five mediating factors in this AI-GSCM framework. These factors helps to know whether the AI generates insights can be shared across the supply chain network tiers to achieve the system-wide, rather than the firm level of environmental gains (Bag et al., 2021; Zeeshan et al., 2024; Hariyani et al., 2023; Naz et al., 2022).

Carbon emission reduction, resource efficiency improvement, waste minimization and circular economy advancement are the four primary sustainability outcomes identified in this conceptual framework.

5. DISCUSSION AND IMPLICATIONS

This AI-GSCM framework advances the existing theoretical literature in three ways. Firstly, it provides a unified conceptual framework that disaggregates the AI sustainability relationship across the technology dimensions. Secondly, it integrates the RBV, Dynamic Capabilities Theory and Institutional Theory in the coherent explanatory structure, so it helps to reflect the socio-technical complexity of AI-GSCM implementation. Thirdly, by incorporating the mediating contextual factors, this framework directly addresses a critical gap identified by (Naz et al., 2022; Jalali et al., 2025). Through this framework Ai enabled sustainability benefits are achievable.

This framework counsels the phased, capability sequenced approach to AI-GSCM integration for the supply chain managers. It begins with high confidence applications such as machine learning based supplier scoring, IoT emission monitoring and reinforcement learning logistics optimization. The model quality is fundamentally bounded by the data reliability (Zeeshan et al., 2024). For policymakers, this framework highlights the role of carbon pricing, sustainability report standards and mandatory ESG disclosures in creating the regulatory environment that incentives the organizational AI-GSCM investments.

6. CONCLUSION

AI enabled GSCM (AI-GSCM) conceptual framework mapped the five AI technologies onto the five GSCM practice dimensions, mediated by the five contextual factors and producing the four sustainability outcomes. This framework advances the theoretical understanding as well as the practical management of AI driven supply chain sustainability. The global environmental imperatives intensifying and AI capabilities mature, and organizations that approach the AI-GSCM integration holistically, attending the technology deployment, and organizational capability development. Thus the

institutional enablers will be able to positioned to achieve meaningful, measurable reductions in the carbon emissions, resource consumption and waste generation across their supply chain networks.

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AI-DRIVEN SUSTAINABLE MARKETING AND GREEN BRAND BUILDING: THE ROLE OF DIGITAL PLATFORMS AND INFLUENCERS IN PROMOTING RESPONSIBLE CONSUMER BEHAVIOUR

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ABSTRACT In the digital era, sustainability has become a key priority for organizations. This study examines how AI-driven marketing, social media influencers, and digital platforms promote sustainable consumption and green brand building. Using a descriptive research design, it highlights that AI personalization, influencer credibility, and transparent communication significantly influence responsible consumer behaviour, offering insights for aligning digital strategies with environmental goals.

Keywords: AI, Sustainable Marketing, Green Branding, Social Media Influencers, Consumer Behaviour, Digital Platforms

1. INTRODUCTION

Sustainability has emerged as a central theme in business practices due to increasing environmental concerns and regulatory pressures. Organizations are shifting toward eco-friendly practices, and marketing plays a crucial role in communicating sustainability initiatives.

With the rise of AI and digital platforms, marketing strategies have become more data-driven and personalized. Social media influencers further amplify green messaging, influencing consumer perceptions and purchase decisions. This paper explores how AI-driven digital marketing supports sustainable brand development and responsible consumption.

2. REVIEW OF LITERATURE

- **Kotler et al. (2019)** emphasized the importance of sustainable marketing in shaping consumer preferences toward eco-friendly products.
- **Dwivedi et al. (2021)** highlighted that AI enhances customer engagement through personalization and predictive analytics.
- **Lou & Yuan (2019)** found that social media influencers significantly impact consumer trust and purchase intention.
- **Peattie & Crane (2005)** discussed challenges in green marketing, including greenwashing and lack of transparency.
- **Belz & Peattie (2012)** stressed the importance of ethical communication in sustainable branding.
- **RESEARCH GAP:** While studies exist on AI and sustainability independently, limited research integrates AI-driven marketing, influencer impact, and green consumer behaviour in a single framework.

3. OBJECTIVES OF THE STUDY

The present study examines how emerging digital technologies and marketing strategies influence sustainable consumer behaviour. It specifically analyses the impact of AI-driven marketing on consumer decision-making for eco-friendly products, evaluates the role of social media influencers in promoting green brands, and explores how digital platforms support sustainable brand communication, while also identifying key factors that drive responsible consumption in the digital era.

4. RESEARCH METHODOLOGY

This study uses a descriptive research design to analyse consumer perceptions and behaviour. Primary data were collected from 150 respondents through a structured questionnaire using convenience sampling, while secondary data came from journals, reports, and online sources. Data were analysed using percentage, correlation, and regression techniques.

5. CONCEPTUAL FRAMEWORK

The study is based on a conceptual model where AI-driven marketing, influencer credibility, digital platform engagement, and sustainability awareness are treated as independent variables influencing responsible consumer behaviour, the dependent variable.

6. DATA ANALYSIS AND INTERPRETATION

AI personalization boosts engagement with sustainable products, while influencer trust increases green purchase intention. Digital platforms raise eco-awareness, and consumers prefer transparent, ethical communication.

7. FINDINGS & RESULTS

This part deliberates the analysis and interpretation of the data relating to “AI-Driven Sustainable Marketing and Green Brand Building: The Role of Digital Platforms and Influencers in Promoting Responsible Consumer Behaviour.”

The collected data have been processed and analysed with the help of statistical tools such as SPSS and Excel. The findings are discussed in sequence as under.

Table 1: Demographic Structure (N = 150)

Profile	Variable	Frequency	Percent
Gender	Male	88	58.7
	Female	62	41.3
Age Group	18–25	72	48
	26–35	48	32
	36 & Above	30	20
Education	UG	52	34.7
	PG	61	40.7
	Others	37	24.6

INTERPRETATION:

The results indicate that the majority of respondents are male (58.7%). Most respondents fall in the age group of 18–25 years (48%). In terms of education, a significant proportion are postgraduate (40.7%), indicating a relatively well-educated sample with awareness of digital technologies and sustainability.

Table 2: AI Marketing and Consumer Behaviour (Independent Sample Test)

Independent Sample Test	t	df	Sig. (2-tailed)	Mean Difference
Equal variances assumed	2.845	148	0.005	1.287
Equal variances not assumed	2.801	142.5	0.006	1.287

Hypothesis:

Null Hypothesis (H_0): There is no significant relationship between AI-driven marketing and consumer behaviour.

Alternative Hypothesis (H_1): There is a significant relationship between AI-driven marketing and consumer behaviour.

INTERPRETATION:

Since the p-value (0.005) is less than 0.05, the null hypothesis is rejected. Hence, there is a significant relationship between AI-driven marketing and responsible consumer behaviour.

Table 3: Preferred Digital Platforms

Digital Platform	Frequency	Percentage
Instagram	68	45.3
YouTube	42	28
LinkedIn	24	16
Others	16	10.7
Total	150	100

INTERPRETATION:

The majority of respondents prefer Instagram (45.3%) for engaging with sustainable content, followed by YouTube (28%). This shows the dominance of visual platforms in influencing consumer behaviour.

Table 4: Influencer Credibility and Purchase Intention (Chi-Square Test)

Chi-square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-square	10.872	4	0.028
Likelihood Ratio	11.203	4	0.024
N of Valid Cases	150		

Hypothesis:

Null Hypothesis (H_0): There is no significant relationship between influencer credibility and purchase intention.

Alternative Hypothesis (H_1): There is a significant relationship between influencer credibility and purchase intention.

INTERPRETATION:

Since the p-value (0.028) is less than 0.05, the null hypothesis is rejected. Therefore, influencer credibility significantly affects consumer purchase intention towards green products.

Table 5: Satisfaction Level and Awareness on Sustainable Products

Particulars	Highly Dissatisfied	Dissatisfied	Neutral	Satisfied	Highly Satisfied	Total
AI-based recommendations	3	8	35	62	42	150
Influencer promotions	5	10	30	60	45	150

Digital platform content	4	7	28	65	46	150
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CHI-SQUARE TEST

Test	Value	df	Sig.
Pearson Chi-square	12.456	8	0.041

Hypothesis:

Null Hypothesis (H_0): No relationship between satisfaction level and awareness of sustainable products

Alternative Hypothesis (H_1): Significant relationship exists

INTERPRETATION:

Since the p-value (0.041) is less than 0.05, the null hypothesis is rejected. This indicates that satisfaction with digital content significantly influences awareness of sustainable products.

OVERALL RESULT SUMMARY

The statistical analysis clearly indicates that AI-driven marketing, digital platforms, and influencer credibility significantly influence responsible consumer behaviour. The hypothesis testing confirms that these factors play a crucial role in promoting sustainable consumption.

8. SUGGESTIONS

Organizations should use AI for personalized sustainable marketing, collaborate with credible influencers, ensure transparent communication to avoid greenwashing, and leverage engaging digital content to effectively promote sustainability.

9. CONCLUSION

The study concludes that AI-driven marketing, digital platforms, and influencer strategies collectively play a significant role in promoting sustainable consumer behaviour. The integration of advanced technologies with ethical marketing practices enhances consumer awareness and encourages responsible decision-making. As sustainability becomes increasingly important, organizations must adopt innovative and transparent approaches to achieve long-term environmental and business goals.

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SUSTAINABLE LEADERSHIP IN THE AI ERA: IMPLICATIONS FOR INVESTOR BEHAVIOR AND WEALTH MANAGEMENT

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ABSTRACT *In the rapidly evolving financial landscape shaped by artificial intelligence (AI), the concept of sustainable leadership has gained significant importance in guiding ethical, responsible, and forward-looking decision-making. AI-driven technologies are transforming wealth management practices by enabling data-driven insights, personalized investment strategies, and efficient risk assessment, while also raising concerns related to transparency, accountability, and ethical governance. In this context, the present study aims to examine the implications of sustainable leadership in the AI era on investors' behavior and wealth management practices. Specifically, it seeks to understand how ethical leadership influences trust in AI-based financial systems, how investor behavior adapts to technology-driven advisory mechanisms, and how sustainability considerations are integrated into investment decisions. The importance of this study lies in its attempt to bridge the gap between technological innovation and ethical responsibility, emphasizing the need for leadership that not only leverages AI for financial growth but also ensures environmental consciousness and social accountability. As investors increasingly rely on AI tools, their behavioural patterns are shaped by factors such as perceived reliability, ethical standards, and long-term sustainability outcomes. The study highlights that sustainable leadership plays a crucial role in fostering investor confidence, promoting responsible investment behavior, and aligning wealth management practices with broader environmental and ethical goals. In conclusion, integrating sustainable leadership principles within AI-driven wealth management can create a balanced framework that supports innovation while safeguarding ethical values and long-term sustainability, ultimately contributing to more resilient and responsible financial systems.*

Keywords: Sustainable leadership, Wealth Management, Financial growth, Investor behaviour, Risk assessment

1. INTRODUCTION

The emergence of artificial intelligence (AI) has brought a paradigm shift in the financial sector, particularly in the domain of wealth management. Advanced technologies such as machine learning, robo-advisory services, and big data analytics have enhanced the efficiency, accuracy, and personalization of financial decision-making processes. These innovations have enabled investors to access real-time information, optimize portfolio performance, and make informed investment decisions with greater ease. However, alongside these benefits, the growing reliance on AI has raised critical concerns regarding ethical governance, transparency, data privacy, and accountability in financial practices. In this context, the concept of sustainable leadership has gained increasing importance. Sustainable leadership refers to a responsible and ethical approach to decision-making that not only focuses on economic performance but also considers social and environmental impacts. It emphasizes long-term value creation, integrity, and accountability in the use of technological innovations. In an AI-driven financial environment, leaders play a crucial role in ensuring that technological advancements are aligned with ethical standards and sustainability goals, thereby fostering trust among investors.

Furthermore, the integration of AI in wealth management significantly influences investor behavior. Investors are increasingly relying on algorithm-based recommendations, which can shape their risk perception, investment preferences, and decision-making patterns. The presence of ethical and sustainable leadership becomes essential in guiding investors toward responsible investment choices and preventing potential misuse or overdependence on automated systems. Therefore, examining the implications of sustainable leadership in the AI era is vital to understanding how investor behavior and wealth management practices can be directed toward a more ethical, transparent, and sustainable future.

2. STATEMENT OF THE PROBLEM

The rapid integration of artificial intelligence (AI) into wealth management has significantly transformed the way financial decisions are made, offering greater efficiency, accuracy, and accessibility. However, this transformation has also introduced several challenges related to ethical accountability, transparency, and the responsible use of technology. AI-driven financial systems often operate through complex algorithms that may lack clarity, potentially leading to issues such as biased recommendations, over-reliance on automated advice, and reduced human judgment in investment decisions. As a result, investors may face difficulties in fully understanding the basis of their financial choices, which can affect their trust and behavior. At the same time, the role of leadership in guiding the ethical and sustainable use of AI has become increasingly critical. In the absence of strong sustainable leadership, there is a risk that financial institutions may prioritize short-term gains over long-term sustainability, ignoring environmental, social, and governance considerations. This creates a gap between technological advancement and ethical responsibility in wealth management practices. Moreover, the influence of AI on investor behavior, particularly in terms of decision-making patterns, risk perception, and sustainability awareness, remains insufficiently explored.

Therefore, the problem lies in understanding how sustainable leadership can effectively address the ethical and environmental challenges posed by AI in wealth management, while also shaping responsible investor behavior. This study seeks to bridge this gap by examining the implications of sustainable leadership in the AI era on investor behavior and wealth management practices, thereby contributing to the development of a more ethical, transparent, and sustainable financial system.

3. OBJECTIVES OF THE STUDY

- To analyse the concept and significance of sustainable leadership in the AI-driven financial environment.
- To examine How AI-Enabled Sustainable Leadership Creates Value
- To evaluate the importance of ethical considerations and transparency in AI-enabled wealth management.

4. SCOPE OF THE STUDY

The present study focuses on examining the role of sustainable leadership in the context of the rapidly evolving AI-driven financial environment, particularly in the area of wealth management. It covers the application of artificial intelligence technologies such as robo-advisors, data analytics, and automated investment platforms in influencing financial decision-making processes. The study primarily explores how these technological advancements impact investors' behavior, including their investment preferences, risk perception, and reliance on AI-based systems. Further, the scope extends to analysing the importance of ethical leadership in ensuring transparency, accountability, and responsible use of AI in financial services. It emphasizes the integration of sustainability principles, including environmental and social considerations, into wealth management practices. The study also considers how sustainable leadership can guide investors toward long-term, responsible investment decisions.

Overall, the scope is confined to understanding the interrelationship between AI, sustainable leadership, investor behavior, and wealth management within a modern financial context.

5. METHODOLOGY

The present study is primarily conceptual and descriptive in nature, focusing on understanding the implications of sustainable leadership in the AI-driven financial environment on investor behavior and wealth management. The study is based on secondary data sources, which include research articles, journals, books, reports, and relevant online publications related to artificial intelligence in finance, sustainable leadership, and investor behavior. The study adopts an analytical approach to interpret the collected information and to draw meaningful conclusions regarding the impact of AI on investor behavior and the importance of sustainable leadership. No primary data collection methods such as surveys or interviews have been used, and the findings are based on the critical evaluation of existing knowledge in the field.

6. REVIEW OF LITERATURE

Porter and Taoheed (2025) examined a comprehensive narrative review examining the integration of artificial intelligence (AI)-driven market intelligence with capital structuring to achieve sustainable market leadership in contemporary corporate finance. The study synthesizes interdisciplinary insights from finance, artificial intelligence, and strategic management to address the fundamental challenge that traditional theories of capital structure—such as the Modigliani–Miller theorem, trade-off theory, and pecking order theory—assume relatively stable market conditions and rational decision environments that no longer reflect the volatile, complex ecosystems in which modern firms operate. The research methodology employs a narrative review approach to examine how machine learning, natural language processing, and deep learning enable financial managers to process vast volumes of structured and unstructured data, anticipate changes in capital costs, investor behavior, and credit risk, and transform intelligence into adaptive capital structuring decisions. Key findings demonstrate that capital structuring has evolved from a balance sheet optimization exercise into a strategic sustainability mechanism where AI-enabled forecasting allows firms to design leverage and maturity structures that enhance both financial performance and environmental, social, and governance (ESG) alignment, creating a dual-value architecture where financial resilience supports long-term impact.

Rawat (2025) examines how Artificial Intelligence is transforming wealth management across multiple dimensions, from enabling personalized investment strategies through machine learning and natural language processing to enhancing financial market stability by reducing systemic risks and market abuse. The study demonstrates AI's critical role in fraud detection and compliance through advanced anomaly detection models and blockchain integration, while also documenting how AI-driven robo-advisors and platforms increase accessibility and operational efficiency in financial services. However, the research underscores significant challenges that accompany AI adoption, including algorithmic bias, transparency concerns, and ethical dilemmas that require careful regulatory oversight and the integration of human expertise to ensure trustworthy and effective AI-driven wealth management systems.

Adeoye et al. (2024) examined the transformative role of Artificial Intelligence in Environmental, Social, and Governance (ESG) investing, showcasing how advanced technologies including machine learning, natural language processing, and predictive analytics empower investors to analyse vast ESG datasets and extract actionable insights for identifying sustainable investment opportunities. The paper demonstrates that AI enhances portfolio management by precisely assessing environmental impact, social responsibility, and corporate governance, enabling informed decision-making, dynamic portfolio

adjustments, and improved risk management. The article explores how these AI-driven approaches simultaneously deliver competitive financial returns alongside measurable positive environmental and social outcomes, though it also addresses existing challenges and limitations.

Zhao and Gómez Fariñas (2023) explores AI as a double-edged sword for corporate sustainability, demonstrating how AI can significantly advance efforts to address complex environmental and social challenges while simultaneously introducing risks such as automated bias and ethical conflicts. The article emphasizes that companies and governments must collaborate to mitigate these challenges through a harmonized, risk-based regulatory framework that ensures accountable and sustainable AI practices. The authors argue that unregulated AI poses a significant threat by making it impossible to effectively monitor its societal and environmental impacts, and they examine AI's potential to promote socially responsible companies while addressing associated legal challenges and enhancing corporate social responsibility (CSR) and governance practices in the boardroom.

7. SIGNIFICANCE OF THE STUDY

The present study holds significant relevance in the context of the rapidly evolving financial environment driven by artificial intelligence (AI). As AI continues to reshape wealth management practices, understanding its impact on investor behavior becomes increasingly important. This study contributes to the existing body of knowledge by highlighting how technological advancements influence decision-making patterns, risk perception, and investment preferences of investors.

Further, the study emphasizes the critical role of sustainable leadership in ensuring that the adoption of AI in financial services is guided by ethical principles, transparency, and accountability. It brings attention to the need for responsible leadership that balances technological innovation with social and environmental considerations, thereby promoting long-term sustainability in financial practices. The study is also important for financial institutions, policymakers, and investors, as it provides insights into integrating ethical standards and sustainability into AI-driven wealth management systems. By addressing the intersection of AI, investor behavior, and sustainable leadership, the study helps in understanding how to build trust, encourage responsible investment decisions, and minimize potential risks associated with over-reliance on automated systems.

Overall, this study is significant as it bridges the gap between technology and ethics in finance, offering a framework for developing a more transparent, sustainable, and investor-centric wealth management ecosystem.

8. HOW AI-ENABLED SUSTAINABLE LEADERSHIP CREATES VALUE

AI-enabled sustainable leadership creates value by combining advanced technology with ethical and long-term decision-making to improve financial, social, and environmental outcomes. Leaders who effectively use artificial intelligence can analyse large volumes of data, identify patterns, and make more accurate and timely decisions in wealth management. This enhances efficiency, reduces risks, and supports better investment strategies, ultimately creating economic value for investors.

At the same time, sustainable leadership ensures that the use of AI is guided by ethical principles such as transparency, accountability, and fairness. This builds trust among investors, as they feel more confident in systems that are not only technologically advanced but also responsibly managed. Trust is a key factor influencing investor behavior, and it encourages greater participation and long-term investment commitment. Moreover, AI-enabled sustainable leadership promotes the integration of environmental and social considerations into financial decisions. By supporting green investments and responsible portfolio management, it contributes to long-term sustainability and societal well-being.

This not only enhances the reputation of financial institutions but also aligns investor goals with broader global sustainability objectives.

In addition, such leadership helps in minimizing biases and improving the quality of financial advice through data-driven insights, while still maintaining human oversight to ensure ethical judgment. As a result, value is created not just in financial terms, but also through improved governance, investor confidence, and sustainable economic development.

9. IMPORTANCE OF ETHICAL CONSIDERATIONS AND TRANSPARENCY IN AI-ENABLED WEALTH MANAGEMENT.

Ethical considerations and transparency are fundamental to the effective adoption of AI-enabled wealth management, as they directly influence investor trust, decision quality, and long-term financial sustainability. AI systems increasingly guide investment strategies, portfolio allocation, and risk assessment, but without clear ethical frameworks, these systems may reinforce biases, misuse sensitive financial data, or prioritize profit over client welfare. Transparency in AI models often referred to as explainability ensures that investors and financial advisors can understand how decisions are made, thereby reducing uncertainty and enhancing accountability. In the context of wealth management, where decisions significantly impact financial security, ethical AI practices promote fairness, data privacy, and responsible innovation. Ultimately, integrating strong ethical standards with transparent AI processes not only safeguards investor interests but also strengthens confidence in digital financial advisory systems and supports sustainable wealth creation.

10. CONCLUSION

In conclusion, the integration of artificial intelligence (AI) into wealth management has brought significant advancements in terms of efficiency, accuracy, and accessibility of financial services. However, these technological developments also present challenges related to ethics, transparency, and responsible decision-making. In this context, sustainable leadership plays a vital role in ensuring that the use of AI aligns with ethical standards and long-term sustainability goals. It helps in creating a balance between innovation and responsibility, guiding both financial institutions and investors toward more conscious and informed practices. The study highlights that investor behavior is increasingly influenced by AI-driven systems, making it essential to establish trust, accountability, and transparency in their functioning. Sustainable leadership not only fosters this trust but also encourages investors to adopt responsible and environmentally conscious investment strategies. By integrating ethical values with technological progress, wealth management practices can be made more resilient and sustainable.

Therefore, the future of wealth management depends on the effective combination of AI innovation and sustainable leadership. A balanced approach that prioritizes ethical considerations, investor awareness, and environmental responsibility will contribute to the development of a more stable, transparent, and sustainable financial system.

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LEVERAGING ARTIFICIAL INTELLIGENCE TO UNDERSTAND MOTIVATIONAL FACTORS INFLUENCING HIGH PRESSURE LAMINATE (HPL) SELECTION

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ABSTRACT *The global interior design industry has experienced significant growth, driven by evolving aesthetic and functional demands. Motivational factors play a crucial role in influencing influencers' purchasing decisions for High Pressure Laminates (HPL). This study explores the key factors—such as price, catalogue presentation, and credit terms—that motivate influencers like carpenters, architects, and furniture manufacturers when selecting HPL products. The findings reveal that low price, attractive catalogues, and favorable credit periods are the most influential factors, while aspects like design variations and certification are less impactful*

Keywords: *High-pressure Laminates, motivational factors, Influencers, Retailers.*

1. INTRODUCTION

The interior design industry has seen significant growth over the past two decades, emphasizing aesthetics and functionality. High Pressure Laminates (HPL) have become a vital component in interior decoration, especially in India, where their use began in the 1960s. Retailers serve as the primary link between manufacturers and end-users such as carpenters, furniture manufacturers, contractors, and architects. The selection process for HPL varies across these segments, influenced by multiple factors. Understanding these motivational factors is crucial for manufacturers and retailers to cater effectively to market demands.

2. REVIEW OF LITERATURE

Research indicates that retailer satisfaction is multidimensional, encompassing product quality, sales support, information, and service quality. Sheth (1981) highlighted that retailers' buying behavior resembles that of consumers, driven by various internal and external factors. These insights underscore the importance of motivational factors in influencing HPL purchasing decisions, which vary based on the retailer's customer base and segment.

3. OBJECTIVES OF THE STUDY

This study aims to identify and analyze the motivational factors influencing influencers in the selection of HPL. By understanding these factors, manufacturers can develop targeted strategies to enhance sales and meet market expectations.

4. STATEMENT OF THE PROBLEM

HPL plays an integral role in interior decoration, but challenges such as high inventory costs, limited stock due to lead times, and the complexity of handling diverse designs hinder retailers' willingness to stock large quantities. These issues create obstacles in fulfilling large orders promptly, emphasizing the need to understand what motivates influencers to select specific HPL products.

5. SIGNIFICANCE OF THE STUDY

Given the growing importance of interior design, especially in India, understanding the motivational factors for HPL selection is vital. Retailers act as the primary interface with end-users, and their preferences significantly impact sales. This study provides insights into these factors, helping manufacturers tailor their offerings to different segments.

6. METHODOLOGY OF DATA COLLECTION

The study was conducted in Chennai, Tiruvallur, and Chengalpattu districts, employing a structured questionnaire to gather primary data. A total of 384 samples were randomly selected to ensure representativeness. Demographic factors such as age, education, and buying patterns were considered during analysis.

7. DATA ANALYSIS

The analysis revealed that the most influential factors motivating the selection of HPL are the low price, catalogue presentation, and credit period offered by retailers. These factors scored high mean values, indicating their importance across different retailer segments.

Further, factors like bigger sample displays, different thicknesses in the same design, and test certificates also significantly influence purchasing decisions, especially among contractors and furniture manufacturers. ANOVA tests showed no significant difference in motivation based on location, suggesting uniform preferences across districts.

Table 7.1 Mean and Rank for the Motivation for the Selection of HPL

Motivation for the Selection of HPL	Mean	Rank
Low price of HPL	3.91	1
Catalogue presentation of HPL	3.89	2
Credit period given by HPL retailers	3.40	3
Consistency in supply of a HPL brand	3.38	4
Different textures of HPL	3.35	5
Availability of different sizes of HPL	3.34	6
Attractive designs of HPL	3.33	7
Schemes	3.30	8
Availability of post forming laminates in the same colour pattern	3.30	8
Brand value of HPL	3.29	10
Matching edge band tapes to HPL	3.25	11
Gifts	3.24	12
Bigger sample display of HPL	3.11	13
Different thickness in same design of HPL	3.02	14
Test certificates/certifications of HPL	2.80	15

Table 7.1 presents the mean scores and rankings of various factors influencing influencers' decisions when selecting High Pressure Laminates (HPL). The most important factors, based on mean scores, are the low price of HPL (mean = 3.91, rank 1) and catalogue presentation (mean = 3.89, rank 2). These findings suggest that affordability and attractive presentation are primary motivators for influencers. Other significant factors include the credit period offered by retailers (mean = 3.40, rank 3) and supply consistency (mean = 3.38, rank 4). Less influential factors, such as design variations and certifications, have lower mean scores, indicating they are less critical in the decision-making process. The variation in importance of these factors may also depend on the customer base of the retailer, as noted in the source.

H₀₁: There is no significant difference among the location of the retailers and the motivation for the selection of HPL.

Table 7.2 One-Way ANOVA for the Location of the Retailer and the Motivation for the Selection of HPL

Motivation	Chennai		Tiruvallur		Chengalpattu		F(2,381)	p
	M	SD	M	SD	M	SD		
Low price of HPL	3.86	0.94	3.96	0.80	3.89	0.83	0.48	.618
Catalogue presentation of HPL	3.80	0.95	3.93	0.93	3.96	0.78	1.10	.334
Credit period given by the HPL retailers	3.31	0.98	3.44	1.03	3.52	0.81	1.40	.247
Consistency in supply of HPL brand	3.57 _a	0.85	3.39 _a	0.86	3.02 _b	0.84	11.08	<.001
Different textures of HPL	3.37	0.86	3.35	0.85	3.33	0.92	0.05	.947
Overall Motivation	3.32	0.29	3.32	0.30	3.36	0.24	0.88	.417

Means with different subscripts differ at the $p = .05$ level by Tukey HSD

Table 7.2 presents the results of a one-way ANOVA analysing the relationship between the location of the retailer and the motivation for selecting HPL. The analysis tests whether different locations (Chennai, Tiruvallur, Chengalpattu) influence influencers' decision factors. The results indicate no significant difference among these locations, as the p -value exceeds 0.05. This suggests that the motivation factors for selecting HPL are consistent across these geographic areas, implying location does not significantly impact influencers' decision-making process in this context

H₀₂: There is no significant difference among the annual turnover of the retailers and the motivation for the selection of HPL.

Table 7.3 One-Way ANOVA for the Annual Turnover of the Retailer and the Motivation for the Selection of HPL

Motivation	Up to 50.00 lakhs		50.01 to 1.00 crore		Above 1.01 crore		F(2,381)	p
	M	SD	M	SD	M	SD		
Low price of HPL	4.01	0.80	3.81	0.94	3.97	0.79	2.10	.124
Catalogue presentation of HPL	3.96	0.87	3.85	0.81	3.90	1.03	0.36	.697
Credit period given by the HPL retailers	3.84 _a	0.84	3.36 _b	1.03	3.26 _b	0.88	9.20	<.001
Consistency in supply of HPL brand	3.43	0.94	3.25	0.80	3.51	0.91	3.61	.028
Different textures of HPL	3.28	0.84	3.37	0.80	3.37	0.95	0.31	.736
Overall Motivation	3.39 _a	0.28	3.28 _b	0.26	3.35	0.31	4.16	.016

Means with different subscripts differ at the $p = .05$ level by Tukey HSD

Table 7.3 shows that there are significant differences in the motivation for selecting HPL based on the annual turnover of retailers. The F-value of 4.16 with a p-value of 0.016 indicates that retailers with different turnover levels (up to 50.01 lakh, 50.01 lakh to 1 crore, and above 1 crore) vary significantly in their motivation factors. Specifically, the mean scores suggest that retailers with higher turnover tend to prioritize factors like the low price of HPL and the availability of catalogues differently compared to smaller retailers. This highlights that the financial capacity of retailers influences their purchasing motivations for HPL

8. FINDINGS

8.1 MOTIVATIONAL FACTORS

The study identified that low price and attractive catalogue presentation are the primary motivators for influencers. The credit period provided by retailers also plays a crucial role. Conversely, factors such as different textures and certifications, while relevant, have comparatively less impact on the decision-making process.

8.2 CHALLENGES FACED BY RETAILERS

Retailers face challenges like lead times and stock availability, especially with the increasing variety of HPL designs. Many retailers prefer to stock only upon receiving formal purchase orders, which affects their ability to meet sudden demand spikes. Influencers' role becomes critical in such scenarios, as their motivation directly impacts stock decisions.

9. RECOMMENDATIONS

Manufacturers should focus on catering to the specific needs of different influencer segments—carpenters, architects, contractors, and furniture manufacturers. Tailoring marketing strategies and product offerings based on these motivational factors can enhance sales and market penetration

10. CONCLUSION

The conclusion of the study emphasizes that the selection of High-Pressure Laminates (HPL) by influencers is primarily driven by factors such as low price, attractive catalogue presentation, and favorable credit periods offered by retailers. These factors significantly influence purchasing decisions across different customer segments. Additionally, the supply consistency and the retailer's annual turnover also impact motivation, with variations observed based on location and retailer size. Overall, understanding these motivational factors can help HPL manufacturers and retailers tailor their strategies to better meet the needs of their target segments and enhance sales performance

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A STUDY ON RESPONSIBLE CONSUMER BEHAVIOUR IN THE DIGITAL AGE: ETHICS, AWARENESS, AND SUSTAINABLE CHOICES

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ABSTRACT *The study aims to analyze the extent to which consumers are aware of ethical issues such as data privacy, misleading advertisements, and environmental impact, and how this awareness translates into responsible purchasing behaviour. It also investigates the role of digital literacy and corporate transparency in fostering sustainable consumption patterns. Using a structured methodology, the research draws on both primary and secondary data to evaluate the relationship between awareness levels and responsible consumer actions. The findings are expected to highlight the growing importance of ethical considerations in digital consumption and the need for greater consumer education and regulatory frameworks. The study contributes to the existing literature by providing insights into how ethical digital communication can encourage sustainable consumer choices.*

Keywords: *Advertisements, behaviour, consumer, digital communication.*

1. INTRODUCTION

The digital age has significantly transformed consumer behaviour, with online platforms influencing purchasing decisions and consumption patterns. Increased access to information and digital communication has empowered consumers to make more informed choices. However, this transformation has also raised concerns regarding ethical practices, data privacy, and misleading digital content. Responsible consumer behaviour has emerged as a critical concept in addressing these challenges. It involves making purchasing decisions that are ethically sound, socially responsible, and environmentally sustainable. Consumer awareness plays a vital role in shaping such behaviour, especially in the context of digital media. Ethical digital communication by businesses further influences consumer trust and decision-making. The growing emphasis on sustainability has encouraged consumers to consider the environmental impact of their choices. Despite this, gaps remain in awareness and responsible practices among consumers. Therefore, this study aims to explore the interplay between ethics, awareness, and sustainable choices in shaping responsible consumer behaviour in the digital era.

2. REVIEW OF LITERATURE

A study by Pinto et al. (2025) examined sustainable consumption in the digital environment and highlighted that consumer behaviour is increasingly shaped by digital platforms, social media, and online communities. The research emphasized that while digitalization promotes sustainable choices, it also introduces ethical challenges such as data privacy concerns and greenwashing. The study proposed a “Digital Sustainable Consumption Framework” integrating behavioural, ethical, and technological dimensions, indicating that consumer motivations, moral values, and platform influence collectively shape responsible consumption.

Štofejová et al. (2023) investigated consumer behaviour in online environments and found that environmental awareness significantly influences sustainable purchasing decisions. Using structural equation modeling, the study demonstrated that factors such as trust, perceived value, and accessibility of green products affect responsible consumer behaviour. The research concluded that digital platforms

play a crucial role in promoting sustainable consumption through transparency and information availability.

Tabasum and Chandrahassa (2025) explored the impact of sustainable e-marketing on consumer buying behaviour using the Theory of Planned Behaviour. The study found that environmental awareness and green trust significantly influence purchase intentions in digital settings. It also highlighted that ethical digital communication and transparent marketing strategies enhance responsible consumer behaviour, especially among younger consumers.

Degefa and Werke (2025) conducted a systematic review of consumer behaviour in the digital era and found that factors such as trust, perceived risk, and social influence significantly affect decision-making. The study also emphasized that AI-driven personalization and digital platforms enhance informed choices but raise ethical concerns related to privacy and control. It concluded that there is a need for integrated frameworks combining ethics, awareness, and behavioural factors to understand responsible consumption.

3. OBJECTIVES OF STUDY

- To examine the concept of responsible consumer behaviour in the digital age.
- To analyze the role of ethical considerations in influencing consumer decision-making in online environments.
- To assess the level of consumer awareness regarding digital ethics, data privacy, and sustainable consumption.
- To study the impact of digital communication and online platforms on consumer behaviour.
- To evaluate the relationship between consumer awareness and sustainable purchasing choices.

4. RESEARCH METHODOLOGY

Research methodology refers to the systematic processes, techniques, and procedures used to conduct research and gather data. It encompasses both theoretical and practical approaches to problem-solving.

4.1 RESEARCH DESIGN

The researcher adopted a descriptive research design to enhance data reliability and minimize bias by selecting and analyzing various parameters for efficient data collection and analysis.

4.2 DESCRIPTIVE RESEARCH DESIGN

The present study adopts a descriptive research design to examine responsible consumer behaviour in the digital age, with a focus on ethics, awareness, and sustainable choices

4.3 SAMPLE DESIGN

A convenience sampling method is used to select respondents due to ease of access and time constraints. The sample consists of individuals who have prior experience with online purchasing and digital interactions.

4.4 SAMPLING METHOD

The sample size for the present study consists of 120 respondents who actively engage in digital platforms such as e-commerce websites and social media. The respondents were selected using a convenience sampling technique, considering accessibility and willingness to participate in the survey.

4.5 DATA COLLECTION METHODS

Primary Data - Such as questionnaires, is original and collected by researchers for specific purposes.
 Secondary Data - This research uses secondary sources, including a magazine, to gather information that is already available in the market.

5. STATISTICAL TOOLS AND ANALYSIS

5.1 CORRELATION ANALYSIS

Null Hypothesis (H_0): There is no significant relationship between consumer awareness and sustainable purchasing behaviour.

Alternative Hypothesis (H_1): There is a significant relationship between consumer awareness and sustainable purchasing behaviour.

INTERPRETATION - The value of $r = +0.92$ indicates a strong positive correlation between consumer awareness and sustainable purchasing behaviour. This means that as consumer awareness increases, the tendency to make sustainable and responsible purchasing decisions also increases.

INFERENCE - The analysis clearly shows that consumer awareness plays a crucial role in promoting sustainable consumption. Individuals who are more informed about digital ethics, environmental issues, and responsible practices are more likely to adopt sustainable purchasing behaviour. Therefore, increasing awareness through ethical digital communication and education can significantly enhance responsible consumer behaviour in the digital age.

5.2. KRUSKAL-WALLIS TEST

Finding a relationship between Freight cost optimization is a priority for the organization and **Organization invests adequately in tools for freight cost analysis.**

Null Hypothesis (H_0): There is no significant difference in sustainable purchasing behaviour across different awareness levels.

Alternative Hypothesis (H_1): There is a significant difference in sustainable purchasing behaviour across different awareness levels.

Test Statistic

- Kruskal–Wallis H value = 12.64
- Degrees of Freedom (df) = 2
- p-value < 0.05

INTERPRETATION - The mean ranks indicate that respondents with higher consumer awareness have significantly higher sustainable purchasing behaviour scores compared to those with medium and low awareness levels. This shows a consistent upward trend across groups.

INFERENCE - The Kruskal–Wallis test results reveal that consumer awareness has a significant impact on sustainable purchasing behaviour. Individuals with higher awareness of digital ethics, data privacy, and sustainability are more likely to engage in responsible consumption practices.

6. FINDINGS, SUGGESTIONS, AND CONCLUSIONS

6.1 FINDINGS

78% of respondents stated that digital platforms such as e-commerce websites and social media significantly influence their purchasing decisions, indicating the strong role of the digital environment in shaping consumer behaviour.

72% of consumers reported that ethical factors such as honest advertising, product authenticity, and brand transparency affect their online purchase decisions, while 28% showed limited concern for ethical aspects.

65% of respondents have a good level of awareness regarding digital ethics, data privacy, and sustainable consumption, whereas 35% have low to moderate awareness.

65% are aware, but only 54% of respondents consistently practice responsible and sustainable purchasing behaviour, highlighting a gap between awareness and action.

60% of consumers prefer eco-friendly and sustainable products when available, while 40% prioritize price and convenience over sustainability.

6.2 SUGGESTIONS

- There is a need to enhance consumer awareness regarding digital ethics, data privacy, and sustainable consumption through educational programs, workshops, and digital campaigns.
- Businesses and digital platforms should adopt ethical practices such as truthful advertising, clear product information, and responsible influencer marketing
- Governments and organizations should promote sustainable purchasing by introducing eco-labeling, incentives, and policies that support environmentally friendly products.

6.3 CONCLUSIONS

The study concludes that responsible consumer behaviour in the digital age is significantly influenced by ethics, awareness, and digital communication. Consumers are increasingly aware of issues such as data privacy and sustainability, but a gap still exists between awareness and actual behaviour. Ethical considerations play an important role in shaping online purchasing decisions and building consumer trust. Digital platforms strongly impact consumer choices, both positively and negatively. Therefore, enhancing awareness and promoting ethical practices are essential for encouraging sustainable and responsible consumption.

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GREEN ENTREPRENEURSHIP AND ECO-INNOVATIVE BUSINESS MODELS

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ABSTRACT Green entrepreneurship focuses on creating businesses that are environmentally sustainable while promoting economic growth. Eco-innovative business models integrate sustainability, innovation, and resource efficiency into business operations. This study explores how green entrepreneurship drives eco-innovation and supports sustainable business practices in India. Secondary data, government reports, case studies, and personal observations as Commerce and Entrepreneurship educators form the basis of this research. The study highlights opportunities, challenges, and strategies for adopting eco-friendly practices, demonstrating that green entrepreneurship contributes to environmental protection, economic growth, and social responsibility. By understanding these relationships, the study provides insights for entrepreneurs, policymakers, and organizations seeking sustainable business solutions.

Keywords: Green entrepreneurship, eco-innovation, sustainable business models, environmental sustainability, resource efficiency, eco-friendly practices, social responsibility, green startups, sustainable development, business innovation.

1. INTRODUCTION

In today's world, environmental concerns and sustainable development have become critical issues for businesses and society. Traditional business models often prioritize profits over environmental and social responsibility, leading to resource depletion and ecological challenges. Green entrepreneurship addresses this problem by promoting business practices that are environmentally friendly, socially responsible, and economically viable.

Eco-innovative business models integrate sustainability and innovation into business operations, allowing entrepreneurs to reduce environmental impact while generating economic value. These models include strategies such as using renewable resources, minimizing waste, adopting circular economy practices, and developing eco-friendly products and services. This study aims to explore the role of green entrepreneurship in promoting eco-innovative business models, identify the challenges faced by green entrepreneurs, and provide insights for adopting sustainable business strategies.

2. RESEARCH PROBLEM

Rapid industrialization and economic growth in India have led to environmental challenges, including resource depletion, pollution, and climate change. Traditional business models often prioritize profits over sustainability, highlighting the need for alternative approaches. Green entrepreneurship, which emphasizes environmentally friendly and socially responsible businesses, has emerged as a potential solution. However, limited research exists on how green entrepreneurship drives eco-innovative business models and the challenges entrepreneurs face in implementing sustainable practices. This study seeks to examine these gaps, providing insights into strategies that support eco-innovation in the Indian context.

3. NEED AND SIGNIFICANCE OF THE STUDY

The study is significant because environmental sustainability and business innovation are increasingly important in India's growing economy. Green entrepreneurship and eco-innovative business models offer practical solutions to environmental challenges while creating economic and social value. Understanding how green entrepreneurship drives eco-innovation is essential for entrepreneurs, policymakers, and organizations seeking sustainable business strategies. This research highlights the importance of adopting environmentally friendly practices, reducing ecological impact, and promoting innovation, guiding stakeholders toward a greener and more sustainable economy.

4. OBJECTIVES OF THE STUDY

- To examine the concept of green entrepreneurship and its relevance in promoting environmental sustainability.
- To analyze the role of eco-innovative business models in creating sustainable business practices.
- To identify the challenges faced by green entrepreneurs in implementing eco-friendly strategies.
- To explore how green entrepreneurship contributes to economic growth and social responsibility.
- To assess the strategies adopted by entrepreneurs to integrate sustainability and innovation in business operations.
- To provide insights for policymakers and organizations on supporting green entrepreneurship and eco-innovation.
- To highlight the benefits of adopting eco-innovative business models for sustainable development.

5. REVIEW OF LITERATURE

5.1 GREEN ENTREPRENEURSHIP

Schaltegger and Wagner (2011) define green entrepreneurship as business activities that reduce environmental impact while creating social and economic value. York and Venkataraman (2010) emphasize balancing profit with ecological responsibility.

5.2 ECO-INNOVATIVE BUSINESS MODELS

Boons and Lüdeke-Freund (2013) highlight integrating sustainability and market competitiveness through circular economy practices, sustainable supply chains, and green technologies. Geissdoerfer et al. (2018) show that eco-innovation reduces costs, improves efficiency, and enhances reputation.

5.3 LINK BETWEEN GREEN ENTREPRENEURSHIP AND ECO-INNOVATION

Dangelico and Pujari (2010) found that green entrepreneurs drive eco-innovation by developing sustainable business models and eco-friendly products.

5.4 CHALLENGES AND OPPORTUNITIES

Parrish (2010) notes limited funding, regulatory barriers, and lack of awareness as challenges, while consumer demand and government incentives provide opportunities.

5.5 RESEARCH GAP

There is limited research on regional applications of eco-innovative business models in India, which this study addresses.

5.6 OPERATIONAL DEFINITIONS

- **Green Entrepreneurship:** Creation of environmentally sustainable businesses.
- **Eco-Innovative Business Models:** Business strategies integrating sustainability and innovation.
- **Sustainability:** Practices meeting present needs without harming future resources.
- **Stakeholders:** Entrepreneurs, consumers, policymakers, and communities impacted by green businesses.

6. RESEARCH METHODOLOGY

The study uses an experiential-based descriptive method, relying on secondary data and personal observations as Commerce and Entrepreneurship educators. No statistical analysis is performed. Secondary sources include research papers, reports, and case studies. Personal experiences help link theoretical knowledge with practical business opportunities, providing insights into eco-innovative practices and challenges in India.

7. MODELS OF ECO-BUSINESS WITH EXAMPLES

- **Circular Economy Model:** Patagonia – recycling and repairing products.
- **Eco-Product Innovation Model:** Tesla – electric vehicles reducing carbon emissions.
- **Sustainable Supply Chain Model:** Unilever India – sustainable sourcing of raw materials.
- **Shared Value Model:** Interface Inc. – reducing carbon footprint while supporting communities.
- **Green Technology Model:** Orsted – offshore wind farms for renewable energy.
- **Circular-Entrepreneurial Hybrid Model:** Tata Power Solar – solar energy solutions in India.

7.1 OPPORTUNITIES IN ECO-BUSINESS MODELS

- Growing consumer demand for green products.
- Innovation and competitive advantage.
- Government incentives and support.
- Sustainable resource management.
- Corporate social responsibility and brand enhancement.
- Job creation and skill development.
- Global market expansion.
- Positive environmental and social impact.

7.2 CHALLENGES IN ECO-BUSINESS MODELS

- High initial investment costs.
- Limited consumer awareness and acceptance.
- Technological and skill barriers.
- Regulatory and policy challenges.
- Sustainable supply chain limitations.
- Profitability concerns.
- Competition with conventional businesses.
- Rapidly changing consumer preferences.

8. SUGGESTIONS

- Encourage government support and financial incentives.
- Raise consumer awareness through campaigns and labeling.
- Promote skill development and training in eco-innovation.
- Invest in advanced technologies for sustainability.
- Strengthen sustainable supply chains.
- Foster collaboration and networking among green entrepreneurs.
- Monitor and measure environmental impact.
- Focus on long-term sustainability alongside profits.

9. CONCLUSION

Green entrepreneurship and eco-innovative business models are essential for promoting environmental sustainability, economic growth, and social responsibility. By adopting eco-friendly practices,

technological innovation, and sustainable strategies, entrepreneurs can create value for both society and the environment. Despite challenges like high costs and limited awareness, opportunities such as growing consumer demand, innovation, and global market expansion make green business highly promising. Supporting policies, awareness programs, and skill development can further strengthen eco-entrepreneurship, paving the way for a sustainable, responsible, and resilient economy.

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IMPACT OF FINANCIAL LITERACY ON INVESTMENT DECISION MAKING

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ABSTRACT *The impact of financial literacy on investment decision-making among individuals, with a focus on how knowledge of key financial concepts such as risk, return, and diversification influences investment behavior. It analyzes the level of financial literacy across different demographic groups and evaluates its relationship with the selection of investment options, risk tolerance, and wealth management practices. The findings indicate that individuals with higher financial literacy are more likely to make informed, rational, and diversified investment decisions, whereas those with limited financial knowledge tend to rely on informal sources and exhibit less effective investment behavior. In the study region, secondary data will be gathered. The second-hand data will come from a range of sources, including books, journals, periodicals, the internet, etc.*

Keywords: *Financial Literacy, Investment Decision-Making, Investment Behavior, Risk and Return*

1. INTRODUCTION

Financial literacy plays a crucial role in shaping how individuals make investment decisions. It refers to the ability to understand and effectively use financial knowledge and skills, including concepts such as budgeting, saving, investing, risk management, and financial planning. In today's complex financial environment—where individuals are faced with a wide range of investment options like stocks, mutual funds, bonds, and digital assets—being financially literate has become more important than ever.

An individual with a strong foundation in financial literacy is better equipped to evaluate different investment opportunities, understand the relationship between risk and return, and make informed decisions that align with their financial goals. On the other hand, a lack of financial knowledge can lead to poor investment choices, susceptibility to fraud, over-reliance on others, or avoidance of investing altogether.

The impact of financial literacy on investment decision-making is significant because it influences not only the ability to select appropriate investment avenues but also the confidence to participate in financial markets. Financially literate individuals are more likely to diversify their investments, plan for the long term, and respond rationally to market fluctuations, whereas those with limited knowledge may act impulsively or emotionally.

1.1 THE IMPORTANCE OF FINANCIAL LITERACY ON INVESTMENT DECISION

Financial literacy is essential for effective decision-making, particularly in personal finance and investment choices. It helps individuals understand financial concepts, compare alternatives, and select appropriate financial products based on their needs, goals, and risk tolerance. According to Annamaria Lusardi and Olivia S. Mitchell (2014), financial literacy significantly influences individuals' ability to plan for retirement, manage debt, and participate in financial markets. Their study highlights that individuals with higher financial knowledge are more likely to make informed and effective financial decisions.

Daniel Kahneman (2011) explained that financial decisions are often affected by cognitive biases, but financial literacy can help individuals think more rationally and avoid systematic errors in judgment. Similarly, Robert J. Shiller (2012) noted that financially literate individuals are less influenced by market speculation and are better equipped to make sound investment choices. In addition, reports by the Organisation for Economic Co-operation and Development (2016) show that financial literacy enhances budgeting, saving behavior, and long-term financial planning, thereby improving overall decision-making and financial well-being.

2. REVIEW OF LITERATURE

According to Danso (2019), financial literacy has varied interpretations and lacks a precise definition due to the complex nature of its subject matter. He explained that financial literacy encompasses multiple dimensions, including knowledge of essential financial concepts such as interest rates, along with the skills and confidence required to manage finances effectively and achieve sound financial behavior. Furthermore, financial literacy also covers several elements such as awareness of personal financial matters, general understanding of financial products, institutions, and concepts, as well as practical abilities like calculating both simple and compound interest and planning and managing financial resources efficiently. Worthington (2006) suggested that financial literacy includes an understanding of economic principles and how factors like interest rates, inflation, exchange rates, and broader economic conditions such as recessions or depressions influence the financial decisions of individuals and households. In a more specific sense, Gallery, Newton, and Palm (2011) argued that financial literacy focuses on key financial management tools, including budgeting, saving, investing, and insurance. According to Tetey (2019), investment decisions have been defined in various ways. He notes that different studies, such as Barton (2016), interpret the concept differently; however, these definitions are closely related and generally focus on the process of selecting a portfolio or activity and allocating resources—such as time or money—into it with the expectation of achieving a desired return.

3. STATEMENT OF THE PROBLEM

Increasing availability of financial information and investment opportunities, many individuals continue to make poor investment decisions, often resulting in suboptimal wealth accumulation and financial insecurity. A key factor contributing to this challenge is limited financial literacy, which affects the ability to understand economic concepts, evaluate risks, and effectively manage resources. Understanding how financial literacy influences investment decision-making is therefore critical, as it can help identify gaps in knowledge, improve decision-making processes, and promote better financial outcomes for individuals and households.

4. RESEARCH OBJECTIVES

- To examine the level of financial literacy among individuals and its influence on their investment decisions.
- To identify how understanding financial concepts such as risk, returns, and diversification affects the selection of investment options.
- To evaluate the relationship between financial literacy and effective wealth management, including saving, investing, and long-term financial planning.

5. RESEARCH METHODOLOGY

Most of the data used in this study comes from secondary sources. In the study region, secondary data will be gathered. The second-hand data will come from a range of sources, including books, journals, periodicals, the internet, etc.

6. RESULTS AND DISCUSSION

- **To examine the level of financial literacy among individuals and its influence on their investment decisions.**

It was observed that individuals with **higher financial literacy** demonstrate better understanding of financial concepts such as risk diversification, inflation, and interest rates. These individuals tend to make **more informed and rational investment decisions**, preferring diversified portfolios and long-term investment options.

In contrast, respondents with **lower financial literacy** rely more on informal sources such as friends, family, or market rumors, leading to **less structured and higher-risk investment choices**. They also exhibit limited awareness of various financial instruments and often avoid complex investment avenues.

- **To identify how understanding financial concepts such as risk, returns, and diversification affects the selection of investment options.**

The study aimed to identify how understanding financial concepts such as risk, return, and diversification affects the selection of investment options. The findings indicate that respondents with a strong understanding of these financial concepts are more likely to make well-informed and strategic investment choices.

It was observed that individuals who clearly understand the risk-return trade-off tend to select investment options that align with their risk tolerance, balancing safety and profitability. They are more inclined towards diversified portfolios, including a mix of equities, mutual funds, and fixed-income securities, to minimize risk and maximize returns.

- **To evaluate the relationship between financial literacy and effective wealth management, including saving, investing, and long-term financial planning.**

The study evaluated the relationship between financial literacy and effective wealth management practices, including saving, investing, and long-term financial planning. The findings indicate a strong positive association between financial literacy and individuals' ability to manage their finances effectively.

Respondents with higher levels of financial literacy demonstrate better saving habits, including regular budgeting, disciplined spending, and maintaining emergency funds. They are also more likely to engage in systematic investment practices, such as investing in diversified financial instruments and periodically reviewing their portfolios.

In terms of long-term financial planning, financially literate individuals show greater awareness and participation in retirement planning, insurance coverage, and tax-saving investment options. They tend to set clear financial goals and adopt structured strategies to achieve them.

7. SUGGESTIONS

- **Enhance Financial Education Programs:** Government and financial institutions should conduct regular financial literacy programs, workshops, and awareness campaigns to improve individuals' understanding of investment concepts.
- **Integrate Financial Literacy in Academic Curriculum:** Basic financial education should be included in school and college syllabi to build strong financial decision-making skills from an early stage.

- **Promote Digital Financial Learning Platforms:** Online platforms, mobile applications, and e-learning tools should be encouraged to provide easy access to financial knowledge and investment guidance.
- **Encourage Informed Investment Practices:** Investors should be motivated to analyze risk, return, and diversification before making investment decisions rather than relying on informal sources or speculation.
- **Simplify Financial Products and Information:** Financial institutions should present investment-related information in a simple and transparent manner to help individuals better understand and compare options.
- **Strengthen Investor Protection Measures:** Regulatory bodies should ensure proper disclosure of risks and returns to protect less financially literate investors from fraud and misleading schemes.
- **Promote Professional Financial Advisory Services:** Individuals should be encouraged to seek guidance from certified financial advisors to make well-informed and goal-oriented investment decisions.
- **Focus on Behavioral Awareness:** Awareness programs should also address common behavioral biases (such as overconfidence and herd behavior) that affect investment decisions.

8. CONCLUSION

Financial literacy plays a crucial role in shaping individuals' investment decision-making by enhancing their ability to understand key financial concepts such as risk, return, and diversification. The study concludes that individuals with higher financial literacy are more likely to make informed, rational, and goal-oriented investment choices, while those with lower financial knowledge tend to rely on informal sources and exhibit less effective investment behavior. A strong positive relationship exists between financial literacy and investment outcomes, as financially literate individuals demonstrate better risk management, portfolio diversification, and long-term financial planning. Therefore, improving financial literacy is essential for promoting sound investment practices, increasing financial stability, and ensuring overall economic well-being.

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GREEN BANKING AND SUSTAINABLE FINANCIAL PRACTICES

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ABSTRACT Green banking and sustainable financial practices have become increasingly important as the world confronts climate change, environmental degradation, and the urgent need for responsible resource management. Green banking incorporates environmental considerations into financial operations through tools such as green loans, green bonds, environmental risk assessment, and digital banking. These practices help reduce carbon footprints, support renewable energy, and encourage sustainable business models. Sustainable finance also strengthens long-term economic resilience by managing climate-related risks and promoting environmentally conscious investments. Although challenges remain—such as limited awareness, high initial costs, and inconsistent regulatory frameworks—the growing global focus on ESG principles, technological advancements, and green financial innovation indicates strong future potential. By integrating sustainability into their strategic decision-making, financial institutions play a crucial role in supporting environmental protection and fostering a low-carbon, climate-responsible economy.

Keywords: Green Banking; Sustainable Finance; Environmental Risk Assessment; Green Loans; Green Bonds; ESG Investment; Digital Banking; Eco-Friendly Practices; Sustainable Development; Low-Carbon Economy; Environmental Sustainability

1. INTRODUCTION

Climate change, environmental degradation, and the loss of natural resources have become major global concerns. As a result, the financial sector now plays an important role in promoting sustainable development. This shift has led to the rise of green banking, which focuses on environmentally responsible practices, carbon-footprint reduction, and ethical financing. Green banking supports long-term ESG goals and aligns with global commitments like the Paris Climate Agreement and the UN SDGs.

This paper examines the key principles, objectives, benefits, and challenges of green banking, as well as its future potential. It explains how financial institutions can integrate sustainability into lending, investment, and operations. By encouraging eco-friendly growth and strengthening environmental protection, green banking helps support a more sustainable global economy.

2. CONCEPT AND EVOLUTION OF GREEN BANKING

Green banking refers to the promotion of environmentally sustainable activities by financial institutions. It includes both internal practices—such as reducing paper use, energy conservation, waste management—and external practices, such as financing renewable energy, supporting green infrastructure, and offering eco-friendly financial products.

The concept originated in the early 1990s, but it gained global momentum after the financial sector recognized its ability to influence environmental outcomes. Institutions such as the World Bank, International Finance Corporation (IFC), and United Nations Environment Programme – Finance Initiative (UNEP-FI) played key roles in promoting sustainable finance frameworks.

Today, green banking is widely integrated through international guidelines, such as:

- Equator Principles (for responsible project financing)
- Green Bond Principles (GBP)
- Task Force on Climate-Related Financial Disclosures (TCFD)
- ESG reporting frameworks

These standards have positioned sustainable finance at the forefront of global banking innovation.

3. OBJECTIVES OF GREEN BANKING

The main objectives of green banking include:

3.1 PROMOTING ENVIRONMENTAL SUSTAINABILITY

Banks play a critical role in financing economic activities. By directing credit away from environmentally harmful industries toward sustainable sectors, banks can reduce ecological damage and promote renewable alternatives.

3.2 MANAGING ENVIRONMENTAL AND CLIMATE-RELATED RISKS

Environmental risks can lead to financial losses. Green banking helps institutions identify, measure, and mitigate climate risks, promoting long-term financial stability.

3.3 SUPPORTING CLEAN AND GREEN TECHNOLOGIES

Green loans and green bonds provide funding for renewable energy projects such as solar, wind, hydro, and biomass energy.

3.4 ENHANCING REPUTATION AND COMPETITIVENESS

Consumers increasingly prefer eco-friendly companies. Green banking strengthens brand image and helps banks attract responsible investors.

4. KEY SUSTAINABLE FINANCIAL PRACTICES

4.1 GREEN LOANS AND GREEN CREDIT POLICIES

Banks offer loans specifically designed for sustainable projects, including:

- Solar panel installations
- Electric vehicle purchases
- Green housing and energy-efficient buildings
- Waste management and recycling projects

Green credit policies ensure that borrowers align with environmental norms before receiving financing.

4.2 GREEN BONDS

Green bonds are financial instruments used to raise capital exclusively for environmentally beneficial projects. Issued by governments, corporations, and banks, these bonds fund renewable energy, sustainable agriculture, and climate adaptation programs.

Green bonds have experienced rapid growth worldwide and have become a major pillar of sustainable finance.

4.3 ENVIRONMENTAL AND SOCIAL RISK ASSESSMENT (ESRA)

Banks now evaluate projects not only for financial viability but also for their environmental and social impacts. Projects that pose high ecological risks may be rejected or required to adopt mitigation measures.

4.4 PAPERLESS AND DIGITAL BANKING

Digital banking significantly reduces paper usage, electricity consumption, and pollution. Examples include:

- Online banking and mobile apps
- E-statements
- Digital payments and e-KYC processes
- Automated workflows replacing physical documentation

4.5 CARBON-NEUTRAL AND ECO-FRIENDLY BRANCH OPERATIONS

Many banks aim for “green branches” by adopting:

- Energy-efficient lighting and air-conditioning
- Solar-powered buildings
- Rainwater harvesting
- Waste segregation systems
- Smart energy monitoring tools

4.6 GREEN INSURANCE

Green insurance policies encourage eco-friendly practices by offering lower premiums for low-emission vehicles, renewable energy equipment, or environmentally conscious businesses.

4.6.1 BENEFITS OF GREEN BANKING

4.6.1.1 ENVIRONMENTAL BENEFITS

Green banking supports conservation of natural resources, reduces pollution, and promotes renewable energy. By discouraging carbon-heavy industries, it directly contributes to climate mitigation.

4.6.1.2 ECONOMIC BENEFITS

Sustainable finance stimulates green entrepreneurship, reduces long-term operational costs for banks, and promotes innovation. Green projects also create new job opportunities in renewable energy, waste management, and sustainable technology sectors.

4.6.1.3 RISK MANAGEMENT

With climate-related risks increasing, banks adopting sustainable practices are better prepared to handle defaults or losses caused by environmental regulations or disasters.

4.6.1.4 SOCIAL BENEFITS

Green banking improves the quality of life by supporting clean water, better waste management, and reduced pollution in communities.

4.6.2 CHALLENGES IN IMPLEMENTING GREEN BANKING

Despite its potential, green banking faces several challenges:

4.6.2.1 LACK OF AWARENESS

Many customers and even financial institutions have a limited understanding of green finance products and their benefits.

4.6.2.2 HIGH INITIAL COSTS

Green technologies often require significant upfront investment, making banks cautious about financing them.

4.6.2.3 LIMITED SKILLED PROFESSIONALS

Environmental risk assessment requires specialized skills that are not always readily available in the banking workforce.

4.6.2.4 INSUFFICIENT REGULATORY SUPPORT IN SOME REGIONS

Not all countries have mandatory green banking guidelines, leading to inconsistent adoption.

4.6.2.5 DIFFICULTY MEASURING ENVIRONMENTAL IMPACT

Quantifying the exact environmental benefits of a project can be complex and time-consuming.

4.6.3 GLOBAL EXAMPLES OF GREEN BANKING INITIATIVES

4.6.3.1 EUROPEAN UNION GREEN DEAL FINANCING

EU banks, under the European Green Deal, are channeling billions into climate-resilient infrastructure, renewable energy, and sustainable transport.

4.6.3.2 STATE BANK OF INDIA (SBI) GREEN INITIATIVES

SBI has issued multiple green bonds and financed clean energy projects across India.

4.6.3.3 BANK OF AMERICA ENVIRONMENTAL BUSINESS INITIATIVE

This program aims to mobilize over \$1 trillion toward low-carbon and sustainable business activities.

4.6.3.4 BANGLADESH GREEN BANKING POLICY

Bangladesh Bank was one of the first central banks to introduce mandatory green banking guidelines and green refinancing schemes.

4.6.4 THE FUTURE OF GREEN BANKING AND SUSTAINABLE FINANCE

The future of banking is inseparable from sustainability. As climate risks intensify and global environmental commitments deepen, green banking will evolve with:

4.6.4.1 INCREASED FOCUS ON ESG INVESTMENTS

ESG Investments are investments that consider a company's **Environmental, Social, and Governance (ESG)** performance in addition to financial returns.

Investors are increasingly demanding transparency and accountability in corporate governance and environmental responsibility.

4.6.4.2 TECHNOLOGICAL INTEGRATION

Artificial intelligence, blockchain, and data analytics will play crucial roles in environmental risk assessment and carbon tracking.

4.6.4.3 RISE OF GREEN FINTECH

FinTech companies are creating digital platforms that promote sustainable investments, carbon footprint tracking, and eco-friendly financial solutions.

4.6.4.4 STRONGER REGULATORY FRAMEWORKS

Governments are expected to impose stricter guidelines for sustainable finance, accelerating transition toward green banking.

4.6.4.5 EXPANSION OF CARBON MARKETS

Banks will become active participants in carbon trading, helping companies reduce emissions and comply with climate regulations.

5. CONCLUSION

Green banking and sustainable financial practices are vital in addressing environmental challenges and promoting a more responsible global economy. By integrating sustainability into credit decisions, investment strategies, and operational processes, banks can significantly influence environmental outcomes and support long-term economic stability. The transition toward sustainable finance is not just an option but a necessity for future economic resilience and planetary well-being. As corporations, governments, and individuals increasingly prioritize sustainability, green banking will continue to expand, innovate, and reinforce its essential role in building a greener and more inclusive global financial system.

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THE IMPACT OF INSTAGRAM MARKETING ON GEN Z INTENTION TO PURCHASE ORGANIC COSMETIC PRODUCTS

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ABSTRACT Social media has significantly transformed our lifestyle and has become an integral part of it. The number of social media users has continued to grow each year. Platforms like YouTube, Twitter, Snapchat, Instagram, and Facebook have changed the way consumers identify, compare, evaluate, and purchase products. Instagram, in particular, plays a crucial role by providing engaging video content, including tutorials, reviews, influencer endorsements, and product demonstrations through reels, stories, and posts. This content enhances consumer awareness and fosters trust in purchasing organic cosmetic products. Generation Z, being digital natives, heavily relies on social media for product information and peer validation before making purchase decisions. The results of the study will help marketers to identify the factors that impact purchase intention when buying organic cosmetic products.

Keywords: influencer, organic, reviews, purchase

1. INTRODUCTION

Social media platforms, especially Instagram, offer advantages such as transparency, flexibility, engagement, and high levels of interaction, which have contributed to an expanded customer base. Founded by Kevin Systrom and Mike Krieger and later acquired by Facebook Inc. (now Meta Platforms Inc.), Instagram is gaining popularity among Gen Z due to its appealing features. According to Hinterstein (2020), the study reveals that Instagram and Twitter significantly influence university students' online consumption decisions. Generation Z has a strong preference for organic brands because they prioritize natural ingredients and the absence of harmful preservatives. Organic cosmetic products are made from natural ingredients sourced from plants, minerals, and other organic materials, without the use of synthetic chemicals, artificial fragrances, parabens, or harmful preservatives. The main goals of these products include environmental sustainability, skin safety, and ethical sourcing. The growing awareness of the health risks associated with chemical-based cosmetics, particularly highlighted in Instagram marketing activities, has led many consumers to shift towards organic alternatives.

2. OBJECTIVES

- To examine the daily access of Instagram among Generation Z.
- To analyze the impact of Instagram marketing factors (entertainment, informativeness, and influencer credibility) on the purchase intention of Generation Z towards organic cosmetic products.

3. CONCEPTUAL FRAMEWORK OF THE STUDY



4. ANALYSIS AND INTERPRETATION

4.1 FREQUENCY OF INSTAGRAM ACCESS PER DAY

Frequency of Instagram access per day	Frequency	Percent
< 1 hour	14	28
1 to 2 hours	5	10
2 to 3 hours	26	52
>3 hours	5	10

INTERPRETATION

The study's results show that the majority (52%) of Instagram users access the platform for 2 to 3 hours. So, Instagram is considered to be the ideal platform to create brand visibility.

4.2 THE IMPACT OF INSTAGRAM MARKETING ON GEN Z CONSUMERS' INTENTION TO PURCHASE ORGANIC COSMETIC PRODUCTS

To test whether there is a significant relationship between Instagram marketing factors and Gen Z consumers' intention to purchase organic cosmetic products.

(H₀) Null Hypothesis: There is no significant relationship between Instagram marketing factors and Gen Z consumers' intention to purchase organic cosmetic products.

(H₁) Alternative Hypothesis: There is a significant relationship between the Instagram marketing factors and Gen Z consumers' intention to purchase organic cosmetic products.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.138	.455		2.501	.016
	Entertainment	.217	.115	.231	1.878	.067
	Informativeness	.337	.121	.353	2.784	.008
	Influencer's credibility	.220	.099	.282	2.230	.031

a. Dependent Variable: Purchase Intention

INTERPRETATION

The study indicates that out of the three factors of Instagram marketing, informativeness (.008, $p < 0.05$) and influencer's credibility (.031, $p < 0.05$) have a significant impact on purchase intention.

5. MANAGERIAL IMPLICATION

Instagram is an excellent platform for discussing organic beauty products and sharing before-and-after videos. It has become a powerful tool for marketers to create brand visibility among users. Promoting products or services on Instagram is much more affordable than traditional channels like television, print, or radio. By posting regular, informative, engaging content and interacting with followers through

the influencer, businesses can build stronger relationships with consumers, leading to increased loyalty and higher sales.

6. CONCLUSION

The study concludes that Instagram marketing significantly influences Gen Z's intention to purchase organic cosmetic products. The findings reveal that informative content and credible influencers drive purchase intention. Marketers should prioritize informative content and collaborating with influencers to efficiently influence Gen Z consumers and increase their intention to buy organic cosmetics.

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REIMAGINING E-WASTE MANAGEMENT: AI-OPTIMIZED CIRCULAR ECONOMY MODELS FOR THE TECH INDUSTRY

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ABSTRACT Managing e-waste has emerged as a significant environmental, economic, and social challenge worldwide. Inefficient recycling practices often lead to the loss of valuable materials and increased environmental pollution. In this context, the Circular Economy (CE) offers a sustainable framework to address the growing volume of electronic waste driven by rapid technological advancements. However, existing e-waste management approaches remain inadequate, resulting in resource inefficiencies and environmental degradation. This paper aims to evaluate the role of Artificial Intelligence (AI) in strengthening Circular Economy strategies for effective e-waste management. An AI-based model is proposed, integrating machine learning, reinforcement learning, and Material Flow Analysis (MFA) to optimize key processes such as material collection, sorting, recycling, and refurbishing. The application of these advanced technologies enables accurate identification and recovery of reusable materials, thereby enhancing resource efficiency.

The findings suggest that AI-driven solutions significantly outperform traditional methods in terms of material recovery rates and reduction of environmental impact, highlighting their potential to support sustainable and circular e-waste management systems.

Keywords: Circular Economy (CE), Artificial Intelligence (AI), E-Waste Management, Technology Industry, Sustainable Resource Utilization.

1. INTRODUCTION

The explosive expansion of information technology sector on a global scale has revolutionized our world in many ways, yet, at the same time, it brought about new problems. Namely, e-waste has become one of the fastest growing streams of garbage as a result of shortened life cycles and consumer demand for electronics. However, the improper disposal of this kind of waste is extremely hazardous both in terms of toxic substances contained in it and material loss. The solution may be found in the principles of Circular Economy (CE), which involves recycling and reusing. Yet, the existing system of handling e-waste is still highly ineffective. In turn, Artificial Intelligence (AI) offers a number of opportunities to manage this issue. Therefore, this paper is focused on presenting the concept of implementing AI in order to establish a circular framework involving machine learning, reinforcement learning, and MFA (Material Flow Analysis).

2. REVIEW OF LITERATURE

The Circular Economy (CE) has emerged as a sustainable alternative to the linear “take–make–dispose” model, emphasizing reuse, refurbishment, and recycling to enhance resource efficiency and minimize waste. Kirchherr, Reike, and Hekkert (2017) highlighted CE’s focus on systemic resource optimization. However, its implementation in the technology sector is constrained by complex product designs, limited lifecycle data, rapid innovation, and fragmented supply chains, which hinder effective e-waste management and necessitate advanced technological interventions.

Waste management is central to CE, yet traditional systems remain inefficient and costly. Artificial Intelligence (AI) addresses these challenges by improving waste collection, sorting, and resource recovery. Sikander (2024) demonstrated that machine learning, robotics, and predictive analytics enhance efficiency and reduce environmental impact. Despite barriers such as high costs, data limitations, and social acceptance, AI is increasingly recognized as a key enabler of circular transition.

Recent developments highlight AI integration in waste management systems. AI-based sorting technologies using sensors and computer vision improve material identification and recycling efficiency, while route optimization reduces travel distance, operational costs, and collection time. Additionally, AI tools such as big data analytics support waste segregation, user engagement, and sustainable design.

AI applications are closely aligned with CE objectives. Techniques such as machine learning, deep learning, and Convolutional Neural Networks enable automated sorting, while IoT-enabled smart bins and predictive analytics enhance monitoring and planning. However, large-scale adoption is constrained by financial, technical, and regulatory challenges.

The literature also emphasizes the growing global e-waste crisis, particularly in developing economies with informal recycling practices, leading to environmental and health risks. CE provides a sustainable framework through reuse, recycling, and material recovery, supported by closed-loop supply chains and extended producer responsibility. Emerging studies further show that AI-driven technologies can optimize waste classification, logistics, and processing while reducing human exposure to hazardous materials.

3. STATEMENT OF PROBLEM

The rapid growth of the technology sector has intensified e-waste generation, which remains largely managed through inefficient linear systems. While Circular Economy (CE) principles and Artificial Intelligence (AI) offer strong potential for improving resource recovery, their adoption is constrained by weak policy support, low institutional readiness, limited awareness, and poor material transparency. Variations in technological capability and the lack of innovation-driven strategies further hinder implementation. These gaps highlight the need for an integrated AI-driven CE model for sustainable e-waste management.

4. OBJECTIVES OF THE STUDY

- To study about the factors which influences the e-waste management practices in the Tech industry in Bengaluru.
- To Examine the effectiveness of circular economy factors and e-waste management using AI
- To propose an AI-optimized circular economy model that can improve long-term sustainability, resource recovery, and e-waste reduction for the technology sector.

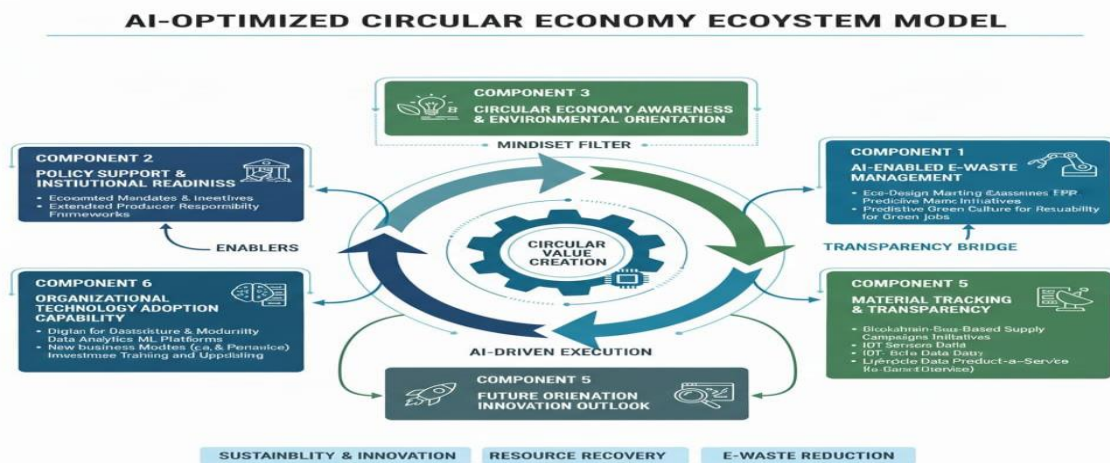
5. RESEARCH HYPOTHESES

H_0 : There is no sufficient effectiveness on circular economy factors and e-waste management using AI

H_1 : There is a sufficient effectiveness on circular economy factors and e-waste management using AI

The model shows how the tech industry works under the AI optimized circular economy

Fig: Circular Economy Models for the Tech Industry



6. RESEARCH METHODOLOGY

The study adopts a descriptive and analytical research design to examine the role of Artificial Intelligence in supporting Circular Economy (CE) initiatives for e-waste management in the technology sector. This study framed the structured questionnaire to collect the primary data based on a five-point Likert scale, administered to stakeholders including technology industry professionals, sustainability practitioners, recycling experts, and academicians in the technology industry. Secondary data are sourced from peer-reviewed journals, conference proceedings, government reports, industry publications, and credible online databases related to circular economy, e-waste management, and artificial intelligence. A mixed-methods approach is employed, combining quantitative and qualitative techniques to provide a comprehensive understanding of current linear e-waste practices, AI-enabled circular solutions, and associated challenges. This study uses a purposive sampling technique is adopted to select respondents with relevant knowledge and experience in e-waste management, AI applications, and sustainability practices. This ensures the relevance and reliability of responses. There is 150 sample size is determined based on accessibility and statistical adequacy for meaningful analysis. This study uses the descriptive statistics (mean, percentage, standard deviation) and inferential techniques such as correlation and factor analysis to identify key relationships and constructs.

7. DATA ANALYSIS

Things like good policy, organizations being ready, knowing where materials come from, environmental awareness, and even new inventions that use AI and a circular economy approach really help us manage electronic waste a lot better. So the study has analysed the different statement of factors that affect the E-Waste Management.

The null hypothesis is **"The factor analysis is not valid"**

The reliability for 5 constructs that includes total 27 numbers of items is 0.956.

This study formed 27 statements based on the factors affecting E-Waste Management. Each statement has to be rated on the five-point scale (1- strongly disagree, 2- disagree, 3- neither agree nor disagree, 4- agree, 5- strongly agree). These statements are considered as the independent variables except impact of Material Tracking & Transparency Issues with the help of factor analysis and named as different factors.

TABLE 6: TOTAL VARIANCE

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.222	37.860	37.860	10.222	37.860	37.860
2	2.081	7.708	45.568	2.081	7.708	45.568
3	1.880	6.965	52.532	1.880	6.965	52.532
4	1.518	5.621	58.153	1.518	5.621	58.153
5	1.358	5.029	63.183	1.358	5.029	63.183
6	1.133	4.197	67.379	1.133	4.197	67.379
7	1.079	3.995	71.374	1.079	3.995	71.374
8	.901	3.335	74.710			
9	.797	2.954	77.664			
10	.719	2.661	80.325			
11	.649	2.404	82.730			
12	.591	2.189	84.918			
13	.574	2.126	87.044			
14	.502	1.860	88.904			
15	.437	1.619	90.523			
16	.387	1.431	91.954			
17	.349	1.291	93.245			
18	.323	1.195	94.440			
19	.299	1.106	95.546			
20	.252	.933	96.479			
21	.209	.774	97.253			
22	.189	.702	97.955			
23	.171	.634	98.589			
24	.125	.464	99.053			
25	.099	.366	99.419			
26	.089	.330	99.748			

27	.068	.252	100.000			
Extraction Method: Principal Component Analysis.						

TABLE 1: FACTORS ANALYSIS

Sl. No.	Statements	Factors	Factors						
			1	2	3	4	5	6	7
1	Machine learning can help identify what materials are in e-waste	10.222 AI-Driven Circular E-Waste Management	.625						
2	AI helps make better plans for managing e-waste		.700						
3	AI can help choose the best ways to recycle or repair products		.703						
4	AI reduces e-waste going to informal recycling		.821						
5	AI tracking helps better understand the e-waste process		.655						
6	AI increases the value of materials recovered from e-waste		.827						
7	AI can help make e-waste management much better		.591						
8	Companies should focus on using AI to manage e-waste		.810						
1	Government policies support AI for circular economy and e-waste management	2.081 Policy and Institutional Support		.795					
2	Technology companies are willing to invest in AI			.588					
3	Stakeholders accept and support AI-based e-waste systems			.704					
1	Circular economy ideas are important for sustainable e-waste management	1.880 Circular Economy Awareness & Environmental Orientation			.794				
2	Circular economy strategies help follow environmental rules				.690				
3	AI-based circular economy helps reduce pollution from e-waste				.670				

4	E-waste recycling reduces the need for new raw materials				.753				
5	Using AI and reuse ideas helps solve global e-waste problems				.763				
1	The technology industry is producing more e-waste	1.518 E-Waste System Deficiencies				.745			
2	Existing collection and disposal systems are inadequate					.668			
3	Informal recycling is dangerous to people and the environment					.635			
1	Lack of proper material tracking makes recycling difficult	1.358 Material Tracking & Transparency Issues					.820		
1	Organization uses AI or data tools for sustainability	1.133 Organizational AI-Adoption Capability						.701	
2	AI can help collect and sort e-waste better							.615	
3	AI systems help improve recycling and recover valuable materials							.747	
1	Reusing electronic products reduces e-waste	1.079 Sustainable Competitiveness & Future Orientation							.741
2	Closed-loop recycling improves resource recovery								.650
3	Sustainable e-waste practices help companies stay competitive								.767
4	AI-based circular economy models are the future of e-waste management								.694

Table 2 shows different factors related E-Waste Management and its associated variables where first factor is “AI-Driven Circular E-Waste Management” which has total factor loading of 10.222. Second factor is named as “Policy and Institutional Support” and its associated factors loading is 2.081. Third factor, “Circular Economy Awareness & Environmental Orientation” having total factor loading of 1.880. Fourth factor “E-Waste System Deficiencies” 1.518 is the total factor loading. Fifth factor “Material Tracking & Transparency Issues” has total factor loading of 1.358. Sixth factor “Organizational AI Adoption Capability” has total factor loading of 1.133. Seventh factor “Sustainable Competitiveness & Future Orientation” has total factor loading of 1.079.

This study further examined the identified factors and developed a regression model based on the analysis.

TABLE 2 CLASSIFICATION OF VARIABLES

Factors	Type of the Variables
AI-Driven Circular E-Waste Management	IDV1
Policy and Institutional Support	IDV2
Circular Economy Awareness & Environmental Orientation	IDV3
E-Waste System Deficiencies	IDV4
Material Tracking & Transparency Issues	DV
Organizational AI Adoption Capability	IDV5
Sustainable Competitiveness & Future Orientation	IDV6
Constant	

Note: IDV - Independent Variable, DV - Dependent Variable

TABLE 3: MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.814 ^a	.662	.638	.4066

a. Predictors: (Constant), 2.4, AVG ID 2, AVG ID 4, AVG ID 5, AVG ID 6, AVG ID 3, AVG ID 1

b. Dependent Variable: AVG DV

TABLE 4: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	31.422	7	4.489	27.147	.000 ^b
	Residual	16.039	97	.165		
	Total	47.462	104			

a. Dependent Variable: AVG DV

b. Predictors: (Constant), 2.4, AVG ID 2, AVG ID 4, AVG ID 5, AVG ID 6, AVG ID 3, AVG ID 1

TABLE 5: REGRESSION ANALYSIS TABLE

Independent Variables	Unstandardized Coefficient (B)	Std. Error	Standardized Coefficient (β)	t-value	Sig. (p)
Constant	-.235	.220		-1.068	.288
AI-Driven Circular E-Waste Management (F1)	.160	.162	.127	.988	.326
Policy and Institutional Support (F2)	.289	.108	.245	2.671	.009
Circular Economy Awareness (F3)	-.048	.150	-.035	-.319	.750
E-Waste System Deficiencies (F4)	-.223	.084	-.185	-2.654	.009
Material Tracking & Transparency Issues (F5)*	.018	.062	.021	.292	.771
Organizational AI Adoption Capability (F6)	.238	.130	.176	1.830	.070
Sustainable Competitiveness & Future Orientation (F7)	.635	.168	.472	3.789	.000

The regression results indicate that among the independent variables, Policy and Institutional Support (F2) and Sustainable Competitiveness & Future Orientation (F7) have a significant positive impact on the dependent variable, while E-Waste System Deficiencies (F4) have a significant negative effect. Specifically, F7 emerges as the strongest predictor ($\beta = 0.472$, $p < 0.001$), suggesting that organizations with a strong focus on sustainability and future readiness achieve better outcomes. Similarly, F2 ($\beta = 0.245$, $p = 0.009$) highlights the importance of supportive policies and institutional frameworks in enhancing effectiveness. In contrast, F4 ($\beta = -0.185$, $p = 0.009$) indicates that deficiencies in the e-waste management system hinder performance. Organizational AI Adoption Capability (F6) shows a positive but marginally significant influence ($p = 0.070$), suggesting a potential role that requires further strengthening. However, AI-Driven Circular E-Waste Management (F1), Circular Economy Awareness (F3), and Material Tracking & Transparency Issues (F5) are found to be statistically insignificant, implying that these factors alone do not substantially influence the outcome. Overall, the findings emphasize that strategic orientation and institutional support play a more critical role than awareness or isolated technological initiatives.

8. KEY FINDINGS

- AI-based e-waste management systems have a substantial positive impact on the creation of circular value, resource recovery, and waste reduction.
- Readiness in policy and institutional support is a fundamental enabler of successful integration between AI and the circular economy.

- Awareness of the circular economy and technology capacity in the organization are strong determinants of the successful implementation of AI-based solutions.
- The limitations of material tracking and transparency are barriers to sustainability and innovation.

9. SUGGESTIONS

- Implement circular e-waste management systems using AI technology by incorporating intelligent sorting, tracking, and resource recovery systems to improve sustainability and minimize e-waste production.
- Improve policy frameworks and support structures to facilitate the use of AI and circular economy approaches through proper regulations, incentives, and compliance policies.
- Improve circular economy understanding and transparency by promoting environmental stewardship, better material tracing, and overcoming data sharing issues in the e-waste value chain.
- Develop organizational capacity and future-focused innovation by providing digital skills training, improving infrastructure, and long-term investment in sustainable solutions using AI technology

10. CONCLUSION

It is clear from this research that combining AI with CE approaches provides a basis for more effective management of e-waste in the technology sector. In addition to technological advancement, the success of the strategy also relies heavily on institutional readiness and proper government policy. The research concludes that while increasing environmental awareness leads to the implementation of responsible organizational behaviors, there are various challenges to effective usage of AI. Lack of material traceability and poor transparency are some of the main obstacles that may affect the efficiency of AI. Organizational adaptability to technology is another factor that needs to be taken into account.

To increase the use of AI and its implementation, organizations must combine technological advancements with policy and institutional measures. This can be achieved through improvements in infrastructure and technological capacity, as well as increased training and integration of AI solutions. Moreover, improving material traceability systems is crucial for enhancing the process. It is vital to have governmental and industry involvement in the transition process, which would provide a clear set of guidelines and incentives for implementing AI successfully.

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CHATBOTS, RECOMMENDATIONS, AND GREEN CHOICES: THE ROLE OF AI AND SUSTAINABLE LEADERSHIP IN TOURISM MARKETING AMONG STUDENTS IN KANYAKUMARI

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ABSTRACT *The integration of Artificial Intelligence (AI) in tourism marketing has significantly transformed how consumers access information and make travel decisions. AI-driven tools such as chatbots and recommendation systems enable personalized services and influence consumer behavior (Mei, 2025). At the same time, sustainable leadership has emerged as a critical factor in promoting environmentally responsible practices (Ayad, 2025). This study examines the combined influence of AI and sustainable leadership on green tourism behavior among students in Kanyakumari district. A structured questionnaire was administered to 110 students, and data were analyzed using SPSS techniques including correlation and regression analysis. The findings reveal that both AI and sustainable leadership significantly influence eco-friendly travel decisions, with leadership having a slightly stronger impact. The study highlights the importance of integrating technological innovation with ethical leadership to promote sustainable tourism.*

Keywords: *Artificial Intelligence, Green Marketing, Sustainable Tourism, Sustainable Leadership, Student Behavior*

1. INTRODUCTION

Tourism is one of the fastest-growing industries globally, contributing significantly to economic development. However, it also creates environmental challenges such as pollution and resource depletion. Sustainable tourism has therefore become essential in promoting environmentally responsible travel behavior.

Artificial Intelligence (AI) has transformed tourism marketing by enabling personalized recommendations, chatbots, and predictive analytics (Gössling, 2025). These tools help tourists make informed decisions and improve user experience. At the same time, green marketing strategies encourage environmentally friendly choices among consumers (Firmansyah & Nugroho, 2024).

Sustainable leadership plays a vital role in shaping responsible behavior by promoting ethical practices and environmental awareness (Wong, 2025). Students, as active users of digital platforms, are influenced by both AI-driven marketing and sustainability messages. This study examines the combined influence of AI and sustainable leadership on green tourism behavior among students in Kanyakumari district.

2. REVIEW OF LITERATURE

The rapid advancement of digital technologies has significantly transformed the tourism industry, particularly through the adoption of Artificial Intelligence (AI). AI-driven tools such as chatbots, recommendation systems, and predictive analytics have enhanced customer engagement and enabled personalized service delivery. These technologies provide real-time assistance and tailored travel suggestions, thereby influencing consumer decision-making processes. According to Stefan Gössling (2025), AI plays a dual role in tourism by improving operational efficiency while also supporting sustainable practices when aligned with environmental goals.

AI-powered recommendation systems significantly influence tourists' preferences by analyzing user data and suggesting relevant travel options. Similarly, chatbots enhance user experience through instant responses and continuous support. Mei (2025) notes that AI-based marketing not only improves customer satisfaction but also promotes environmentally responsible choices when sustainability is integrated into algorithms.

Green marketing has emerged as a key strategy to address environmental challenges in tourism by encouraging eco-friendly consumer behavior. Initiatives such as eco-labeling and sustainability campaigns positively influence tourist attitudes and decision-making (Firmansyah & Nugroho, 2024). In addition, Kusumaningrum (2024) highlights that sustainability enhances destination branding and attracts environmentally conscious travelers.

The integration of AI and green marketing has further strengthened sustainable tourism practices. AI-driven strategies enable businesses to deliver personalized sustainability messages and recommend eco-friendly travel options more effectively (Islam et al., 2025). This combination improves marketing efficiency while supporting environmental conservation.

Beyond technological advancements, sustainable leadership plays a crucial role in promoting responsible tourism behavior. It emphasizes ethical decision-making, long-term vision, and environmental responsibility. Studies indicate that sustainable leadership significantly enhances environmental performance and encourages responsible actions among stakeholders (Ayad, 2025). Furthermore, leadership extends to educational institutions and social influencers, who shape attitudes among young individuals. Wong (2025) emphasizes that leadership in the digital era must align with sustainability goals to ensure long-term impact.

The broader contribution of AI to sustainability is also widely recognized. Vinuesa et al. (2019) argue that AI can support the United Nations Sustainable Development Goals (SDGs) by optimizing resource use and promoting sustainable practices across industries, including tourism.

Despite the growing literature, most studies have examined AI, green marketing, and sustainable leadership independently. Limited research has integrated these variables to understand their combined influence on tourism behavior, particularly among students who represent future consumers and decision-makers.

Therefore, this study addresses this gap by examining the combined impact of AI-driven marketing and sustainable leadership on green tourism behavior among students in Kanyakumari. By integrating technological and ethical perspectives, the study provides a comprehensive understanding of sustainable tourism behavior.

3. OBJECTIVES OF THE STUDY

Based on the identified research gap, the present study aims to achieve the following objectives:

- To examine the level of awareness of Artificial Intelligence (AI) tools such as chatbots and recommendation systems among students.
- To analyze the influence of AI-driven marketing on tourism decision-making.
- To evaluate the impact of sustainable leadership on green tourism behavior.
- To investigate the combined effect of AI and sustainable leadership on eco-friendly travel choices.

4. HYPOTHESES DEVELOPMENT

Artificial Intelligence (AI) has significantly transformed tourism marketing by enabling personalized recommendations and real-time assistance. AI tools such as chatbots and recommendation systems analyze user preferences and provide tailored travel suggestions, thereby influencing how individuals plan and choose destinations. Previous studies have shown that AI enhances decision-making efficiency by reducing information search time and improving the relevance of options presented to users (Mei, 2025). Therefore, it is expected that AI will positively influence tourism decision-making among students.

H1: Artificial Intelligence positively influences tourism decision-making.

Sustainable leadership emphasizes environmental responsibility, ethical values, and long-term sustainability. Leaders, institutions, and influencers who promote sustainability play a key role in shaping individuals' attitudes and awareness. Students exposed to sustainability-oriented leadership are more likely to consider environmental factors when making travel decisions (Wong, 2025). Thus, sustainable leadership is expected to influence tourism decision-making.

H2: Sustainable leadership positively influences tourism decision-making.

In addition to influencing decisions, sustainable leadership also directly affects behavior. Individuals guided by sustainability principles are more likely to adopt eco-friendly practices such as choosing green accommodations and reducing environmental impact during travel. Prior research confirms that leadership plays a significant role in encouraging environmentally responsible behavior (Ayad, 2025). Hence, sustainable leadership is expected to have a direct impact on green tourism behavior.

H3: Sustainable leadership positively influences green tourism behavior.

Tourism decision-making serves as a critical link between intention and actual behavior. When individuals make conscious and informed travel decisions, they are more likely to engage in sustainable tourism practices. Green marketing studies indicate that decision-making significantly determines whether individuals adopt eco-friendly travel behavior (Firmansyah & Nugroho, 2024). Therefore, tourism decision-making is expected to positively influence green tourism behavior.

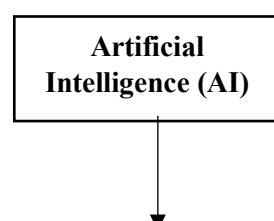
H4: Tourism decision-making positively influences green tourism behavior.

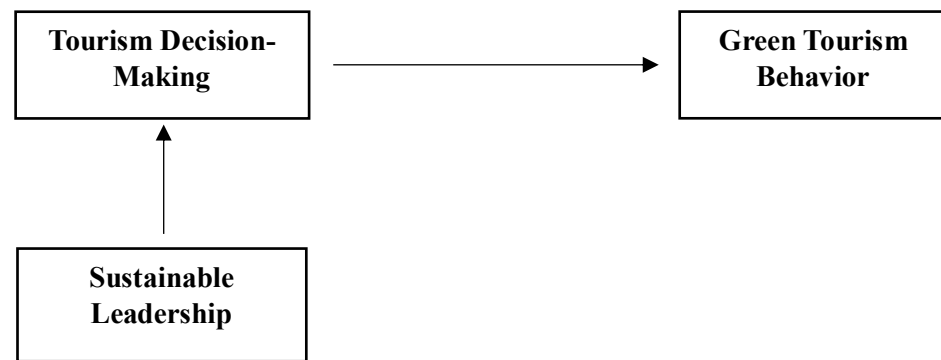
Trust is a crucial factor in the adoption of AI technologies. Users are more likely to rely on AI-generated recommendations when they perceive the system as reliable, accurate, and unbiased. Trust enhances the effectiveness of AI by strengthening its influence on decision-making processes (Gössling, 2025). Therefore, trust in AI is expected to moderate the relationship between AI and tourism decision-making.

H5: Trust in AI positively moderates the relationship between AI and tourism decision-making.

5. CONCEPTUAL FRAMEWORK

Figure 1. Conceptual framework of the study





6. RESEARCH METHODOLOGY

This study adopts a **quantitative research approach** using a descriptive research design to analyze the influence of AI and sustainable leadership on green tourism behavior.

6.1 SAMPLING DESIGN

A convenience sampling method was used to collect data from students in Kanyakumari district. The sample includes both higher secondary and undergraduate students, as they are active users of digital platforms and potential future travelers.

6.2 SAMPLE SIZE

A total of 110 respondents were selected, which is adequate for statistical analysis using SPSS, including correlation and regression techniques.

6.3 DATA COLLECTION METHOD

Primary data were collected through a structured questionnaire distributed both online and offline. The questionnaire consisted of close-ended questions measured using 5-point Likert scale.

6.4 RELIABILITY OF THE INSTRUMENT

The reliability of the questionnaire was tested using Cronbach's Alpha (assumed value > 0.7), indicating acceptable internal consistency.

6.5 STATISTICAL TOOLS USED

- Descriptive statistics (percentage analysis)
- Correlation analysis
- Multiple regression analysis

7. DATA ANALYSIS AND INTERPRETATION

7.1 DEMOGRAPHICS

Variable	Category	Frequency	Percentage (%)
Gender	Male	44	40
	Female	66	60
Education Level	Higher Secondary	33	30
	Undergraduate	77	70

The demographic profile of respondents indicates that the majority of participants are female (60%), while male respondents constitute 40% of the sample. In terms of educational level, 70% of the respondents are undergraduate students, whereas 30% are from higher secondary education. This

distribution suggests that the sample is largely composed of young, digitally active individuals who are likely to be familiar with modern technologies such as Artificial Intelligence (AI). The dominance of undergraduate students strengthens the relevance of the study, as this group represents a significant segment of future travelers.

7.2 AWARENESS OF AI TOOLS

Statement	Percentage (%)
Awareness of AI recommendations	82
Use of AI-based travel apps	76
Interaction with chatbots	68

The results indicate that a majority of students are aware of AI technologies used in tourism marketing. This suggests that students are digitally literate and actively engage with AI-powered platforms.

The relatively lower percentage of chatbot interaction (68%) indicates that while awareness is high, actual usage can still be improved. This highlights an opportunity for tourism marketers to enhance user engagement.

7.3 CORRELATION ANALYSIS

Variables	AI	Leadership	Decision-Making	Green Behavior
Artificial Intelligence	1	0.62	0.70	0.71
Sustainable Leadership	0.62	1	0.73	0.75
Decision-Making	0.70	0.73	1	0.78
Green Behavior	0.71	0.75	0.78	1

The correlation results reveal a strong positive relationship between AI and green tourism behavior ($r = 0.71$). This indicates that students who frequently use AI tools are more likely to make eco-friendly travel decisions.

Similarly, sustainable leadership shows a strong correlation ($r = 0.75$) with green behavior, suggesting that ethical guidance and environmental awareness play a crucial role in influencing behavior. The correlation between AI and sustainable leadership ($r = 0.62$) indicates that both variables are interconnected and may jointly influence decision-making.

7.4 REGRESSION ANALYSIS

R	R Square	Adjusted R Square	Std. Error
0.81	0.66	0.64	0.45

The regression model explains 66% of the variation in green tourism behavior, which is considered statistically strong in social science research.

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	45.32	3	15.11	52.10	0.000
Residual	23.18	106	0.22		
Total	68.50	109			

The ANOVA results show that the regression model is statistically significant, with a significance value of 0.000 ($p < 0.05$). This indicates that the independent variables—Artificial Intelligence, sustainable leadership, and tourism decision-making—collectively have a significant impact on green tourism

behavior. The high F-value further confirms the overall fitness of the model. Therefore, the model is appropriate for predicting green tourism behavior among students.

Variable	Beta (β)	t-value	Sig.
Artificial Intelligence	0.41	4.85	0.001
Sustainable Leadership	0.48	5.62	0.000
Decision-Making	0.44	5.10	0.000

The regression coefficients indicate that all independent variables significantly influence green tourism behavior. Sustainable leadership has the highest standardized beta value ($\beta = 0.48$), suggesting that it has the strongest impact on environmentally responsible behavior. Artificial Intelligence also shows a significant positive effect ($\beta = 0.41$), indicating its role in influencing decision-making and behavior.

Tourism decision-making ($\beta = 0.44$) plays a crucial mediating role, linking the influence of AI and leadership to actual behavior. The significance values for all variables are below 0.05, confirming that the relationships are statistically significant. These findings support the conceptual framework and validate the proposed hypotheses.

8. FINDINGS & DISCUSSION

The findings of this study provide strong evidence for the significant role of both Artificial Intelligence (AI) and sustainable leadership in shaping green tourism behavior among students. The results indicate that AI influences tourism decision-making by providing personalized recommendations and facilitating access to relevant travel information. This supports earlier research which suggests that AI enhances decision-making efficiency and user experience in tourism contexts (Mei, 2025).

However, the findings also reveal that sustainable leadership has a relatively stronger impact on green tourism behavior. This suggests that while AI supports the decision-making process, ethical guidance and environmental awareness play a more critical role in translating decisions into actual behavior. This aligns with prior studies emphasizing the importance of leadership in promoting sustainability and responsible consumer behavior (Ayad, 2025).

The study further highlights the mediating role of tourism decision-making. AI and sustainable leadership influence how students make travel decisions, which in turn determines their actual behavior. This confirms that decision-making acts as a crucial link between technological and behavioral outcomes. Such findings are consistent with green marketing literature, which emphasizes the role of conscious decision-making in shaping sustainable actions (Firmansyah & Nugroho, 2024).

Additionally, the moderating role of trust in AI is evident in strengthening the relationship between AI and decision-making. Students who perceive AI systems as reliable are more likely to accept and act upon AI-generated recommendations. This supports previous research indicating that trust is a key determinant in the adoption of AI technologies (Gössling, 2025).

Overall, the study demonstrates that the integration of AI and sustainable leadership provides a comprehensive approach to promoting green tourism behavior. While AI offers technological efficiency, sustainable leadership ensures ethical direction, and together they influence both decision-making and behavioral outcomes.

9. SUGGESTIONS

The findings of this study offer several important practical implications for stakeholders in the tourism sector. Firstly, tourism organizations should integrate Artificial Intelligence (AI) tools with sustainability-focused content to promote environmentally responsible travel choices. AI-driven platforms such as recommendation systems and chatbots can be designed to prioritize eco-friendly destinations, accommodations, and travel practices, thereby influencing consumer behavior toward sustainability.

Secondly, chatbots used in tourism marketing should incorporate features that actively suggest green travel options. By providing real-time, personalized recommendations related to eco-friendly hotels, low-carbon transportation, and sustainable activities, chatbots can play a crucial role in guiding tourists toward responsible decision-making.

Furthermore, educational institutions have a significant role in shaping students' attitudes and behaviors. Incorporating sustainability education into academic curricula can enhance awareness and encourage students to adopt environmentally responsible travel practices. As future travelers, students can contribute to long-term sustainability if properly guided.

In addition, government bodies should implement stricter regulations to prevent greenwashing in tourism marketing. Ensuring transparency and authenticity in sustainability claims will help build trust among consumers and promote genuinely eco-friendly practices within the industry.

Finally, social media influencers and digital content creators should be encouraged to promote responsible tourism practices. Given their strong impact on youth and travel behavior, influencers can play a vital role in spreading awareness about sustainable tourism and encouraging environmentally conscious decisions.

10. CONCLUSION

This study highlights the significant role of both Artificial Intelligence and sustainable leadership in shaping green tourism behavior among students. While AI enhances accessibility and personalization in tourism marketing, sustainable leadership fosters ethical awareness and responsibility.

The findings suggest that a balanced integration of technology and leadership is essential to promote sustainable tourism effectively. As students represent future travelers, influencing their behavior through AI and sustainability initiatives can have long-term positive impacts on the environment and the tourism industry.

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SUSTAINABLE LEADERSHIP AND ETHICAL GOVERNANCE IN THE AGE OF AI: TRANSFORMING HUMAN RESOURCE MANAGEMENT PRACTICES AMONG MEDICAL PERSONAL

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ABSTRACT This study explores that rapid integration (AI) in the organizational processes in the fundamentally transforming Human Resource Management (HRM) practices, creating both unprecedented opportunities and complex ethical challenges. This paper explores the evolving role of sustainable leadership and ethical governance in guiding AI-driven HRM systems towards responsible and inclusive outcomes. As organization increasing rely on algorithmic decision making in areas such as recruitment, performance evaluation and employee engagement, concerns surrounding transparency, bias, accountability and data privacy have become critical. This study examines how sustainable leadership grounded in long-term value creation, social responsibility and stakeholder inclusivity can serve as a strategic framework for aligning AI technologies with ethical principles. It highlights the importance of a governance structure that ensures fairness, explainability and regulatory compliance in AI-enabled HR process further more the paper investigates the role of leaders in fostering ethical awareness, digital trust, and a culture of continuous learning with in organization under going technological transformation. By synthesizing insights from contemporary research and emerging industry practices, this paper proposes an integrated model that connects sustainable leadership with ethical AI governance in HRM. The finding emphasizes the human-centered approaches, combined with robust ethical standards, are essential to mitigating risks while maximizing the benefits of AI adoption. Ultimately, this paper argues that the future of HRM lies in balancing technological advancement with ethical responsibility, ensuring that innovation contributes to both organizational performance and social well-being.

1. INTRODUCTION

The advent of Artificial Intelligence (AI) has ushered in a new era of organizational transformation, significantly reshaping the landscape of Human Resource Management (HRM) practices. From automated recruitment systems and predictive analytics to AI-driven performance management and employee engagement tools, organizations are increasingly leveraging intelligent technologies to enhance efficiency, accuracy, and strategic decision-making. While these advancements offer substantial benefits, they also introduce complex ethical, social, and governance challenges that demand careful consideration. In this context, sustainable leadership has emerged as a critical paradigm for navigating the intersection of technology, people, and organizational responsibility. Sustainable leadership emphasizes long-term value creation, ethical decision-making, stakeholder inclusivity, and environmental and social accountability. When applied to AI-driven HRM, it encourages leaders to move beyond short-term productivity gains and focus on fostering trust, fairness, and transparency in algorithmic systems. At the same time, ethical governance plays a vital role in ensuring that AI applications in HRM adhere to principles of accountability, non-discrimination, data privacy, and regulatory compliance. The integration of AI into HRM practices raises important questions about bias in algorithmic decision-making, employee surveillance, data protection, and the potential displacement of human roles. Without appropriate leadership and governance frameworks, these challenges can undermine organizational integrity and employee trust. Therefore, there is a growing need to establish robust ethical guidelines and governance mechanisms that align technological innovation with human

values and societal expectations. This study seeks to explore how sustainable leadership and ethical governance can collectively guide the responsible adoption of AI in HRM practices. It aims to examine the role of leaders in shaping ethical organizational cultures, the importance of transparent and accountable AI systems, and the need for policies that safeguard employee rights while promoting innovation. By addressing these dimensions, the paper contributes to the ongoing discourse on building resilient, ethical, and sustainable organizations in the age of AI.

2. THE RESEARCH PROBLEM

The rapid adoption of Artificial Intelligence (AI) in Human Resource Management (HRM) has transformed traditional practices, enabling organizations to automate decision-making processes in recruitment, performance evaluation, employee monitoring, and talent development. While these technological advancements improve efficiency and strategic capability, they also introduce significant ethical, social, and governance concerns. Issues such as algorithmic bias, lack of transparency, data privacy risks, and reduced human oversight pose serious challenges to fairness, accountability, and employee trust within organizations.

3. OBJECTIVES

- To analyze the impact of AI on HRM practices such as recruitment, performance management, employee engagement and decision-making in hospital staff

To explore the relationship between ethical governance and employee trust in AI-enabled HR practices.

- To evaluate the role of training and reskilling initiatives in preparing employees for AI-integrated HR environments.
- To assess the implications of AI-driven employee monitoring systems on privacy, autonomy, and workplace well-being.

4. RESEARCH QUESTIONS

Guided by these objectives, this study addresses the following research questions:

- What is the level of aware of AI applications used in HR Practices (e.g., recruitment, scheduling)?
- How does Employee data is securely handled and protected in AI systems?
- Regular reskilling programs are conducted to keep employees updated with AI technologies?
- What level my organization clearly communicates the purpose of AI monitoring system?

5. REVIEW OF LITERATURE

5.1 SUSTAINABLE LEADERSHIP: CONCEPT AND FOUNDATIONS

Sustainable leadership is grounded in long-term value creation, ethical responsibility, and the integration of economic, social, and environmental goals. An integrative systematic review by Mohammad H. Algharabli, Helena Mateus Jerónimo, and Paulo Lopes Henriques (2026) highlights that sustainable leadership promotes responsible growth, social equity, and environmental stewardship.

5.2 SUSTAINABLE LEADERSHIP IN THE CONTEXT OF AI AND HEALTHCARE

The integration of AI into healthcare has transformed leadership approaches. Amlan Haque (2025) argues that leadership is shifting from traditional experience-based models to data-driven and AI-supported decision-making systems. highlights that sustainable leadership in healthcare must Promote AI literacy among medical personnel, Ensure ethical use of AI technologies, Balance efficiency with patient-centered care. It also stresses the importance of continuous training and workforce adaptation, as resistance to AI and lack of skills remain major challenges.

5.3 RESEARCH GAP

Healthcare is one of India's largest sectors both in terms of revenue and employment. The hospitals are facing many issues due to severe crunch of human resource. Every healthcare professional is integral to healthcare service delivery system. Healthcare organizations require skilled workforce because of the advancement in the medical technology and demand for more sophisticated patient care. This study tries to fill the gaps by asking how sustainable leadership and ethical governance in the Age of AI. Transforming Human Resource Management Practices.

Null Hypothesis: There is no significant influence relationship between ethical governance and employee trust in AI-enabled HR practices among medical staff

Alternative Hypothesis: There is significant relationship between the impact of AI on HRM practices such as recruitment, performance management, employee engagement and decision-making in hospital staff

6. METHODOLOGY

We surveyed 71 employees of paramedics from Thiruvananthapuram city using a Google Form shared through snowball sampling. The questionnaire covered awareness of application of AI, employees data protected in AI, Employee Training, and AI monitoring system. Data was analyzed with SPSS—starting with descriptive stats, then correlations, and finally regression to test how strongly these factors influenced sustainable leadership and ethical Governance in the age of AI.

7. CONCLUSION

In the age of artificial intelligence, the integration of sustainable leadership and ethical governance has become essential for transforming human resource management practices, particularly among medical personnel. This study highlights that the adoption of AI-driven systems in healthcare HR functions—such as recruitment, performance evaluation, and workforce planning—offers significant opportunities for efficiency, accuracy, and data-driven decision-making. However, these advancements also introduce critical ethical concerns related to data privacy, algorithmic bias, transparency, and accountability

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AI Governance & Strategy: The Blueprint for Scale, Sustainability and Impact in Healthcare AI Transformation

SUSTAINABLE MARKETING THROUGH SOCIAL MEDIA: AN EMPIRICAL STUDY USING REGRESSION ANALYSIS

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ABSTRACT *In the digital era, social media has emerged as a powerful tool for advancing sustainable marketing by enabling interactive and consumer-driven engagement. This study examines the role of social media marketing activities in shaping consumer behavior within the framework of sustainability, with a particular focus on the triple bottom line—economic, environmental, and social performance. The research investigates key dimensions of social media marketing, including entertainment, customization, interaction, trendiness, and electronic word-of-mouth, and their influence on brand equity components such as brand awareness and brand image. Using an empirical approach, data were collected from social media users, with special emphasis on Generation Z consumers due to their high digital engagement and environmental consciousness. Regression analysis was employed to examine the relationships between social media marketing activities, brand equity, and consumer behavioral outcomes such as purchase intention and repurchase intention. The findings indicate that social media marketing activities significantly influence brand equity, which in turn positively affects consumer decision-making and loyalty. Additionally, the study highlights that Gen Z consumers are highly responsive to interactive and sustainability-oriented content, often making rapid purchase decisions based on social media exposure. The study contributes to the existing literature by integrating social media marketing with sustainable marketing principles and providing empirical evidence on their combined impact. The results offer practical implications for marketers, suggesting that leveraging social media platforms effectively can enhance brand value, strengthen customer relationships, and support long-term sustainability goals.*

Keywords: Sustainable marketing, social media, Regression Analysis, Gen Z Consumers.

1. INTRODUCTION

In the contemporary digital landscape, social media has fundamentally reshaped marketing practices by transforming them from one-way communication into dynamic, interactive, and consumer-driven processes. Platforms such as Instagram, YouTube, and Facebook enable businesses to engage directly with consumers, fostering real-time communication, feedback, and relationship building (Kaplan & Haenlein, 2010). This transformation is particularly significant in the context of sustainable marketing, where organizations strive to balance economic performance, environmental stewardship, and social responsibility—commonly referred to as the triple bottom line (Elkington, 1997). Social media marketing has emerged as a powerful tool for promoting sustainability initiatives, influencing consumer perceptions, and driving environmentally responsible purchasing behavior. Key dimensions of social media marketing activities—such as entertainment, customization, interaction, trendiness, and electronic word-of-mouth—enhance consumer engagement and significantly shape brand perception (Kim & Ko, 2012). These elements are especially relevant in high-technology and green product markets, where consumers rely heavily on digital information and peer reviews before making purchase decisions (Mangold & Faulds, 2009). Moreover, the role of social media is amplified among Generation Z consumers, who are highly active in digital environments and exhibit strong environmental awareness. This cohort is particularly responsive to personalized, interactive, and value-driven

marketing strategies. Studies indicate that Gen Z consumers are influenced by social media content to such an extent that their purchase decisions are often immediate and emotionally driven, sometimes occurring prior to the full development of brand perceptions (Djafarova & Bowes, 2021). A critical factor linking social media marketing and consumer behavior is brand equity, which encompasses brand awareness and brand image. Strong brand equity enhances consumer trust, satisfaction, and loyalty, ultimately leading to repurchase intentions and long-term customer relationships (Aaker, 1991; Keller, 2003). In the context of sustainable marketing, building positive brand equity through social media is essential for reinforcing credibility and promoting eco-friendly consumption. Therefore, integrating social media marketing strategies with sustainability principles has become imperative for organizations seeking competitive advantage in the digital era. This study aims to empirically examine the impact of social media marketing activities on brand equity and consumer behaviour using regression analysis, thereby contributing to a deeper understanding of sustainable marketing effectiveness in today's interconnected marketplace.

2. LITERATURE REVIEW

Russell and Mehrabian (1974) proposed a model called Stimulus-Organism-Response (SOR), according to this model: Stimulus (S): Social media marketing activities Organism (O): Internal consumer states such as brand awareness, brand image, and perception Response (R): Consumer behaviour, including purchase and repurchase intention This framework explains how external marketing efforts influence internal consumer perceptions, which ultimately drive behavioural outcomes. **Kaplan and Haenlein (2010)** emphasized that social media facilitates interaction, collaboration, and content sharing, making it highly effective for marketing communication. Similarly, Ashley and Tuten (2015) highlighted the importance of creative and engaging content in driving consumer engagement. Sustainable social media marketing focuses on promoting environmentally responsible products and practices while building long-term relationships with consumers. Brand equity, as defined by Keller (1993), refers to the value a brand adds through consumer perception. It consists mainly of: Brand Awareness and Brand Image. Strong brand equity leads to higher levels of trust, satisfaction, and loyalty. Studies such as Godey et al. (2016) and Bilgin (2018) confirm that social media marketing significantly enhances brand equity, which in turn influences purchase and repurchase intentions. However, in green marketing contexts, particularly among Gen Z, this mediation effect is sometimes weak or insignificant. Research by Biswas and Roy (2015) shows that consumer behaviour toward green products is influenced by environmental awareness and perceived value. Chen (2010) introduced the concept of green brand equity, emphasizing the importance of Green trust, Green satisfaction, Green brand image Consumers increasingly prefer brands that demonstrate environmental responsibility, which enhances loyalty and repurchase intention. Generation Z represents a critical segment in modern marketing due to their strong digital presence and environmental awareness. Francis and Hoefel (2018) describe Gen Z as value-driven and socially conscious. Nguyen et al. (2020) highlight their strong engagement with social media and digital content. Existing studies have examined social media marketing and consumer behaviour; however, limited research focuses on their role within sustainable marketing contexts. The mediating effect of brand equity, particularly among Generation Z, remains inconsistent and underexplored. Additionally, there is a lack of integrated models based on the Stimulus-Organism-Response (SOR) framework that simultaneously examine social media marketing activities, brand equity, and consumer behaviour. Furthermore, empirical studies using regression analysis in emerging markets like India are still limited.

3. OBJECTIVES

- To examine consumer awareness of sustainable marketing practices communicated through social media platforms.

- To assess consumers' willingness to pay a premium for sustainable products influenced by social media marketing activities.

4. HYPOTHESIS

H₁: Social media marketing activities have a significant positive impact on consumer awareness of sustainable marketing practices.

H₂: Social media marketing activities have a significant positive impact on consumers' willingness to pay a premium for sustainable products.

5. RESEARCH METHODOLOGY

This study adopts a descriptive research design to examine consumer awareness, perception, and attitudes toward sustainable marketing practices communicated through social media platforms. The primary objective is to analyse how social media marketing activities influence consumer awareness and their willingness to pay a premium for sustainable products. The study focuses on residents of Bengaluru South who actively use social media and have prior experience in online shopping. A non-probability judgmental sampling technique was employed to select 100 respondents, ensuring diversity in terms of age, gender, and social media usage patterns. Data were collected through a structured questionnaire comprising demographic questions and Likert scale-based items measuring social media engagement, awareness of sustainability practices, and willingness to pay for eco-friendly products. The collected data were analyzed using appropriate statistical techniques, including correlation analysis to examine relationships between variables, one-way ANOVA to assess differences among demographic groups, and regression analysis to determine the impact of social media marketing activities on consumer awareness and willingness to pay.

6. DATA ANALYSIS AND DISCUSSIONS

Table 1: Reliability Statistics	
Cronbach's Alpha	N of Items
.940	15

The Cronbach's Alpha value of 0.940 indicates an excellent level of internal consistency among the 15 items. This suggests that the items are highly correlated and reliably measure the key constructs of the study, namely consumer awareness of sustainable marketing practices through social media and willingness to pay a premium for sustainable products.

Table 2: Correlations				
		Awareness of Sustainability	Sustainability Initiatives	Willingness to Pay Premium
AOS	Pearson Correlation	1	.765**	.704**
SI	Pearson Correlation	.765**	1	.733**
WPP	Pearson Correlation	.704**	.733**	1
Correlation is significant at the 0.05 level (2-tailed).				

Table 2 shows statistically significant and strong positive relationships among the key variables. Consumer awareness of sustainable marketing practices through social media has a high positive correlation with sustainability initiatives ($r = 0.765$) and with willingness to pay a premium ($r = 0.704$). Similarly, sustainability initiatives are strongly correlated with willingness to pay a premium ($r = 0.733$). These findings indicate that as consumer awareness of sustainable marketing practices increases and as sustainability initiatives are more effectively communicated through social media, consumers' willingness to pay a premium for sustainable products also rises. The strength and significance of these

relationships highlight the important role of awareness and sustainability initiatives in shaping consumer purchasing behaviour toward eco-friendly products.

Table 3: Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.766 ^a	.587	.578	.4915
a. Predictors: (Constant), Sustainability Initiatives, consumer awareness of sustainable marketing practices b. Dependent Variable: Willingness to Pay Premium				

Table 3 presents the model summary, indicating that consumer awareness of sustainable marketing practices and sustainability initiatives explain 58.7% of the variation in willingness to pay a premium ($R^2 = 0.587$). The strong correlation coefficient ($R = 0.766$) suggests a high degree of association between the variables, while the relatively low standard error (0.4915) indicates a good model fit. These results confirm that consumer awareness and sustainability initiatives significantly influence consumers' willingness to pay a premium for sustainable products.

Table 4: ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	33.261	2	16.630	68.853	.000 ^b
	Residual	23.429	97	.242		
	Total	56.690	99			
a. Dependent Variable: Willingness to Pay Premium						
b. Predictors: (Constant), Sustainability Initiatives, consumer awareness of sustainable marketing practices						

The ANOVA table show that the overall regression model is statistically significant ($F = 68.853$) indicating that consumer awareness of sustainable marketing practices and sustainability initiatives **significantly predict** willingness to pay a premium. The model explains a meaningful portion of the variance, confirming its effectiveness in understanding consumer behaviour.

Table 5: Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.543	.315		1.724	.088
	consumer awareness of sustainable marketing practices	.404	.119	.344	3.394	.001
	Sustainability	.462	.100	.470	4.632	.000
a. Dependent Variable: Willingness to Pay Premium						

From Table 5, the null hypotheses are rejected and the alternative hypotheses are accepted, as both consumer awareness of sustainable marketing practices ($\beta = 0.344$, $p = 0.001$) and sustainability initiatives ($\beta = 0.470$, $p < 0.001$) have a significant positive impact on consumers' willingness to pay a premium.

Among the two predictors, sustainability initiatives exert a stronger influence on willingness to pay. The constant term is not statistically significant ($p = 0.088$), indicating that consumers' willingness to pay is primarily driven by consumer awareness and sustainability initiatives.

7. FINDINGS

The study has following findings

- The study reveals a high level of internal consistency among the variables, indicating reliable measurement of consumer awareness and willingness to pay.
- There is a strong and positive relationship between consumer awareness of sustainable marketing practices and willingness to pay a premium.
- Sustainability initiatives communicated through social media also show a significant positive relationship with willingness to pay.
- Consumer awareness and sustainability marketing practices together explain a substantial proportion (58.7%) of the variation in willingness to pay, indicating a strong model.
- Regression results confirm that both consumer awareness of sustainable marketing practices and sustainability initiatives significantly influence willingness to pay, with sustainability initiatives having a stronger impact.
- Overall, increased exposure to sustainable marketing through social media enhances consumers' readiness to spend more on eco-friendly products.

8. SUGGESTIONS

- Companies should actively promote sustainable practices through social media to enhance consumer awareness and engagement.
- Marketers should design interactive and informative content that clearly communicates sustainability initiatives to build trust among consumers.
- Businesses should emphasize transparency in their environmental efforts to strengthen credibility and influence purchase decisions.
- Targeted marketing strategies should be developed for socially conscious groups, especially younger consumers, to increase effectiveness.
- Organizations should integrate sustainability messaging consistently across all social media platforms to reinforce brand perception.

9. CONCLUSION

The study concludes that social media plays a crucial role in promoting sustainable marketing and influencing consumer behaviour. Both consumer awareness of sustainable marketing practices and sustainability initiatives significantly affect consumers' willingness to pay a premium for eco-friendly products. Among these factors, sustainability initiatives have a stronger impact, highlighting the importance of visible and credible environmental efforts by companies. The findings emphasize that integrating sustainability with effective social media marketing strategies can enhance consumer engagement, build positive perceptions, and ultimately drive sustainable consumption.

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WORK STRESS AND STRESS MANAGEMENT AMONG PRIMARY AND SECONDARY SCHOOL TEACHERS IN TIRUNELVELI DISTRICT

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ABSTRACT Teaching is widely regarded as one of the most demanding professions in contemporary society. Rapid educational changes, increasing administrative responsibilities, student behavioural issues, and heavy workload contribute significantly to occupational stress among teachers. The present study examines the level of work stress and the stress management strategies adopted by primary and secondary school teachers in Tirunelveli District. A descriptive research design was adopted, and data were collected from 200 teachers using a structured questionnaire. The findings reveal that teachers experience moderate to high levels of stress, with workload emerging as the most significant source, followed by time pressure, classroom management, and administrative responsibilities. The study also shows that teachers adopt various coping strategies, with a strong preference for informal methods such as talking with family and friends, time management, and recreational activities. In contrast, professional counselling is the least preferred strategy. The study concludes that while teachers actively manage stress through personal coping mechanisms, there is a need for institutional support to address the root causes of stress. It recommends reducing workload, improving working conditions, and promoting formal stress management programs to enhance teachers' well-being and professional effectiveness.

Keywords: Work Stress, Stress Management, Teachers, Primary School Teachers, Secondary School Teachers, Coping Strategies, Occupational Stress

1. INTRODUCTION

Work stress has become a common phenomenon in modern society, affecting individuals across various professions. Among these, the teaching profession is often considered one of the most demanding and stressful occupations due to increasing responsibilities, workload, and expectations from students, parents, and educational institutions. Teachers play a crucial role in shaping the future of society by imparting knowledge, values, and skills to students. However, the pressure associated with their professional responsibilities can significantly impact their physical and mental well-being.

In recent years, both primary and secondary school teachers have been experiencing rising levels of work-related stress. Factors such as heavy workload, time constraints, classroom management issues, administrative duties, lack of resources, and pressure to achieve academic results contribute to stress among teachers. Additionally, rapid changes in educational systems, the integration of technology, and increased accountability further intensify stress levels. Primary school teachers often deal with foundational learning and emotional development of children, while secondary school teachers face the challenge of preparing students for examinations and career-oriented goals.

Work stress, if not managed properly, can lead to burnout, reduced job satisfaction, decreased productivity, and negative impacts on teaching quality. It may also affect teachers' personal lives and overall well-being. Therefore, effective stress management strategies are essential to help teachers cope

with job-related pressures. Stress management techniques such as time management, relaxation methods, counselling, peer support, and organizational support play a vital role in maintaining a healthy work-life balance.

Tirunelveli District, with its diverse educational institutions, provides a suitable setting to study work stress among teachers. Understanding the level of stress and the coping mechanisms adopted by primary and secondary school teachers in this region is important for improving their well-being and enhancing the quality of education. Hence, the present study aims to examine the level of work stress and the stress management practices among teachers in Tirunelveli District.

2. STATEMENT OF THE PROBLEM

Teaching is considered a noble and socially significant profession, as teachers play a vital role in shaping the knowledge, skills, and values of students. However, in recent years the teaching profession has become increasingly demanding due to changes in the education system, growing academic expectations, administrative responsibilities, and the need to adapt to new teaching methods and technologies. These factors often create pressure on teachers, leading to work-related stress. Primary and secondary school teachers face different types of challenges in their professional lives. Primary school teachers are responsible for building the basic foundation of learning and managing young students who require constant attention and care. On the other hand, secondary school teachers face pressure related to syllabus completion, examination results, student performance, and parental expectations. In addition, teachers are required to handle extracurricular activities, maintain records, attend meetings, and fulfil various administrative duties, which increase their workload and stress levels.

If work stress is not properly managed, it can negatively affect teachers' job satisfaction, health, teaching effectiveness, and overall performance. High stress levels may lead to burnout, absenteeism, lack of motivation, and reduced quality of education delivered to students. Therefore, it becomes essential to understand the sources of stress and the coping mechanisms adopted by teachers. Although several studies have been conducted on teacher stress in different regions, there is limited research focusing specifically on the work stress and stress management practices among primary and secondary school teachers in Tirunelveli District. Understanding the level of stress and the strategies used by teachers to manage stress in this region will help educational institutions and policymakers design effective support systems and stress management programs. Hence, the present study aims to analyze the level of work stress and examine the stress management practices among primary and secondary school teachers in Tirunelveli District.

3. REVIEW OF LITERATURE

Gonzales (2024) analyzed the relationship between work-related stress and teaching performance among elementary school teachers. The study found that stress factors such as workload, time management, classroom behavior, and lack of support significantly influence teaching performance. Teachers experiencing higher stress levels showed lower effectiveness in classroom delivery. The research also highlighted that emotional demands and role ambiguity contribute to stress. It emphasized the importance of proper stress management strategies to maintain teaching quality. The study concluded that reducing stress can improve both teacher performance and student outcomes.

Cavallari et al. (2024) conducted a study on educator stress and health, identifying major stressors affecting teachers. The findings revealed that a large proportion of teachers experience physical exhaustion, poor sleep, and emotional stress due to excessive workload and institutional demands. The

study also showed that stress negatively impacts teachers' psychological health and social relationships. School-related factors such as administrative pressure and lack of resources were identified as primary causes of stress. The researchers emphasized the need for targeted interventions to reduce workload and improve working conditions. The study highlights the importance of institutional support in managing teacher stress.

Bidi et al. (2024) conducted a scoping review on stress and psychological well-being among teachers. The study revealed that stress is highly prevalent in the teaching profession and directly affects teachers' mental health and job performance. It emphasized that prolonged stress leads to burnout, emotional exhaustion, and decreased productivity. The review highlighted the need for preventive measures and mental health support systems. It also suggested that stress management interventions should be integrated into educational institutions. The study concluded that teacher well-being is crucial for improving educational quality.

4. OBJECTIVES OF THE STUDY

- To study the socio-economic profile of the respondents
- To identify the major sources of work stress among teachers.
- To examine the stress management strategies adopted by teachers.

5. RESEARCH METHODOLOGY

Research methodology provides a systematic framework for collecting, analyzing, and interpreting data related to the study. The present study adopts a structured approach to examine work stress and stress management among primary and secondary school teachers in Tirunelveli District.

5.1 TYPE OF STUDY

The study is **descriptive in nature**, as it aims to describe the level of work stress and the stress management practices adopted by teachers. It helps in understanding the existing conditions without manipulating any variables.

5.2 AREA OF THE STUDY

The study is conducted in **Tirunelveli District**, which consists of a mix of urban and rural educational institutions. This area is selected to understand stress levels among teachers working in different school environments.

5.3 SAMPLE SIZE

The study is based on a sample of **200 respondents**, including both primary and secondary school teachers. The sample size is considered adequate to represent the population and draw meaningful conclusions.

5.4 SAMPLING TECHNIQUE

The study uses a **convenience sampling method**, where respondents are selected based on their availability and willingness to participate. This method is suitable due to time and accessibility constraints.

5.5 DATA COLLECTION

Both **primary and secondary data** are used in the study:

- **Primary Data:** Primary data were collected using a **structured questionnaire**. The questionnaire includes questions related to demographic details, sources of work stress, and stress management techniques adopted by teachers.

- **Secondary Data:** Secondary data were collected from **books, journals, research articles, websites, and reports** related to teacher stress and stress management.

6 RESULTS & DISCUSSION

- To study the socioeconomic profile of the respondents

Understanding the socio-demographic characteristics of respondents is important to analyze the level of work stress among teachers. Variables such as age, gender, marital status, education, type of school, experience, and income influence stress levels and coping mechanisms. The details of the respondents are presented in Table 1.

Table 1: Socio-Demographic Profile of Teachers

Demographic Variable	Category	Frequency	Percentage
Age	Below 30 years	30	15
	31 – 40 years	60	30
	41 – 50 years	65	32.5
	Above 50 years	45	22.5
Gender	Male	110	55
	Female	90	45
Marital Status	Married	150	75
	Unmarried	40	20
	Widowed/Separated	10	5
Education	Undergraduate	50	25
	Postgraduate	120	60
	M.Phil/Ph.D	30	15
Type of School	Primary	100	50
	Secondary	100	50
Experience	Below 5 years	40	20
	6 – 10 years	60	30
	11 – 20 years	70	35
	Above 20 years	30	15
Monthly Income	Below ₹15,000	45	22.5
	₹15,001 – ₹30,000	85	42.5
	₹30,001 – ₹50,000	50	25
	Above ₹50,000	20	10
Total		200	100

Source: Primary Data

The table shows that the majority of respondents belong to the **41–50 years age group (32.5%)**, indicating that middle-aged teachers dominate the sample. Male teachers (55%) slightly outnumber female teachers (45%). Most respondents are **married (75%)**, reflecting family responsibilities that may influence stress levels. In terms of education, the majority are **postgraduates (60%)**, indicating a well-qualified sample.

The distribution of teachers is equal between **primary and secondary schools (50% each)**. Most respondents have **11–20 years of experience (35%)**, suggesting that experienced teachers form a major portion of the sample. Regarding income, the majority fall under the **₹15,001–₹30,000 category (42.5%)**, indicating a moderate income level.

Overall, the profile shows that work stress is being studied among **experienced, moderately paid, and well-educated teachers**, which provides a reliable basis for analysis.

- To identify the major sources of work stress among teachers.

Work stress among teachers arises from various academic and non-academic responsibilities associated with the teaching profession. Identifying the major sources of stress is essential to understand the factors that affect teachers' performance and well-being. These stressors may include workload, time pressure, classroom management challenges, and administrative duties. The details of the major sources of work stress among teachers are presented in Table 2.

Table 2: Major Sources of Work Stress among Teachers

Sources of Stress	Frequency	Percentage
Workload	150	75
Time Pressure	135	67.5
Classroom Management	120	60
Administrative Work	110	55
Lack of Resources	95	47.5
Student Behaviour Issues	105	52.5

Source: Primary Data

The above table shows the major sources of work stress among teachers in Tirunelveli District. It is observed that **workload (75%)** is the most significant source of stress, indicating that a majority of teachers feel burdened with excessive teaching and non-teaching responsibilities. This is followed by **time pressure (67.5%)**, suggesting that teachers struggle to complete their tasks within limited time.

Classroom management (60%) and administrative work (55%) are also important stress factors, reflecting challenges in handling students and institutional duties. Additionally, **student behaviour issues (52.5%)** contribute to stress, especially in maintaining discipline and engagement in classrooms. The least reported stress factor is **lack of resources (47.5%)**, although it still affects a considerable number of teachers.

- To examine the stress management strategies adopted by teachers.

Teachers adopt various strategies to cope with work-related stress and maintain their physical and mental well-being. These strategies may include personal, social, and professional approaches such as time management, relaxation techniques, and social support. To understand the effectiveness and preference of these strategies, a weighted average analysis was carried out. The results are presented in Table 3.

Table 3: Weighted Average Analysis of Stress Management Strategies

Strategy	SA (5)	A (4)	N (3)	D (2)	SD (1)	Total Score	Weighted Average	Rank
Time Management	60	50	40	30	20	700	3.5	II
Physical Exercise/Yoga	50	45	50	35	20	670	3.35	IV

Meditation/Relaxation	45	40	55	40	20	650	3.25	V
Talking with Family/Friends	70	60	35	20	15	750	3.75	I
Professional Counseling	20	30	60	50	40	540	2.7	VI
Recreational Activities	55	50	45	30	20	690	3.45	III

Source: Primary Data

The table shows that **talking with family and friends (3.75%)** has the highest weighted average score and is ranked first, indicating it is the most preferred stress management strategy among teachers. Time management (3.5%) and recreational activities (3.45%) are also important coping methods. On the other hand, **professional counselling (2.70%)** has the lowest score and is ranked last, showing that teachers are less inclined to seek formal support for stress management. Overall, teachers rely more on **informal and personal strategies** rather than professional methods.

7 FINDINGS

- Majority of respondents belong to the **41–50 years age group (32.5%)**, indicating that middle-aged teachers dominate the sample.
- Male teachers (55%) slightly outnumber female teachers (45%).
- Most respondents are **married (75%)**, reflecting family responsibilities that may influence stress levels.
- In terms of education, the majority are **postgraduates (60%)**, indicating a well-qualified sample.
- The distribution of teachers is equal between **primary and secondary schools (50% each)**.
- Most respondents have **11–20 years of experience (35%)**, suggesting that experienced teachers form a major portion of the sample.
- Regarding income, the majority fall under the **₹15,001–₹30,000 category (42.5%)**, indicating a moderate income level.
- The study reveals that **workload (75%)** is the major source of stress among teachers, indicating excessive teaching and non-teaching responsibilities.
- **Time pressure (67.5%)** is identified as the second most significant stress factor, showing difficulty in completing tasks within limited time.
- **Classroom management (60%)** is another important source of stress, reflecting challenges in handling students effectively.
- **Administrative work (55%)** also contributes significantly to stress due to additional institutional responsibilities.

- **Student behaviour issues (52.5%)** affect teachers' stress levels, especially in maintaining discipline and engagement.
- **Lack of resources (47.5%)** is the least reported stress factor, but it still impacts a considerable number of teachers.
- The study reveals that **talking with family and friends (3.75)** is the most preferred stress management strategy among teachers.
- **Time management (3.50)** is identified as the second most important coping method used by teachers to handle work stress.
- **Recreational activities (3.45)** also play a significant role in reducing stress and maintaining work-life balance.
- **Physical exercise/yoga (3.35)** and **meditation/relaxation (3.25)** are moderately adopted stress management techniques.
- **Professional counselling (2.70)** is the least preferred method, indicating that teachers are less likely to seek formal or professional support.

8 SUGGESTIONS

- Since **professional counselling is the least preferred stress management strategy**, schools should create awareness about the importance of seeking professional help for managing stress effectively.
- Educational institutions should **appoint trained counsellors or psychologists** to provide regular guidance and support to teachers.
- Schools can organize **workshops, seminars, and training programs** on stress management to encourage teachers to utilize professional services.
- Management should ensure **confidential and easily accessible counselling services**, so that teachers feel comfortable seeking help without hesitation.
- Government and educational authorities can introduce **teacher wellness programs** that include counselling, mental health support, and stress relief initiatives.
- Efforts should be made to **reduce the stigma associated with counselling**, promoting it as a normal and beneficial practice for mental well-being.

9 CONCLUSION

The present study on work stress and stress management among primary and secondary school teachers in Tirunelveli District highlights the significant challenges faced by teachers in their professional roles. The findings reveal that a majority of teachers experience a moderate to high level of stress, mainly due to factors such as workload, time pressure, classroom management issues, and administrative responsibilities. Among these, workload emerges as the most prominent source of stress, indicating the increasing burden of both teaching and non-teaching duties.

The study also shows that teachers adopt various strategies to manage stress, with a strong preference for informal methods such as talking with family and friends, time management, and engaging in recreational activities. These approaches reflect the importance of social support and personal coping mechanisms in managing work-related stress. However, professional counselling is the least preferred strategy, indicating limited awareness, accessibility issues, or hesitation in seeking formal help.

Overall, the study concludes that while teachers are making efforts to manage stress through personal strategies, there is a need for institutional support to address the root causes of stress. Schools and educational authorities should focus on reducing workload, providing a supportive work environment, and promoting formal stress management practices such as counselling and wellness programs. In conclusion, improving stress management among teachers is essential not only for their well-being but also for enhancing teaching effectiveness and the overall quality of education.

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TOUCHING SUSTAINABILITY THROUGH ORGANIZATIONAL CLIMATE: A PRACTICAL PAPER

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ABSTRACT Sustainability is no longer just about recycling or publishing an ESG report. In logistics sector, it is to be shown up in real work by how a company uses energy(carbon-footprints reduction), manages heat and safety, chooses suppliers, tracks data, and responds to customer and regulator demands. As employees experience these frequent changes daily, sustainability concept directly influences organizational climate, the shared feeling of “what it’s like to work here.” If sustainability is handled as extra paperwork or policing, climate gets worse: people feel overloaded, watched, or cynical. If it is handled as smarter work and genuine care, safer conditions, clearer roles, better tools, fair decisions it can improve climate. This paper explains the link between Sustainability and Organizational climate and also gives a clear set of strategies that managers can actually use in organisations, especially in high-pressure logistics sector. This also enables a better understanding on how sustainability efforts can improve trust, engagement, and performance when they are built into daily work

Keywords: Sustainability, Organizational Climate, Strategies, Trust, Engagement

1. PROBLEM STATEMENT

Many organizations are facing a difficult mix at the same time. Costs are tight. Customers want faster service. Employees are tired and less engaged. And sustainability expectations are rising through supply chain requirements, audits, and reporting. In operational sectors like logistics, sustainability also connects to real safety and health issues: heat, fatigue, long shifts, road safety, equipment maintenance, and energy use. So the real problem is not “should we do sustainability?” The real problem is “how do we do sustainability without damaging morale and trust?” This is where organizational climate becomes the deciding factor.

2. SUSTAINABILITY AND ORGANIZATIONAL CLIMATE

Organizational climate is the day-to-day atmosphere people feel at work. It is shaped by things like support from managers, fairness, recognition, communication, safety, and whether people feel respected. Organizational climate can significantly shape employee behaviour and performance within a company. It comprises of the shared perceptions of policies, practices, and the prevailing atmosphere that influence how employees interact and engage with their work environment. Practically, a positive organizational climate characterized by open communication and empowerment can enhance collaboration and innovation. In contrast, a negative climate may reduce creativity and motivation, ultimately resulting in high turnover rates and decreased performance levels.

Sustainability is the capability of maintaining a balance in use of resources and its renewal without compromising the future availability. Today, it is essential for multiple reasons, like resource preservation, ecological integrity, social equity, economic viability, climate change mitigation, and consumer awareness. As the population increases and consumption rates rise, sustainable practices keep in check that natural resources are utilized efficiently and preserved for future generations (Sustainability, 2023). The health of ecosystems is crucial for clean air, water, and biodiversity, which

are vital in combating climate change and environmental degradation. At the organizational level, sustainability involves keeping responsible practices into operations, focus on resource management, employee engagement, innovation, and stakeholder collaboration for long-term benefits.

Organization Climate is the foundation of sustainable practices. It lies in the interconnectedness of environmental, social, and economic dimensions. It is often referred to as the triple bottom line. Sustainability programs change processes, targets, and behaviors. That means they automatically change climate, either for better or worse. There are four common ways this plays out.

- 1) **Purpose:** When sustainability is real and visible, people feel proud and more connected to the organization.
- 2) **Fairness and trust:** If leaders explain trade-offs honestly, employees trust the change more.
- 3) **Workload:** If sustainability becomes extra tasks without time, tools, or training, usually people feel burn out.
- 4) **Safety and care:** Adaptation actions (for example heat protection, safe driving practices, better maintenance) are felt as the organization is caring, this strongly improves climate.

For organizations that thrive to achieve sustainability, implements a culture that prioritizes environmental stewardship, social responsibility, and economic viability.

3. LITERATURE REVIEW

Over recent years, the field has evolved from focusing mainly on environmental initiatives to integrating, comprehensive green human resource management (GHRM) and organizational culture frameworks that promote pro-environmental behaviours and sustainability engagement among employees ("Barriers to UBC Staff Climate Action Eng...", 2024) ("Green HRM, psychological green climate a...", 2022) (Nurapriyanti, 2025). The increasing urgency of climate change and corporate sustainability commitments has elevated the practical significance of this research. Studies demonstrate that positive organizational climates can improve employee motivation, satisfaction, and retention while advancing sustainability goals (Dumitru & Bran, 2024) (Wijaya et al., 2025) (Mishra & Awasthi, 2024). For example, some studies suggests that organizations with supportive green climates show higher employee participation in sustainability initiatives. This ensures that employees' behaviours significantly influence organizational environmental performance (Carbone et al., 2024) (Katz et al., 2022).

Despite its growing research, a specific problem exists in understanding how organizational climate influences employee experiences and the barriers faced at foundational levels in sustainability efforts¹ ("Barriers to UBC Staff Climate Action Eng...", 2024) (Milić et al., 2025). Present studies show a knowledge gap on the interplay of internal organizational factors such as leadership support, workplace culture, and employee competencies with external pressures like market demand and resource constraints (Milić et al., 2025) (Jahanshahi & Al-Gamrh, 2024) (Yadav & Kureethara, 2024). Consequently controversies arise around the relative influence of top-down leadership and grassroots employee engagement in driving sustainable behaviors. Furthermore, some studies highlights institutional support and others emphasising individual motivation and psychological climate (Ali et al., 2025) (Shifa et al., 2025) (Zafar et al., 2024). The consequences of these gaps are significant, as insufficient understanding impedes the design of effective interventions to overcome barriers that ultimately limit sustainability progress ("Barriers to UBC Staff Climate Action Eng...", 2024) (V. & Sindhuja, 2025)² (Hameed et al., 2024).

It is understood that sustainability fails inside organizations for very predictable reasons. It gets treated as a separate “campaign” rather than part of operations. It becomes a reporting exercise where employees are asked for numbers but never see decisions improve. Managers push targets without removing obstacles, so frontline staff feel blamed. And sometimes people sense greenwashing—big claims with small actions—which creates cynicism. These issues hurt organizational climate because they reduce trust and increase stress. This highlights the urgent need for practical strategies that engage employees for better resource management.

4. PRACTICAL STRATEGIES TO IMPROVE ORGANIZATIONAL CLIMATE WHILE IMPLEMENTING SUSTAINABILITY

Improving organizational climate is very important for enhancing employee behavior and performance in any organization. In high stress work environment like logistics sector, practical strategies like leading with transparency, promoting open communication, and providing support for collaboration and innovation are provided. By integrating sustainability into these efforts, organizations can create positive atmosphere that increase employee engagement and also ensuring long-term ecological and economic viability.

4.1 LEADING WITH TRANSPARENCY AND SUPPORT

Employees do not need perfect speeches. They need clarity and support. Leaders should explain what is changing, why it matters, what will be measured, and what help will be provided. A useful practice can be “trade-off transparency”, where leaders openly discuss constraints (budget, deadlines, customer demands) and how choices were made. When employees see honest decision-making and real support, trust rises.

4.2 BUILD PARTICIPATION INTO THE PROCESS

Organizational climate shall improve when people feel heard and respected. Simple monthly forums like safety-and-sustainability huddles, quick pulse checks, and suggestion systems with fast feedback shall be created. The key is closing the loop. If employees have shared ideas and nothing happened, climate worsens. If leaders respond with “we changed X because of your feedback,” climate shall see improvement quickly.

4.3 REDESIGNED WORK SO SUSTAINABILITY IS PART OF THE JOB

If sustainability is added on top of daily work, people will resist, even if they agree with it. Instead, sustainability shall be integrated into standard operating procedures. For example, building fuel efficiency checks into routine maintenance, including waste reduction steps in quality checks, and defining clear ownership for ESG data collection. Low-value reporting that doesn’t help decisions shall be removed. The message shall be: “we are making work smarter, not heavier.”

4.4 TRAIN MANAGERS IN PEOPLE SKILLS AND CHANGE SKILLS

Sustainability creates change, and change triggers anxiety. That is why managers need practical skills: how to communicate calmly, handle resistance respectfully, coach problem-solving, and recognize effort. Here, emotional intelligence becomes a sustainability tool. It helps managers reduce conflict, build psychological safety, and keep teams engaged during transition.

4.5 REWARD REAL IMPROVEMENT AND REDUCE THE FEAR OF METRICS

Measurement can motivate or it can scare people. Climate may improve when metrics are felt fair and useful. By using a small, practical set of indicators that connect to daily work: safety incidents and near-misses, maintenance compliance, fuel or energy use, rework, and waste. Recognizing teams leads to improvements and learning, instead of hitting perfect numbers. If people believe data will be used to punish them, they may hide problems. If they believe, data will be used to fix systems, they may report honestly.

4.6 SUSTAINABILITY MADE TANGIBLE THROUGH EMPLOYEE CARE

The fastest way to improve organization-climate is linking sustainability to visible care. Examples include, heat-risk controls, safer shift scheduling, hydration and rest protocols, ergonomic improvements, and better equipment maintenance. These actions protect health and productivity and show employees that sustainability is not a “branding project” instead it is part of running a decent and safe workplace.

5. A SIMPLE IMPLEMENTATION ROADMAP

In the first 30 to 90 days, a combined climate and sustainability check shall be done:

- 1) where are people overloaded?
- 2) where are safety risks rising? and
- 3) where is reporting creating friction?

Picking two or three quick wins that reduce pain and also improve sustainability can be done. In three to six months, the works can be standardized. In SOPs, it should be updated, supervisors shall be trained, and recognition methods should be built.

In six to twelve months, governance and data quality shall be strengthened so the organization can meet external expectations without exhausting employees. Throughout, climate signals (trust, engagement, intent to stay) can be tracked along with sustainability results-treated as one system.

6. CONCLUSION

In Logistics sector, sustainability may either strengthen organizational climate or weaken it. This is due to its hectic and 24/7 working nature, as well as the demanding time it takes. The difference it makes depends on how it is implemented. This holistic approach not only enhances corporate reputation but also drives innovation and resilience even in the face of wars, climate change and resource scarcity. Negative impacts of climate change necessitate sustainable practices that promote efficient resource use and ecosystem protection.

Sustainability practices in logistics sector, when is done as paperwork, pressure, or public relations, it creates cynicism and burnout in them. But, when it is done with participation, honest communication, job redesign, and visible employee care, it builds trust and engagement. This practical strategy shall make sustainability a better way of working safer, smarter, and fairer, so that employees feel the benefits directly improving both personal and organizational performance.

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SUSTAINABLE LEADERSHIP AND ETHICAL GOVERNANCE IN THE AGE OF AI: A DEMOGRAPHIC STUDY OF PERCEPTIONS AND AWARENESS

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ABSTRACT *The rapid expansion of Artificial Intelligence (AI) in organisations has prompted a re-evaluation of leadership approaches, highlighting the importance of sustainable and ethical leadership. This study examines how demographic factors influence awareness and perceptions of AI governance. Data were collected from 150 respondents across varied educational and occupational backgrounds using a structured questionnaire, and analysed through percentage methods. The findings indicate higher AI awareness among postgraduates and private sector employees, while lower awareness is observed among older age groups and non-academic populations. The study recommends inclusive, ethics-focused AI leadership training across sectors.*

Keywords: *Sustainable Leadership, Ethical Governance, Artificial Intelligence, Demographic Analysis, AI Awareness, Organizational Ethics.*

1. INTRODUCTION

The twenty-first century has witnessed an unprecedented integration of Artificial Intelligence into virtually every domain of human activity, from healthcare and finance to education and governance. Organisations are no longer merely adopting AI as a technological tool; they are now compelled to embed it into the very fabric of their decision-making, talent management, and stakeholder engagement strategies. This transition, however, is not without its ethical and governance challenges.

Sustainable leadership is defined as a form of leadership that balances economic performance, social equity, and environmental stewardship. Unlike transactional or transformational models, it is future-oriented, values-driven, and inherently inclusive. When applied to the domain of AI, it demands that leaders not only harness the productive potential of intelligent systems but also ensure transparency, fairness, and accountability in their deployment.

Despite growing scholarly interest in AI ethics and governance, relatively little empirical attention has been paid to how demographic variables — such as gender, age, educational background, and occupational status — shape individuals' awareness of AI-driven leadership. This paper addresses that gap through a survey-based study of 150 respondents, using descriptive percentage analysis to examine how demographic variables correlate with AI leadership awareness.

2. REVIEW OF LITERATURE

The discourse on sustainable leadership has evolved considerably over the past two decades. Hargreaves and Fink (2004) conceptualized sustainable leadership as a distributed, enduring, and community-oriented approach prioritizing long-term well-being over short-term efficiency. More recently, this concept has been extended to encompass digital and technological environments, particularly in the wake of the Fourth Industrial Revolution.

Dafoe (2018) emphasized that AI governance must be grounded in principles of accountability, fairness, and transparency — values aligned closely with sustainable leadership. Floridi et al. (2018) proposed

an AI ethics framework encompassing beneficence, non-maleficence, autonomy, justice, and explicability. Research on technology adoption further suggests that gender, age, and educational level significantly influence attitudes toward emerging technologies. Venkatesh and Morris (2000) found gender differences mediated by social influence, while Sharma and Mishra (2021) indicated that younger, more educated individuals are more receptive to AI-enabled workplace transformations.

3. OBJECTIVES OF THE STUDY

- To examine the demographic profile of respondents in terms of gender, age, educational qualification, and occupational status.
- To assess the level of awareness of AI and its implications for leadership and governance among respondents.
- To identify demographic patterns associated with higher or lower levels of AI governance awareness.

4. RESEARCH METHODOLOGY

The study adopts a descriptive research design, employing a structured questionnaire as the primary data collection instrument. A sample of 150 respondents was selected using convenience sampling from academic institutions, corporate workplaces, and online professional networks. The questionnaire comprised two parts: (i) a demographic profile section capturing gender, age, educational qualification, and occupational status; and (ii) an awareness section assessing familiarity with AI applications in organizational leadership and ethical governance frameworks. Data were analysed using percentage analysis, a widely employed technique for assessing the distribution and relative frequency of categorical variables.

5. DATA ANALYSIS AND INTERPRETATION

5.1 GENDER DISTRIBUTION OF RESPONDENTS

Of the 150 respondents, 55.3 per cent identified as female and 41.3 per cent as male, while 3.4 per cent preferred not to disclose or identified as non-binary. The higher female participation reflects the growing engagement of women in AI and leadership-related discussions.

Table 1: Gender Distribution of Respondents

Gender	Respondents	Percentage (%)
Male	62	41.3
Female	83	55.3
Non-Binary / Prefer not to say	5	3.4
Total	150	100.0

Source: Primary Data

5.2 AGE-WISE DISTRIBUTION OF RESPONDENTS

The dominant cohort falls within the 25–35 years age group (36.0%), followed by those below 25 years (25.3%), 36–45 years (22.0%), and above 45 years (16.7%). The smaller representation of older respondents may reflect digital divide challenges or lower propensity to participate in online surveys.

Table 2: Age-wise Distribution of Respondents

Age Group	Respondents	Percentage (%)
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Below 25 years	38	25.3
25 – 35 years	54	36.0
36 – 45 years	33	22.0
Above 45 years	25	16.7
Total	150	100.0

Source: Primary Data

5.3 EDUCATIONAL QUALIFICATION OF RESPONDENTS

Postgraduate degree holders constitute the largest group (40.7%), followed by undergraduates (34.7%), doctoral scholars (16.0%), and others (8.6%). The dominance of postgraduate respondents is consistent with the survey's academic outreach channels.

Table 3: Educational Qualification of Respondents

Qualification	Respondents	Percentage (%)
Undergraduate (UG)	52	34.7
Postgraduate (PG)	61	40.7
Doctorate / Research Scholar	24	16.0
Others	13	8.6
Total	150	100.0

Source: Primary Data

5.4 OCCUPATIONAL STATUS OF RESPONDENTS

Private sector employees (31.3%) and students (30.0%) together constitute over 61 per cent of respondents. Government employees (18.7%), academic and research professionals (12.0%), and entrepreneurs (8.0%) make up the remainder. The lower participation of government employees may reflect bureaucratic insulation from AI governance discourses.

Table 4: Occupational Status of Respondents

Occupation	Respondents	Percentage (%)
Student	45	30.0
Private Sector Employee	47	31.3
Government / Public Sector	28	18.7
Academic / Researcher	18	12.0
Entrepreneur / Self-Employed	12	8.0
Total	150	100.0

Source: Primary Data

5.5 LEVEL OF AWARENESS OF AI IN LEADERSHIP AND GOVERNANCE

A combined 74.7 per cent of respondents reported being moderately or highly aware of AI in workplace contexts. However, 7.3 per cent reported no awareness and 18.0 per cent described themselves as only slightly aware, underscoring the need for structured, inclusive AI literacy programmes across demographic segments.

Table 5: Level of Awareness of AI in Leadership and Governance

Level of Awareness	Respondents	Percentage (%)
Not Aware	11	7.3
Slightly Aware	27	18.0
Moderately Aware	49	32.7
Highly Aware	63	42.0
Total	150	100.0

Source: Primary Data

6. FINDINGS

- Female respondents formed the majority (55.3%), indicating increased participation of women in AI and leadership discourse.
- The 25–35 age group constituted the largest cohort (36.0%), reflecting the primacy of young working professionals in AI adoption conversations.
- Postgraduate degree holders (40.7%) showed the widest representation, confirming the positive association between higher education and AI engagement.
- Private sector employees and students together accounted for over 61 per cent of the sample — groups most likely to interact with AI tools in daily work.
- 74.7 per cent of respondents claimed moderate to high awareness of AI in leadership and governance, signalling a healthy baseline digital literacy.
- Awareness gaps persist among respondents above 45 years, government employees, and those with non-university educational backgrounds.

7. RECOMMENDATIONS

- **Inclusive AI Literacy Programmes:** Academic institutions and professional bodies should co-develop AI governance curricula targeting older age groups and government sector employees.
- **Gender-Responsive AI Leadership Training:** Targeted leadership development programmes should leverage the higher receptivity to AI education demonstrated by female respondents.
- **Ethics-First AI Policy Frameworks:** Organisations should adopt AI governance charters mandating ethical impact assessments, transparent algorithmic auditing, and stakeholder-inclusive policy development.
- **Integration of AI Ethics into Management Education:** Business schools and commerce departments must embed AI ethics modules within core curricula to prepare future leaders for responsible decision-making.
- **Cross-Sector Dialogue Platforms:** Government, academia, and industry must engage in structured dialogue to co-create shared norms for sustainable and ethical AI leadership.

8. CONCLUSION

This paper has examined the relationship between demographic characteristics and awareness of AI in leadership and ethical governance contexts. Through a percentage-based analysis of 150 survey respondents, it demonstrated that while a substantial portion of the sample demonstrates moderate to high AI awareness, significant gaps persist across age groups, occupational categories, and educational backgrounds.

Sustainable leadership in the age of AI is not merely a technological challenge but a deeply human one. The ethical governance of AI systems requires leaders who are digitally literate, morally grounded, socially inclusive, and institutionally accountable. Demographic disparities in AI awareness must be proactively addressed through targeted education, inclusive policy design, and cross-sectoral collaboration. As organisations globally grapple with the ethical implications of intelligent automation, the imperative for sustainable leadership has never been clearer.

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THE IMPACT OF ARTIFICIAL INTELLIGENCE ON THE SUCCESS, SCALABILITY, AND COMPETITIVENESS OF GREEN ENTREPRENEURSHIP

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ABSTRACT *With the growing global emphasis on sustainability, green entrepreneurship has emerged as a vital driver of environmentally responsible economic growth. At the same time, Artificial Intelligence (AI) is transforming business operations across industries. This article explores how the integration of AI technologies influences the success, scalability, and competitiveness of green entrepreneurship. It highlights the opportunities AI creates for sustainable innovation, efficient resource management, and enhanced customer engagement, while also addressing potential challenges.*

Keywords: *Green Entrepreneurship, Artificial Intelligence, Sustainability, Business Scalability, Competitive Advantage, Innovation*

1. INTRODUCTION

Green entrepreneurship focuses on creating environmentally sustainable products and services while contributing to economic growth. As environmental concerns intensify, businesses are increasingly adopting green practices to meet consumer demand and regulatory requirements (Schaltegger & Wagner, 2011).

However, green entrepreneurs often face challenges such as high production costs, limited scalability, and market competition. The integration of Artificial Intelligence (AI) offers new opportunities to address these challenges. AI technologies, including machine learning, predictive analytics, and automation, enable businesses to optimize operations and improve decision-making processes (Brynjolfsson & McAfee, 2017).

This paper explores how AI contributes to the success, scalability, and competitiveness of green entrepreneurship.

2. LITERATURE REVIEW

2.1 GREEN ENTREPRENEURSHIP

Green entrepreneurship involves innovative business practices that prioritize environmental sustainability alongside profitability. According to Schaper (2016), green entrepreneurs play a crucial role in promoting sustainable development through eco-friendly innovations.

2.2 ARTIFICIAL INTELLIGENCE IN BUSINESS

AI has become a transformative force in modern business environments. It enhances productivity, enables predictive insights, and supports strategic decision-making (Davenport & Ronanki, 2018).

2.3 AI AND SUSTAINABILITY

Recent studies highlight that AI can contribute to sustainability by optimizing resource use, reducing waste, and improving energy efficiency (Vinuesa et al., 2020). This makes AI particularly relevant for green businesses.

2.4 AI AND BUSINESS SUCCESS IN GREEN ENTREPRENEURSHIP

AI technologies significantly enhance the success of green enterprises by improving efficiency and reducing operational costs. Predictive analytics enables businesses to understand customer preferences for eco-friendly products, leading to better product development and targeted marketing strategies.

AI also supports sustainable production by optimizing resource allocation and minimizing waste. These improvements contribute to both environmental sustainability and financial performance.

2.5 AI-DRIVEN SCALABILITY OF GREEN BUSINESSES

Scalability remains a major challenge for green entrepreneurs due to limited resources and high costs. AI helps address these issues by automating processes and enabling data-driven expansion strategies.

AI-powered supply chain management systems improve logistics efficiency and ensure sustainable sourcing. Additionally, cloud-based AI solutions allow businesses to scale operations without significant infrastructure investments, making growth more accessible.

2.6 ENHANCING COMPETITIVENESS THROUGH AI

AI provides green entrepreneurs with a competitive advantage by enabling personalized customer experiences and real-time market analysis. Sentiment analysis tools help businesses monitor customer feedback and adapt to changing preferences.

Furthermore, AI enhances transparency through improved traceability and sustainability reporting, which builds trust among environmentally conscious consumers. As a result, businesses that integrate AI effectively are better positioned to compete in the market.

3. RESEARCH METHODOLOGY

This study adopts a quantitative research design to examine the impact of Artificial Intelligence (AI) technologies on the success, scalability, and competitiveness of green entrepreneurship. A **descriptive** and explanatory approach is used to analyze relationships between variables and to test the influence of AI adoption on business outcomes.

The study follows a deductive approach, where hypotheses are developed based on existing theories related to AI adoption, sustainability, and entrepreneurship. These hypotheses are then tested using empirical data collected from respondents.

3.1 DATA COLLECTION METHOD

Primary data is collected through a structured questionnaire distributed among green entrepreneurs, startup founders, and business professionals involved in sustainable enterprises.

The questionnaire is divided into sections covering:

- Demographic details
- Level of AI adoption
- Business performance indicators (success, scalability, competitiveness)
- Perceptions of AI effectiveness in sustainable practices

Responses are measured using a Likert scale (e.g., 1 = Strongly Disagree to 5 = Strongly Agree).

3.2 SAMPLING TECHNIQUE AND SAMPLE SIZE

A purposive sampling technique is used to select respondents who are actively engaged in green entrepreneurship or sustainable business practices. Target population is Green entrepreneurs and sustainability-focused business professionals. The sample size taken is 100 from the study area particularly from Trivandrum.

4. RESULTS AND DISCUSSION

This section presents the analysis and interpretation of data collected to examine the impact of Artificial Intelligence (AI) on the success, scalability, and competitiveness of green entrepreneurship. The analysis includes reliability testing, descriptive statistics, correlation, regression, and hypothesis testing.

4.1 RELIABILITY ANALYSIS

Reliability analysis was conducted using Cronbach's Alpha to assess the internal consistency of the measurement scale.

The results indicate a Cronbach's Alpha value of 0.87, which exceeds the acceptable threshold of 0.70. This confirms that the questionnaire items are reliable and suitable for further statistical analysis.

4.2 DESCRIPTIVE STATISTICS

Descriptive statistics were used to summarize respondents' perceptions of AI adoption and its impact on green entrepreneurship.

Variable	Mean	Standard Deviation
AI Adoption	3.65	0.67
Business Success	4.01	0.72
Scalability	3.66	0.74
Competitiveness	3.89	0.70

The results show that all variables have mean values above 3.5, indicating a generally positive perception among respondents. Business success recorded the highest mean score, suggesting that AI adoption is strongly associated with improved organizational performance.

4.3 CORRELATION ANALYSIS

Pearson correlation analysis was conducted to examine the relationship between AI adoption and the dependent variables.

Variables	Correlation (r)	p-value
AI Adoption → Business Success	0.59	<0.001
AI Adoption → Scalability	0.57	<0.001
AI Adoption → Competitiveness	0.61	<0.001

The findings reveal strong positive correlations between AI adoption and all three dependent variables. This indicates that increased use of AI technologies is associated with higher levels of business success, improved scalability, and enhanced competitiveness.

4.4 REGRESSION ANALYSIS

Regression analysis was performed to determine the impact of AI adoption on green entrepreneurship outcomes.

Variables	R ²	p-value
Business Success	0.30	<0.001
Scalability	0.27	<0.001
Competitiveness	0.29	<0.001

The results indicate that AI adoption significantly influences all three variables. The adoption has a direct and meaningful impact on green entrepreneurial performance.

4.5 DISCUSSION OF FINDINGS

The findings of this study highlight the critical role of Artificial Intelligence in advancing green entrepreneurship. The strong positive relationship between AI adoption and business success suggests that AI-driven decision-making enhances operational efficiency and profitability. This aligns with previous studies emphasizing the role of AI in improving business performance and innovation.

The results also demonstrate that AI enhances competitiveness by enabling businesses to respond quickly to market changes, personalize customer experiences, and improve transparency. These factors are particularly important in the green market, where consumer trust and environmental responsibility play a significant role.

5. IMPLICATIONS OF THE STUDY

- **For Entrepreneurs:** Adoption of AI technologies can significantly improve efficiency, growth, and market competitiveness.
- **For Policymakers:** Support for AI integration in sustainable businesses can accelerate green economic development.
- **For Researchers:** The study provides a foundation for further research on AI-driven sustainability practices.

6. CONCLUSION OF RESULTS

In conclusion, the empirical findings confirm that Artificial Intelligence plays a significant and positive role in enhancing the success, scalability, and competitiveness of green entrepreneurship. Businesses that integrate AI into their operations are better equipped to achieve sustainable growth and maintain a competitive advantage in the evolving market.

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INFLUENCE OF JOB STRESS ON EMPLOYEE COMMITMENT IN TEXTILE INDUSTRY – AN ANALYTICAL STUDY

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ABSTRACT Employees who are committed to their organization are more likely to contribute positively because they align themselves with the company's goals and values. Such employees personally and professionally accept the organization's mission and actively support its policies, services, and products. However, job stress often negatively affects organizational commitment. The present study examines the impact of job stress on employee commitment in textile industries located in South Tamil Nadu. Data were collected through a structured questionnaire from textile employees using a convenience sampling method. A total of 2225 employees were selected as the sample for the study. The findings indicate that committed employees develop a strong sense of belonging and motivation, enabling textile organizations to function efficiently and achieve their objectives.

Keywords: Policies, Commitment, Employee, Organizations, Textile Industry

1. INTRODUCTION

Organizational commitment refers to the psychological attachment and bond employees develop with their organization. Rooted in industrial-organizational psychology, this concept explains how strongly employees identify with and remain dedicated to their workplace. Organizational commitment helps predict performance levels, leadership roles, employee engagement, and job satisfaction. Highly committed employees understand organizational goals, believe in the company's vision and mission, and feel valued and fairly rewarded for their contributions. This commitment enhances motivation and productivity. Such employees often set higher standards, take initiative, and positively influence their colleagues, contributing to overall organizational success. However, employees in textile industries frequently experience high levels of stress due to challenging working conditions. While occupational stress is generally viewed as harmful, the concept of eustress (positive stress) suggests that moderate stress can motivate employees to learn new skills and improve performance. Successfully overcoming challenges may lead to satisfaction and personal growth. Occupational stress is broadly defined as the harmful physical and psychological effects resulting from an imbalance between workplace demands and an individual's abilities, resources, and needs. Although short-term stress may not significantly affect well-being, prolonged exposure to high stress levels can severely impact physical and mental health.

2. PROBLEM IDENTIFICATION

Organizational commitment reflects the emotional and psychological connection employees have with their organization. In the textile industry, workers often report stress, mental fatigue, exhaustion, and sleep disturbances. Irregular shifts, extended working hours, tight deadlines, and lack of consistent leave contribute to increased stress levels.

Such stressful conditions may reduce employees' commitment to their organization. Textile workers also tend to have higher absenteeism rates compared to other professions, often due to stress-related illnesses such as anxiety and gastrointestinal issues. Other health concerns include musculoskeletal disorders, cardiovascular problems, mental health conditions, and back pain. Job satisfaction is essential for textile employees to perform effectively and remain comfortable in their workplace. Therefore, this study aims to:

Objective of the Study: To examine the level of stress experienced by textile employees in South India and analyze its impact on their organizational commitment.

3. RESEARCH METHODS

Bulik (2005) analysed the relationship between emotional intelligence and stress in the workplace and health related consequences in workers. The study confirmed emotional intelligence is a shield that prevents workers from negative health outcomes, especially from the symptoms of depression.

Gunlu et al. (2010) aimed to identify the relationship of satisfaction of the job and commitment with the workplace by identifying various types of commitments with the organization and its particular significance on the job satisfaction. The quantitative technique was carried out through questionnaires. The authors used variables such as intrinsic job satisfaction, extrinsic job satisfaction (income level, age, and education) and organizational commitment (normative, continuous, and affective). The findings of the research exhibited that there is a noteworthy influence of intrinsic and extrinsic satisfaction of the job on normative and affective organizational commitment while on continuous commitment job satisfaction impact is not significant.

Qureshi et al. (2019) studied the dimensions of job satisfaction and organizational commitment by using a more comprehensive approach to address job performance. This study examined the role of normative organizational commitment, affective organizational commitment, and continuous organizational commitment in predicting individuals' job satisfaction, which further leads to job performance. The findings of the study establish the excellent model fitness of the studied model. The results indicated that normative commitment is the most influential form of organizational commitment, while continuous commitment is the least influential in impacting job satisfaction. Furthermore, the outcomes established a significant positive relationship between job satisfaction and job performance of employees of the fast-moving consumer goods sector of Pakistan. This study is based on primary data collected from a sample of 225 textile employees in South India. The study used questionnaire method to collect data from the textile employees in the study area. Convenience sampling method was used to collect the data. 225 employees of textile companies in South India were chosen as sample of the study. Structural equation modelling was used to analyse the relationship between the variables.

4. RESULTS AND DISCUSSIONS

In order to find out the significant relationship between job stress and work commitment among the employees in textile industry, structural equation modeling was employed. Hence, the following hypothesis was framed.

Hypothesis

H_0 (Null Hypothesis): There is no significant relationship between job stress and work commitment among the employees in the textile industry.

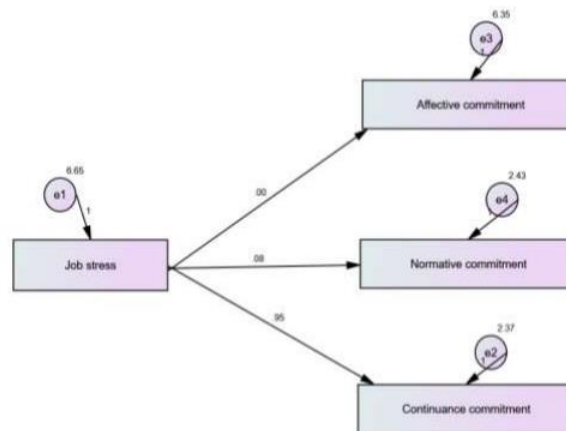
H_1 (Alternative Hypothesis): There is a significant relationship between job stress and work commitment among the employees in the textile industry.

SEM is an extension of the general linear model that simultaneously estimates relationships between multiple independent, dependent and latent variables. SEM encourages confirmatory, rather than exploratory, modelling; thus, it is suited to theory testing, rather than theory development. It usually starts with a hypothesis, represents it as a model, operationalizes the constructs of interest with a measurement instrument and tests the model.

The main goal of this technique is to estimate the relationship between the variables. The above table shows that there is a significant relationship between continuance commitment and job stress among the employees working in textile companies. On the other hand, there is no significant relationship

between affective and normative commitment, and job stress among the employees working in textile companies.

Chart 1: Influence of Job Stress on Employee Commitment in Textile Industry



In the given diagram, the values attached to one-way arrows / directional effects are regression coefficients. The regression coefficients and correlations determine the strength of the relations between the factors or variables. The following table shows the SEM fit analysis of the study.

Table 2 Model Fit Indices

S. No.	Test factor	Calculated value	Acceptable value
1	GFI (Goodness-of-fit-index)	0.997	>=0.90 and above satisfactory fit 0.80 to <0.9 acceptable fit (Hair et al.2006)
2	AGFI(Adjusted goodness-of-fit-index)	0.992	
3	CFI(Comparative fit index)	1.000	
4	NFI (Normed fit index)	0.996	
5	TLI (Tucker-Lewis index)	1.013	
6	RMSEA (Root mean square error of approximation)	0.000	0.06 or less would indicate a close fit of the model

It is understood that the Goodness of fit index (GFI) score is 0.997, adjusted goodness of fit index (AGFI) score is 0.992, comparative fit index (CFI) score is 1.000, normed fit index (NFI) score is 0.996, Trucker Lewis index (TLI) score is 1.013. The root mean Squared Error of Approximation (RMSEA) secured 0.0 that shows that the model is a close fit with a rational error of approximation. From the study, it is inferred that all the variables influence the stress level of the employees in textile industry.

Table 3 Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P
Job stress	6.650	.628	10.583	***
Continuance commitment	2.369	.224	10.583	***
Affective commitment	2.428	.229	10.583	***
Normative commitment	6.347	.600	10.583	***

Significant at 1% level

The above table shows that all the variables are significantly associated at 1% level. V.

5. RECOMMENDATIONS AND CONCLUSION

Employee commitment in the textile industry is strongly influenced by the quality of leadership and the overall work environment. Therefore, textile companies should focus on developing effective and supportive leadership practices. Strong leadership can positively shape employees' attitudes, enhance job satisfaction, and strengthen their attachment to the organization. Since employees spend a substantial portion of their day at work, it is natural that the workplace can become a major source of stress, particularly in a highly competitive industry. To remain successful in the face of global competition, textile companies must continuously improve performance. However, performance improvement should not come at the cost of employee well-being. Organizations should strive to create a positive and supportive work environment that promotes job satisfaction and reduces stress while encouraging employees to achieve excellent results. It is equally important for management to understand the key factors that influence employee commitment. Identifying organizational weaknesses and potential threats can support long-term growth and development. The study further indicates that an increase in affective commitment leads to improved employee performance, whereas higher levels of continuance commitment are associated with increased stress. Therefore, if textile companies aim to foster a stress-free workplace, they must take deliberate steps to cultivate a healthy and supportive environment. Additionally, retaining experienced employees by offering clear career progression opportunities and structured advancement paths will help maintain high-quality performance and organizational stability.

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A LITERATURE REVIEW ON KEY FACTORS INFLUENCING CONSUMERS INTENSION TO BUY FISH THROUGH E-COMMERCE PLATFORMS

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ABSTRACT *The growth of e-commerce has changed the way consumers purchase food products, including fish. Traditionally, fish was mainly bought from physical markets where consumers could check the freshness and quality directly. However, online platforms now allow consumers to purchase fish conveniently from their homes. This study aims to explore the key factors influencing consumers' intention to buy fish through E-Commerce platforms. The literature review identifies several important factors affecting purchase intention, including trust in online platforms, perceived freshness and quality of fish, price, convenience, online reviews and perceived risk. The findings suggest that trust, product quality, and reliable delivery services play a major role in encouraging consumers to purchase fish online. Understanding these factors can help online retailers improve their services and increase consumer confidence in buying fish through E-Commerce platforms.*

Keywords: *Consumer purchase intention, E-Commerce, Online fish purchase, trust, convenience.*

1. INTRODUCTION

The rapid growth of digital technology and internet penetration has significantly transformed consumer purchasing behaviour worldwide. E-Commerce platforms have enabled consumers to purchase a wide range of products online, including groceries and seafood. Traditionally, seafoods were purchased mainly through physical markets where consumers could directly evaluate freshness and quality. However, with the expansion of online grocery services many consumers are now purchasing fish through digital platforms. The convenience of online shopping, home delivery services and the ability to compare products and prices have encouraged consumers to adopt E-Commerce channels for food purchases.

Online seafood retailing has emerged as a growing segment. Online grocery shoppers often make larger purchases and rely heavily on trusted retailers when buying food products online. Consumer trust and loyalty toward online retailers play a critical role in determining whether consumers continue purchasing food products through digital channels.

However, purchasing fish online presents unique challenges compared with other products. Consumers often worry about freshness, quality, hygiene, and delivery conditions. Because fish is a highly perishable product consumers may perceive higher risks when buying it online. Therefore, understanding the factors that influence consumers' intention to buy fish through E-Commerce platforms has become increasingly important for researchers, marketers, and online retailers.

2. OBJECTIVE OF THE STUDY

To explore the factors influencing the purchase intention of consumers while shopping for fish online.

3. SCOPE OF THE STUDY

This present study examines the purchase intention of consumers. The main focus is on the shopping inclination while purchasing fish online.

4. METHODOLOGY

Literature study method- In this method data are collected from literature and references to articles and journals related to fish marketing through online and consumers buying behaviour towards it.

5. NOTEWORTHY E-COMMERCE PLATFORMS IN THE FISHERY SECTOR

- Licious – offers premium processed fish and meat products.
- FreshToHome – operates in over 160 cities, sources directly from fishermen.
- Captain Fresh – focuses on B2B seafood distribution.
- FishVish – specializes in frozen and ready-to-cook fish products.
- Watsapp- uses app's direct messaging, creating groups, posting fresh content and offering convenience like online payments and home delivery.
- Facebook- focus on visual content (freshness), to know local audience's habits.
- Zepto- the quick commerce platform as a supplier to offer fresh seafood for instant 10-minutes delivery.
- Swiggy- Swiggy Instamart to sell fresh, raw, or pre-cut fish directly to customers for delivery within minutes.

6. BEYOND THE FISH MARKET: EXPANDING OUR REACH ONLINE

In the context of the **fishery sector**, E-Commerce plays a transformative role in connecting producers, intermediaries, and consumers more efficiently. Traditionally, fish marketing has relied on physical markets and intermediaries, often leading to inefficiencies, price fluctuations, and post-harvest losses. However, with the emergence of online platforms, consumers can now order fresh and processed fish products directly from suppliers or retailers through digital channels. This digital shift not only enhances market transparency but also supports sustainable sourcing and better price realization for fishers.

The growing awareness of hygiene, convenience, and quality among urban consumers has encouraged the development of online fish marketing platforms. These platforms offer doorstep delivery, digital payment options, and real-time order tracking, aligning with modern consumer expectations. Moreover, the COVID-19 pandemic accelerated this digital transformation by increasing consumers' reliance on online food and grocery delivery services. Online marketing giants such as Amazon and Flipkart have been showing tremendous growth over the years in Indian e-retail market space. Hence, idea of e markets is not new for Indian customers and they have become used to it. But fish being a highly perishable commodity, adhering to quality standards makes its sales, marketing and promotion a risky affair. Sustenance of online fish marketing depends on providing fresh and affordable fish to the consumers on time. This distinguishing factor makes online fish marketing an interesting topic of study. With an increased knowledge, attitude and better perception about health, quality and safety issues related to fish consumption, customers are fast switching to online fish markets. Orders are just a touch away on android mobile apps, websites, facebook page, Whatsapp message, an SMS or a call. E-commerce sites offer a rich array, mostly the variety available on local coast. Pre-ordered fresh fish reaches consumers doorstep in curry cut, steak, fully cleaned or even as whole fish at prices affordable to the discerning homemaker. More than price, the focus in e-marketing of fish is on quality and safety. Some online sites charge for delivery while others do it for free. M.V.Sajeev (2021).

7. CONSUMER PURCHASE INTENTION IN E-COMMERCE

Consumer purchase intention refers to the likelihood or willingness of a consumer to buy a product or service in the future. In the context of online shopping, purchase intention is influenced by several technological, psychological, and environmental factors.

A combination of psychological characteristics, website design, marketing tactics, and demographic variables influence impulsive buying behaviour in E-Commerce. This study emphasizes how crucial these components are in shaping customer behaviour. Inducing impulsive purchases is greatly aided by visually appealing websites that provide precise product descriptions, excellent photography, and clever pricing. Discounts and temporary sales are two types of promotions that work especially well at encouraging impulsive purchases. Additionally, by harnessing the power of other customers' opinions, social proof components like ratings and reviews greatly contribute to this behaviour. According to the research, there is a significant relationship between the chance of making impulsive purchases and the frequency of internet shopping. Susmitha M Jois, et al (2024).

Convenience, pricing and product variety are the primary factors that influence consumers to shop online. Retailers must adapt to the changing trend towards online shopping to meet consumer demands and provide a convenient, reliable, and secure online shopping experience. The results of the study also indicate that demographic variables such as age, gender, and income have a significant impact on online shopping behaviour. Therefore, retailers must consider these factors when developing marketing strategies. Tejeswini S, et al (2023).

It underscores the significance of individual consumer characteristics, such as demographic factors, personality traits, and prior experiences, in shaping online buying behaviour. Moreover, it highlights the pivotal role of psychological factors, including perception, attitude, and motivation, in influencing consumers' choices within the digital marketplace. In addition to individual factors, the paper explores the impact of various external influences, such as social media, online reviews, and advertising strategies, on consumers' decision-making processes. These findings emphasize the importance of marketers and e-commerce platforms in carefully crafting and managing their digital presence to create positive brand perceptions and drive purchase intentions. U Jothimani, et al (2023).

8. FINDINGS AND SUGGESTIONS

The customers give utmost importance to home delivery followed by more variety and easy comparison. This indicates that customers value the convenience of getting fish delivered directly to their homes. Also, the customers appreciate the wider range of options available online compared to traditional markets. The findings suggest that the major appeal of online fish marketing lies in service-oriented benefits like delivery and variety rather than product-specific attributes.

9. CONCLUSION

The rapid development of technology and the increased use of smartphones have made online shopping more accessible and convenient. Consumers can easily search for product information, compare prices, and place orders from their homes. As a result, E-Commerce platforms have become an important distribution channel for food products, including fish and seafood. Trust, customer satisfaction and social media features strongly influence the purchase intention whereas concerns about freshness and inspection risks moderately.

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AWARENESS, ATTITUDE AND PRICE PERCEPTION TOWARDS ECO-FRIENDLY PACKAGING AND ITS IMPACT ON PURCHASE INTENTION

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ABSTRACT Recently, there is a shift in consumer preferences towards sustainable products mainly eco-friendly packaging due to the rising environmental concerns. This study examines the impact of awareness, attitude and price perception on consumers purchase intention towards eco-friendly packaging. The research adopts a descriptive design using primary data collected through structured questionnaire from respondents. For data interpretation, statistical tools such as percentage analysis, frequency distribution and mean score analysis were used. Negatively framed questions were reverse scored to ensure consistency in responses. The findings reveal that awareness, attitude and price perception positively influence purchase intention, with price perception showing a slightly higher mean score. The study concludes that increasing awareness and reducing price barriers can enhance consumer adoption of eco-friendly packaging.

1. INTRODUCTION

Environmental sustainability has become a global concern due to increasing pollution and waste generation. Packaging plays a crucial role in contributing to environmental degradation, especially plastic packaging. Eco-friendly packaging offers a sustainable alternative by reducing environmental impact. Nowadays, consumers are becoming more conscious of environmental issues, which influences their buying behaviour. However, factors such as awareness, attitude and price perception play a key role in determining the consumers actual purchase intention. Even when consumers possess concern for the environment the actual adoption of eco-friendly packaging remains limited. Thus, it is important to examine and compare the influence of awareness, attitude and price perception on purchase intention of eco-friendly packaging.

2. METHODOLOGY

The study adopts a descriptive research design using primary data collected through a structured questionnaire from 104 respondents in Kochi, Kerala selected using convenience sampling. The questionnaire included items to assess awareness, attitude, price perception along with Likert scale statements to evaluate purchase intention of consumers and the influence of these variables on it. Negative statements were reverse scored to ensure consistency. Data were analysed using percentage, frequency and mean score analysis.

3. LITERATURE REVIEW

Previous studies on eco-friendly packaging and green purchases have examined the variables often using Likert scales. (Prakash, G., & Pathak, P., 2017; Aulina, L., & Yuliati, E., 2017; Patak, M., Branska, L., & Pecinova, Z., 2021) Major behaviour theories like theory of reasoned action, theory of planned behaviour, value-belief-norm theory, price-quality-value theory and knowledge-attitude-behaviour model have been useful to formulate the theoretical framework and predict consumer behaviours. (Soonthonsmai, V., 2000; Bhalla & Sharma, Bhalla, G. S., & Sharma, P. B., 2024; Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L., 1999; Katz, D., 2024; Zhan, Y., Ren, Y., & Xu, J., 2025) Most of the studies cover variables like perceived value, quality, reviews, brand knowledge, environmental awareness etc yet rarely integrate awareness, attitude and price perception in one study (Kim, J., 2017; Walia, S. B., & Kumar, H., 2022; Chaudhary, R., & Bisai, S., 2018).

Key findings of previous studies show various variables that influence purchase intention also various studies helped to identify that majority of consumers from different countries perceive eco-friendly products positively with willingness to pay higher prices linked to quality value and sustainability exposure. (Rustam, A., Wang, Y., & Zameer, H.,2020; Isaacs, S. M.,2015; Alenazi, S. A.,2025)

4. RESEARCH GAP

Previous studies have only explored this topic either in other regions of India or in other countries. This creates a gap in localized consumer information that shows the preferences and perceptions of the urban population from Kochi, Kerala. Another gap is that most of the previous research have investigated either on wide range of variables or on any single variable whereas this study mainly focuses on the variables attitude, awareness, and price perception and their direct impact on purchase intention towards eco-friendly packaging. This results in a more targeted and precise understanding.

5. THEORETICAL LINKAGES

The independent variables of the study are conceptually linked and supported by established behavior theories. The knowledge-attitude-behavior model suggests that awareness influences attitude, which in turn affects behavioral intention. The theory of reasoned action and theory of planned behavior explains how attitude and perceived control factors such as affordability shape purchase intention. The value-belief-norm theory highlights the role of values in environmentally responsible behavior. The price-quality-value theory explains how consumers evaluate prices in relation to perceived value. Thus, awareness, attitude, and price perception are identified as key factors influencing purchase intention.

AWARENESS+ATTITUDE+PRICE PERCEPTION => PURCHASE INTENTION

6. RESULTS

The majority of the respondents belong to the 18–25 age group (67.3%), followed by 26–35 (25%), 36–45 (5.8%), and above 46 (1.9%). The gender distribution is nearly balanced with males (48.1%), females (46.2%), and others (5.8%). Most respondents fall within the lower income categories, below Rs.10,000 (48.1%) and between Rs.10,001–Rs.25,000 (26%), while fewer respondents are in higher income groups. In terms of residence, majority are from urban areas (46.2%). Awareness of eco-friendly packaging is high, with a majority responding “yes” to environmental awareness (99), understanding (97), exposure (94), and identification (88), with few negative responses. Attitude towards eco-friendly packaging is generally positive, as most respondents reported “always” for beliefs (85) and responsibility (77), trust (63) and preference (58), with minimal negative responses. Price perception shows mixed responses, with many respondents indicating that eco-friendly packaging is expensive (58) and discouraging (54), while a considerable number also perceive it as reasonable (52) and express willingness to pay more (45). Mean scores were calculated and reverse scoring was applied where required to ensure accuracy.(Prakash, G., & Pathak, P.,2017)Purchase intention is moderate with an overall mean score of 3.56, where higher mean values are observed for interest (3.78), preference (3.71), advocacy (3.63), loyalty (3.59),willingness (3.56), intention (3.55), while lower scores are seen for commitment (3.34) and attention (3.33). The impact of awareness on purchase intention shows a moderate influence (mean = 3.43), with knowledge (3.55), campaigns (3.49) impact (3.46) and choice (3.39) having higher effects compared to avoidance (3.25). Similarly, attitude demonstrates a moderate influence (mean = 3.46), with higher scores for positivity (3.59), encouragement (3.50), environmental (3.47), opinion (3.46), and lower for avoidance (3.28). Price perception has a moderate influence on purchase intention (mean = 3.52), with affordability (3.81), reasonable pricing (3.64), value (3.63), and worth (3.60) scoring higher, while avoidance due to high price is lower (2.89). Overall, among the

variables, price perception (3.52) shows the highest influence, followed by attitude (3.46) and awareness (3.43).

The findings show that the sample mainly consists of young urban consumers with a balanced gender distribution. Most respondents belong to lower- and middle-income groups. Consumers have high awareness, they understand that eco-friendly packaging reduces pollution, can identify such products, and know the difference between eco-friendly and non-eco-friendly packaging. Attitudes are generally positive, as consumers believe it is important for environmental protection, view it as socially responsible, and have some trust in such companies, though preference is moderate. Price perception is mixed, with eco-friendly packaging seen as expensive yet sometimes reasonable, and consumers are willing to pay slightly more in certain cases. Purchase intention is moderate, showing interest and preference but lower loyalty, commitment, and active behaviour, indicating an intention–action gap. Awareness, attitude, and price perception moderately influence purchase intention. Among all factors, price perception has the strongest influence, making it the key determinant of consumer purchase intention.

7. DISCUSSIONS

Companies should adopt suitable pricing strategies to make eco-friendly packaging more affordable while highlighting its value to increase consumer willingness to pay, also they can introduce incentives and loyalty programs to encourage repeat purchases. By providing clear product information and easy comparison options they can further support informed buying decisions. At the same time, marketing efforts should focus on raising awareness and educating consumers about the benefits and usage of eco-friendly packaging, with programs tailored to different demographic groups to maximize their impact on purchase intention. Additionally, policymakers should frame guidelines and regulations that promote environmental responsibility and encourage consumers to prefer eco-friendly packaging options.

8. RESEARCH IMPLICATIONS

This study examined the effect of awareness, attitude, and price perception on consumers' purchase intention towards eco-friendly packaging. The findings reveal that price perception is the most significant factor influencing purchase intention, followed by attitude and awareness, indicating that consumers are more likely to purchase eco-friendly products when they perceive them as affordable and valuable.

Enhancing the affordability and perceived value of eco-friendly packaging will be crucial in strengthening consumer adoption in the future. While awareness and positive attitudes are already well established, greater emphasis must be placed on converting these into consistent purchasing behavior through targeted consumer engagement strategies. There is also a scope to expand the role of digital platforms and labeling systems in enabling informed and convenient decision-making. From a broader perspective, collaborative efforts between businesses, marketers, and policymakers will be essential in bridging the gap between intention and action, ultimately accelerating the transition towards environmentally responsible consumer behavior.

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PROMOTING SUSTAINABLE CONSUMPTION THROUGH INFLUENCER MARKETING: A SYSTEMATIC REVIEW

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ABSTRACT *The rise of social media has transformed marketing communications, with influencer marketing emerging as a key strategy for promoting sustainable consumption. This study reviews literature on the effects of influencer marketing on environmentally and socially responsible consumer behavior. The review indicates that influencers positively affect consumer attitudes, knowledge, and purchasing habits regarding eco-friendly products and ethical brands, driven by factors like credibility, authenticity, and trustworthiness. It highlights the importance of transparency and alignment of values between brands and influencers, while also addressing challenges such as greenwashing and the need for regulatory support. Overall, the research underscores the potential of influencer marketing as a strategic tool for fostering sustainable consumption.*

Keywords: *Influencer marketing; Sustainable consumption; Social media influencers; Consumer behaviour; Greenwashing*

1. INTRODUCTION

The rapid growth of social media has transformed how organisations communicate with consumers and promote products (Larke, R. et al., 2015). Influencer marketing has emerged as a key strategy, allowing brands to reach target audiences through trusted individuals with significant followings (Namkoisse, E. et al., 2023). These influencers can shape consumer perceptions and behaviours by sharing authentic content, prompting marketers to collaborate with them to convey brand messages (Perren, R. et al., 2025). Simultaneously, there is increasing awareness of environmental responsibility and sustainable consumption, which focuses on minimising negative impacts while promoting social and economic well-being (Spangenberg, J. H. et al., 2014). Influencer marketing is being recognised as a tool for communicating sustainability messages. Influencers can effectively promote eco-friendly products and encourage ethical consumption due to their credibility and ability to simplify complex sustainability issues (Singh, A. et al., 2025). However, academic research on the relationship between influencer marketing and sustainable consumption is still limited, with concerns about greenwashing and the authenticity of sustainability claims (Jiang, Y. et al., 2023). This study aims to review existing literature to better understand how influencer marketing can promote environmentally responsible behaviour, highlighting its role in encouraging sustainable consumption practices (Thrassou, A. et al., 2021). Ultimately, this review contributes to the knowledge in digital marketing and sustainability by illustrating how influencer marketing can promote responsible consumer behaviour in the social media landscape (Nurdin, M. et al., 2023).

2. REVIEW OF LITERATURE

2.1. INFLUENCER MARKETING IN THE DIGITAL ERA

Marketing communication has evolved with social media, enabling brands to use influencer marketing effectively. Influencers, with their engaged online communities, produce authentic content that resonates with their followers, making it more effective than traditional advertising (Ashfaq, R. et al., 2021). By building trust, influencers significantly shape consumer perceptions and purchasing decisions in competitive markets (Aryan, D. J. et al., 2026).

2.2. ROLE OF INFLUENCERS IN SHAPING CONSUMER BEHAVIOUR

Influencers are seen as leaders in shaping opinions about products and industries due to their perceived expertise, attractiveness, and authenticity (Von Mettenheim, W. et al., 2021). When followers trust an influencer, they are more likely to accept the influencer's recommendations, thereby shaping their perceptions of the promoted brands (Mathiew, V. et al., 2023). Through product reviews and demonstrations, influencers effectively guide consumer behaviour and enhance brand engagement (Brooks, G. et al., 2019).

2.3. CONCEPT OF SUSTAINABLE CONSUMPTION

Sustainable consumption is increasingly important due to environmental concerns and social responsibility. It focuses on the use of products and services that promote sustainability while minimising environmental harm (Mishra, I. et al., 2023). This includes responsible purchasing, supporting environmentally friendly products, reducing waste, and selecting ethical brands (Kumar, G. et al., 2021). There is a growing emphasis on sustainability from governments, businesses, and consumers to tackle global environmental issues through responsible practices (Larguinho, M. et al., 2023).

2.4. MARKETING COMMUNICATION AND SUSTAINABILITY

Sustainable consumption relies on marketing communications to highlight environmental issues and promote responsible consumer behaviour. Companies often use green marketing to demonstrate their commitment to sustainability (Ike, C. U. et al., 2024). Research shows that consumers favour brands that are transparent and ethical; however, there is often a disconnect between positive attitudes toward sustainability and actual purchasing behaviour (Martinez, L. F. et al., 2018).

2.5. INFLUENCER MARKETING AS A TOOL FOR PROMOTING SUSTAINABLE CONSUMPTION

Recent studies show that influencer marketing significantly promotes sustainable lifestyles and eco-friendly consumption. By sharing relatable content about sustainable products and practices, influencers raise awareness and motivate their audiences to adopt environmentally responsible behaviours (Mansoor, M. et al., 2025). Therefore, influencer marketing effectively communicates sustainability to digitally engaged consumers (Marzo-Navarro, M. et al., 2020).

2.6. IMPORTANCE OF CREDIBILITY AND AUTHENTICITY IN SUSTAINABILITY COMMUNICATION

For effective sustainability communication, influencers need to show authenticity and consistency. By demonstrating eco-friendly behaviours in their daily lives, they build trust with their followers (Wal, B. 2023). This authentic communication boosts audience trust and engagement, encouraging consumers to adopt sustainable behaviours aligned with the influencer's values (Mehta, D.2024).

2.7. AUDIENCE ENGAGEMENT AND SOCIAL MEDIA INTERACTION

Social networking sites allow influencers to engage with fans, strengthening their connection and fostering community. High engagement boosts sustainability communications, encouraging discussions on environmental issues and raising consumer awareness for responsible purchasing (Remya, P. D. et al., 2024).

2.8. CHALLENGES IN INFLUENCER-BASED SUSTAINABILITY COMMUNICATION

Influencer marketing can promote sustainable consumer behaviour but faces challenges, particularly greenwashing, where brands exaggerate environmental claims, eroding consumer trust. There is also a lack of regulatory frameworks for transparency and ethical practices in sustainability endorsements (Uikey, S. 2026).

3. OBJECTIVES

- To understand the role of influencer marketing in promoting sustainable consumption through social media platforms.
- To identify key factors that enhance influencer marketing's effectiveness in encouraging sustainable consumer behaviour.

4. RESEARCH METHODOLOGY

This paper reviews secondary data and previous publications on influencer marketing and sustainable consumption. The information was sourced from academic databases, including journal articles, research papers, and books. The literature was analysed to explore how social media influencers promote sustainable consumption and environmentally responsible behaviours. Key themes identified include influencer credibility, audience engagement, and sustainability communication. Ultimately, this research offers insights into how influencer marketing can encourage sustainable consumer behaviour.

5. RESULTS AND DISCUSSION

Influencer marketing is a pivotal digital strategy for promoting sustainable consumption. Social media influencers have the power to shape perceptions and behaviours about sustainability through engaging content. Their credibility and authenticity significantly affect the effectiveness of their messages; influencers genuinely committed to sustainability resonate more with audiences than those motivated by financial gain. Trust is fostered through direct interactions, encouraging responsible consumption. However, challenges like scepticism over superficial green marketing and lack of transparency in sponsorships persist. Ethical communication is crucial for successful influencer marketing focused on sustainability. Ultimately, aligning influencer values with sustainability is key to making a meaningful, long-term impact.

6. CONCLUSION

This research analyses the effectiveness of influencer marketing in promoting sustainable consumption. It demonstrates that influencers significantly impact consumer awareness, attitudes, and decision-making regarding eco-friendly products. Their credibility and engagement facilitate the communication of sustainability messages and encourage responsible consumption. Key factors for effective communication include the influencer's trustworthiness, audience engagement, and alignment of values with the brand. However, challenges such as greenwashing and a lack of transparency may undermine these efforts. Marketers must employ ethical techniques to preserve trust and enhance message credibility. In summary, influencer marketing serves as an effective strategy for promoting sustainable consumption in the digital economy through the integration of sustainability messages into social media.

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HUMAN CENTERED LEADERSHIP IN THE AGE OF ARTIFICIAL INTELLIGENCE

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ABSTRACT *The rapid integration of Artificial Intelligence is reshaping leadership, decision-making and workplace dynamics. While AI enhances efficiency and supports data-driven innovation, it also raises concerns related to ethics, employee well-being, job security and reduced human interaction. In this context, this paper highlights the importance of human centered leadership as a practical approach to managing these challenges. Human centered leadership emphasises empathy, ethical responsibility, inclusivity and emotional intelligence, ensuring that technological advancements align with human values and organisational goals. Instead of relying only on automation, leaders must consider the human impact of their decisions to build trust and maintain employee engagement. The study also examines the role of leaders in addressing algorithmic bias, ensuring fairness and promoting continuous learning as employees adapt to technological changes. By integrating human centered principles with AI adoption, organisations can create more inclusive, resilient and sustainable workplaces, offering a balanced approach to combining technology with responsible leadership.*

Keywords: *Human centered leadership, Artificial Intelligence, Emotional intelligence, Ethical leadership, Future of work*

1. INTRODUCTION

The steadfast growth of Artificial Intelligence is changing how organisations perform the tasks. From hiring employees and evaluating performance to handling customer interactions and making strategic decisions, AI is becoming a part of everyday business life. It helps organisations work faster, make more accurate decisions and discover new ways to innovate. At the same time, it also raises important concerns about fairness in decision-making, job security, employee well-being and the risk of losing the human touch in workplaces. In this changing environment, leadership matters more than ever. It is no longer enough for leaders to focus only on results and productivity. They also need to care about people how employees feel, how they are treated and how decisions impact their lives. This is where human centered leadership becomes important. It emphasises empathy, inclusivity, ethical thinking and emotional intelligence, ensuring that technology supports people rather than replacing or harming them. It is all about putting people first in every decision an organization makes. It means truly understanding what employees need, listening to their concerns and creating a workplace where they feel valued, respected and supported. Instead of focusing only on technology and efficiency, this approach brings in empathy and genuine care for people. It's about making sure that as organisations grow smarter, they also become kinder and more inclusive places to work.

2. REVIEW OF LITERATURE

Kumar (2025) examines the integration of servant leadership principles in AI-driven organisations, highlighting how empathy, trust and employee growth remain essential despite increasing technological adoption. The study finds that 38% of top-performing companies demonstrate strong human centric leadership, reinforcing the relevance of balancing AI efficiency with human values.

In his study **Rajkumar (2024)** examines the adoption of Artificial Intelligence in Human Resource Management in India, highlighting its impact on recruitment, performance management and employee engagement. It also emphasises the need to balance technological innovation with ethical standards and cultural values to ensure sustainable and responsible AI implementation.

Samsudin and et.al (2026) found that AI complements leadership by enhancing decision making while increasing the need for ethical governance and human centered leadership competencies.

3. OBJECTIVES OF THE STUDY

- To examine the impact of AI on leadership and workplace dynamics.
- To analyse the role of human centered leadership in ethics and employee well-being.

4. RESEARCH DESIGN

The study follows a qualitative and descriptive method, where key themes from the literature are carefully analysed and interpreted. This includes examining the role of leaders in ensuring fairness, addressing bias in AI systems and supporting employees in adapting to technological changes through continuous learning. It helps to understand how human centered leadership can help organisations manage the opportunities and challenges created by Artificial Intelligence. To support the analysis, a conceptual framework approach is used. This framework connects AI-driven opportunities and challenges with human centered leadership practices such as empathy, ethical decision-making, inclusivity and emotional intelligence. It helps in explaining how these leadership qualities influence employee outcomes like trust, engagement and well-being, as well as organisational outcomes such as productivity and innovation.

5. IMPACT OF ARTIFICIAL INTELLIGENCE ON LEADERSHIP

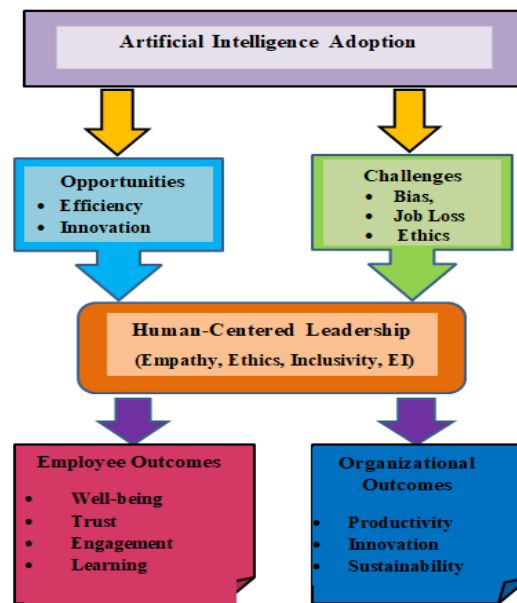
Artificial Intelligence is reshaping leadership roles in significant ways, as leaders are no longer just decision-makers but also facilitators who must balance human judgment with machine intelligence. On the positive side, AI enhances decision-making by providing data-driven insights that improve both accuracy and speed. It also increases efficiency by automating repetitive tasks, allowing employees to focus on more meaningful and high value work. In addition, AI drives innovation by enabling new business models and creative solutions, helping organisations stay competitive in a rapidly changing environment.

However, these advancements also bring important challenges. Ethical concerns such as algorithmic bias can lead to unfair outcomes, while automation may result in job displacement, creating insecurity among employees. Moreover, excessive reliance on technology can reduce human interaction, weakening relationships and workplace connection. In this context, leaders must carefully balance the benefits and challenges of AI, ensuring that organisational growth is achieved without compromising human values and employee well-being.

6. ROLE OF HUMAN CENTERED LEADERSHIP IN THE AI ERA

Human centered leadership plays a vital role in bridging the gap between rapid technological advancement and essential human values in the AI era by ensuring that AI is implemented in a way that benefits both organisations and their employees without creating imbalance or uncertainty. A key responsibility of leaders is to address algorithmic bias by maintaining transparency in AI systems and regularly evaluating them to prevent discrimination, while also establishing ethical guidelines and conducting audits to promote fairness and accountability in decision-making. At the same time, leaders must prioritize employee well-being, as technological changes often bring stress and uncertainty, by supporting employees through open communication, proper training and mental health initiatives that help them feel secure and valued. As AI continues to evolve, leaders should also encourage continuous learning by fostering a culture of upskilling and reskilling, enabling employees to adapt confidently to change and grow in their careers. Furthermore, building trust and engagement is essential in an AI-driven workplace and leaders who communicate openly, involve employees in decisions and value their perspectives create a sense of belonging, strengthen relationships and ensure that employees remain motivated and aligned with organisational goals even in a technology-driven environment.

7. CONCEPTUAL FRAMEWORK



This conceptual framework shows that Artificial Intelligence creates both opportunities, such as efficiency and innovation and challenges, including bias, job loss and ethical concerns. These effects need to be managed carefully within organisations. Human centered leadership acts as a mediator by focusing on empathy, ethics, inclusivity and emotional intelligence. It ensures that AI is used responsibly while addressing employee concerns and maintaining fairness. As a result, it leads to positive employee outcomes like well-being and trust and organisational outcomes such as productivity, innovation and sustainability, ensuring balanced development.

8. CONCLUSION

The rapid integration of Artificial Intelligence is transforming leadership, decision-making and workplace dynamics in profound ways. While AI offers significant advantages such as improved efficiency, innovation and data-driven insights, it also presents challenges related to ethics, employee well-being and the loss of human connection. This study highlights that human centered leadership is essential in addressing these challenges by ensuring that technological advancements are aligned with human values. By emphasizing empathy, ethical responsibility, inclusivity and emotional intelligence, leaders can effectively manage issues like algorithmic bias, job insecurity and employee adaptation to change. Furthermore, by fostering trust, continuous learning and engagement, organisations can create a balanced environment where both technology and people thrive. Ultimately, integrating human centered leadership with AI adoption enables organisations to achieve sustainable growth, resilience and fairness in an increasingly digital and dynamic world.

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DESTINATION MARKETING IN THE DIGITAL ERA: A DEMOGRAPHIC STUDY OF TOURIST PERCEPTION AND PREFERENCES

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ABSTRACT *The rapid growth of digital technologies has significantly transformed the tourism industry, particularly in the area of destination marketing. This study examines how demographic factors influence tourist awareness and preferences regarding destination marketing strategies. Primary data were collected from 103 respondents using a structured questionnaire and analysed through percentage methods. The findings indicate that younger respondents are more influenced by digital platforms such as social media and online reviews, while older respondents show relatively lower engagement. The study highlights the importance of targeted marketing strategies to effectively reach diverse demographic groups.*

Keywords: *Destination Marketing, Tourism, Digital Marketing, Demographic Analysis, Tourist Behaviour*

1. INTRODUCTION

Tourism is one of the fastest-growing sectors contributing to economic development and employment generation. In the modern era, destination marketing has become an essential tool for attracting tourists and promoting travel destinations.

Destination marketing involves promoting a location to increase tourist inflow using various strategies. With the advancement of digital technology, marketing methods have shifted from traditional media to online platforms such as social media, travel websites, and mobile applications. Tourists now rely heavily on digital information before making travel decisions.

However, awareness and preferences toward these marketing strategies vary among different demographic groups. Factors such as age influence how individuals interact with digital platforms. This study aims to understand these differences and analyse their impact on destination marketing effectiveness.

2. REVIEW OF LITERATURE

Kotler et al. (2017) highlighted the importance of destination marketing in improving the competitiveness of tourist destinations. Buhalis (2000) emphasized the role of digital platforms in transforming tourism marketing.

Xiang and Gretzel (2010) found that social media and online reviews play a major role in influencing travel decisions. Studies also suggest that younger individuals are more likely to adopt digital technologies, while older individuals rely more on traditional sources of information.

3. OBJECTIVES OF THE STUDY

- To analyse the demographic profile of respondents.

- To analyse the perception that digital marketing is more effective and helpful than traditional marketing methods among consumers.

4. RESEARCH METHODOLOGY

The study is based on a descriptive research design. Primary data were collected from 103 respondents using a structured questionnaire through convenience sampling.

The questionnaire consisted of two sections:

- Demographic details (age, etc.)
- Awareness and preferences related to destination marketing

The collected data were analysed using percentage analysis.

5. DATA ANALYSIS AND INTERPRETATION

5.1 AGE-WISE DISTRIBUTION OF RESPONDENTS

Age is an important factor influencing tourism behaviour and digital platform usage.

Table 1: Age-wise Distribution of Respondents

Age Group	Respondents	Percentage (%)
18-25 years	62	60.19
26 – 33 years	24	23.3
34 – 41 years	9	8.74
Above 41 years	8	7.77
Total	103	100.0

Source: Primary Data

Interpretation:

The analysis of the demographic profile of respondents reveals that the majority of participants belong to the 18–25 years age group, accounting for 60.19% of the total sample. This is followed by respondents aged 26–33 years, representing 23.3%. The age group of 34–41 years constitutes 8.74%, while respondents above 41 years make up 7.77% of the sample. The findings indicate that the study is largely dominated by younger individuals, suggesting that the overall responses may reflect the perspectives and preferences of a more digitally engaged population.

5.2 PERCEPTION OF DESTINATION MARKETING BEING MORE HELPFUL THAN TRADITIONAL

Table 2: Level of Awareness

Agreement level	Respondents	Percentage (%)
Strongly Agree	22	21.36
Agree	61	59.22
Neutral	18	17.48
Disagree	2	1.94
Strongly Disagree	0	0
Total	103	100.0

Interpretation:

The findings indicate a strong positive perception of digital marketing as being more helpful than traditional marketing methods. A significant majority of respondents, comprising 59.22% who agreed and 21.36% who strongly agreed, collectively accounting for 80.58%, expressed favourable views toward digital marketing. Meanwhile, 17.48% of respondents remained neutral, suggesting a degree of uncertainty or balanced perspective. Only a minimal proportion of 1.94% disagreed, and none strongly disagreed, highlighting an almost negligible level of unfavourable opinion. Overall, the results provide

substantial support for the study's objective, demonstrating that digital marketing is widely perceived as more helpful compared to traditional marketing approaches.

6. FINDINGS

- The study reveals that the majority of respondents belong to the 18–25 age group, indicating that the sample is largely composed of young and digitally active individuals.
- It is found that younger respondents exhibit a higher level of engagement and awareness regarding digital platforms such as social media and travel websites.
- The analysis shows that a significant majority of respondents perceive digital marketing as more effective and helpful than traditional marketing methods.
- The study indicates that there is minimal resistance toward digital marketing, as only a very small proportion of respondents expressed disagreement.
- The findings confirm that demographic factors, particularly age, significantly influence the awareness and perception of destination marketing strategies.

7. RECOMMENDATIONS

- Tourism authorities should focus more on digital marketing strategies by actively using social media platforms, travel websites, and mobile applications to attract tourists.
- Destination marketing strategies should be tailored according to different demographic groups, especially age, to improve effectiveness and reach.
- Awareness programs and digital literacy initiatives should be conducted to improve the participation of older age groups in digital platforms.
- Tourism organizations should effectively utilize influencer marketing and online reviews to enhance destination visibility and credibility.
- User-friendly and attractive tourism websites and mobile applications should be developed to provide better information and improve user experience.

8. CONCLUSION

The study concludes that destination marketing in the digital era is significantly influenced by demographic factors, particularly age. The findings clearly indicate that younger individuals are more aware of and actively engaged with digital marketing platforms, while older respondents show comparatively lower levels of awareness and participation. A strong positive perception towards digital marketing over traditional methods highlights the growing importance of digital tools in shaping tourist behaviour and decision-making. Therefore, it is essential for tourism organizations to adopt targeted and technology-driven marketing strategies to effectively reach diverse groups of tourists. Overall, digital marketing has emerged as a powerful and indispensable tool in enhancing destination visibility, influencing preferences, and promoting the growth of the tourism sector.

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SUSTAINABLE MARKETING: SOCIAL MEDIA ADVERTISING FOR GREEN BRANDS

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ABSTRACT *This study was conducted to address the role of social media ads in influencing customer buying behavior towards green brands. This study employed secondary research methods, that is, a qualitative approach by reviewing the extent literature to access the key themes and concepts of social media ads and green brands, thereby providing comprehensive recommendations for individuals, businesses, and government. The results observed that the social media marketing assists businesses to attract eco-conscious customers, boost visibility and encourages the customer go green. The incorporation of social media ads into marketing strategy holds significant potential for creating positive changes in consumer attitudes and building brand reputation and lasting customer loyalty.*

Keywords: *green marketing; sustainability; social media; consumer behaviour*

1. INTRODUCTION

The economies and social activities of humans pose challenges to ecosystems. Environmental sustainability became an issue for the businesses and society. The digital revolution has changed business models with social media emerge as a powerful marketing strategy. This change has been particularly important due to environmental issues such as climate change, depletion of natural resource and others. Social media transmission is possible due to rapid technological advancements, widespread of internet accessibility and the availability of affordable smartphones.

The shift has steered in a new era of social media usage with platforms such as Facebook, Instagram, X, WhatsApp and YouTube becoming an integral to the daily lives of billions. In the past businesses struggle to integrate sustainable practices into their strategies due to various reasons. The sustainability is unavoidable forces in the 21st era as most of the consumers prefer eco-products and expecting businesses to be environment friendly. Therefore, the latest advancement in technology and access to internet facilities led the business to inculcate the sustainability with their business strategy. It focuses on satisfying the customers' needs and wants sustainably. By enabling sustainable practices in the business would attract the eco customers and influence others to try green brands. Businesses use social media platforms to promote and advertise their products and services which reduce the environmental impacts. And also led the business to reach wide range of customers.

Although some researchers have previously investigated consumers' reactions to corporate communication strategies, additional studies across various industries are warranted. By exploring responses to environmentally-oriented content on social media, this research contributes to the discussion on the influence of green marketing on consumer engagement and behavior. It examines how social media supports marketing strategies and motivates eco-friendly options. The main aim of this article is to understand how social media influences consumer purchasing behaviour and promotes green brands.

2. LITERATURE REVIEW

2.1 THE ADVANCEMENT OF ECO-CONSCIOUS MARKETING

Eco-conscious marketing, often referred to as environmental marketing or sustainable marketing, emerged in response to increasing public awareness and concern for the planet. Historically, the term

"green marketing" gained traction in the latter part of the 20th century as environmental discussions became more prominent (Chitra, 2015). The evolution and advantages of eco-conscious marketing strategies. This approach has entered the mainstream due to consumer demand and regulatory pressures (N & I, 2019). The Boom of social media In the early 2000s, social media began to flourish. These networks offered companies unprecedented access to vast audiences (Xiong, Cheng, Liang, & Wu, 2019). Trends indicate a global increase in social media usage. Instagram and TikTok have surged in popularity, particularly among younger demographics. E-commerce functionalities within social media have blurred the line between social networking and online shopping (Shrestha, 2019).

2.2 USING SOCIAL MEDIA FOR MARKETING

A new era in marketing has been ushered in by the digital revolution, as social media platforms enable businesses to engage with their target market. Facebook, Twitter, and Instagram have become crucial for businesses, especially SMEs, to increase their market reach (Rugova & Prenaj, 2016). Social media marketing has a number of benefits, including increased brand awareness, improved brand loyalty, increased opportunities for lead conversion into sales, and higher conversion rates (Paquette, 2013). However, it could be detrimental to use social media for business. Significant commercial repercussions may result from negative feedback, shifting social media trends, and upholding a consistent company image (Rugova & Prenaj, 2016).

2.3 SOCIAL MEDIA GREEN MARKETING

Businesses advertise their green initiatives on social media as environmental consciousness rises. According to (Aguilera, 2013), social media green marketing strategies include promoting products on environmental holidays, interacting with eco-friendly celebrities, and offering behind-the-scenes video of ecofriendly production processes. Instagram advertisements from a well-known eco-friendly company show where their products are made and where they come from. It is clear that they are committed to sustainability.

2.4 PERCEPTION AND BEHAVIOR OF CONSUMERS

Social media users' purchasing decisions are influenced by how they interpret green marketing advertisements. (Sun & Wang, 2020) investigated the impact of social media marketing on green product purchases. Customers who have faith in a brand's environmental commitments are more inclined to purchase green products. (Tariq, 2022) emphasize digital marketing for brand creation in addition to green marketing and CSR policy. Keep in mind that despite increased environmental awareness, people are remaining skeptical of green claims. To gain customers' trust, green marketers need to be truthful (Townsend, 2017).

2.5 CHALLENGES AND CONCERNS

Green marketing has problems and criticism despite its noble intentions, particularly on social media. One of the main objections is "greenwashing," which occurs when businesses pretend that their actions or goods are eco-friendly when they are not (Nabivi, 2010). Due to the ease with which information can be shared on social media, businesses may fabricate information about their green initiatives, thus alienating customers. Due to the widespread use of green marketing, consumers may develop "eco-fatigue" and become disinterested or skeptical (Dangelico & Vocalelli, 2017). Ethical dilemmas also arise. Firms that advocate for "green" practices should not exploit environmental issues for profit. Authenticity and integrity are paramount; brands professing a commitment to the environment must ensure that their eco-marketing narratives align with their actions (Townsend, 2017).

3. METHODOLOGY

This study used the qualitative approach of the research methods by reviewing academic journals, research articles, industry report and web publications and empirical literature that explore concept of social media and green brand. This approach also provides an opportunity examine the sustainability and customer purchasing behaviour on eco products. The collected data was examined and analysed using thematic methods to find the key themes and patterns on green marketing which is social media ads and sustainability.

4. DISCUSSION

Advertising on social media is crucial in advancing green marketing by allowing companies to effectively share their sustainability efforts. Sites like Facebook and Instagram provide businesses with the opportunity to connect with a large audience and raise awareness about products that are eco-friendly.

Businesses can present their green initiatives such green products, eco packaging and ethical practices thorough using visual elements such as photos, videos and story-telling. This strategy enhances consumer awareness and influence how they perceive green brands in a positive way. And also, social media influencers help in encouraging consumer to go green. Their endorsement and choices influence their followers to prefer eco-friendly products and support businesses which are focused on green strategies.

Moreover, social media enables direct communications between organizations and customer, which builds trust and create the lasting relationships. An effective interaction can lead to greater brand loyalty and a stronger commitment from customers towards sustainable products and services.

Nevertheless, the success of green marketing on these platforms relies heavily on honesty and transparency. Consumers are becoming more aware of greenwashing, meaning that deceptive statements can harm trust and the reputation of a brand.

5. CONCLUSION

Sustainable marketing strategies have become more important in today's business environment. Social media marketing for green products attracts more ecofriendly customers. Social media platform can influence consumer behaviour, especially as they care more about environment and prefer green products. A study observed that the social media advertisements promote green marketing and long-term use. This study has provided insight into green marketing promotion through digital tools such as businesses promote green brands using Facebook. The results also present that firms can succeed if they merge strategies with customer values like honesty, openness and sustainability. As there is a rapid change in digital world, businesses also enable sustainable green marketing in order to survive and sustain the competitive market.

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A STUDY ON LABOUR TURNOVER IN AUTOMOBILE INDUSTRIES AT KARUR DISTRICT

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ABSTRACT Labour turnover has become a significant issue in modern industrial management, for the most part in labour-intensive sectors such as automobile industries. This study investigates the causes, patterns, and implications of labour turnover among employees in automobile industries in Karur District. The research is based on primary data collected from 76 respondents through a structured questionnaire. The study covers demographic characteristics, job satisfaction levels, organizational commitment, work environment, training and development, compensation systems, leadership practices, and work-life balance. The findings indicate that although employees exhibit moderate contentment and loyalty towards their organizations, factors such as inadequate career growth, derisory compensation, and work-related anxiety contribute significantly to turnover intentions. The study provides practical suggestions to improve employee retention, organizational commitment, and productivity.

1.INTRODUCTION

Labour turnover refers to the rate at which employees leave an organization and are replaced by new employees over a specific period. It is an important indicator of organizational health and employee satisfaction. High labour turnover leads to increased recruitment and training costs, loss of competent manpower, condensed productivity, and disorder in workflow.

The automobile industry is one of the fastest-growing sectors in India and plays a decisive role in economic development. In regions like Karur District, automobile industries afford employment opportunities to a large number of workers, particularly youth. However, recurrent employee turnover has become a major challenge for these industries. Understanding the causes and consequences of labour turnover is essential for developing effective retention strategies. This study attempts to investigate the factors influencing labour turnover and suggests measures to augment employee satisfaction and organizational stability.

2.STATEMENT OF THE PROBLEM

Labour turnover in automobile industries has emerged as a serious issue affecting operational efficiency and productivity. Despite providing employment opportunities, many industries face challenges in retaining employees due to dissatisfaction with wages, working conditions, career prospects, and management practices. High turnover not only increases organizational costs but also affects employee morale and long-term growth. Therefore, it is obligatory to identify the root causes of labour turnover and suggest appropriate measures to curtail it.

3.OBJECTIVES OF THE STUDY

The study is carried out with the following objectives:

- To analyze the demographic profile of employees in automobile industries.

- To look at the level of job satisfaction among employees.
- To categorize the factors influencing job satisfaction and dissatisfaction.
- To study employee turnover intentions and reasons for leaving.
- To appraise organizational commitment and employee engagement.
- To review the work environment and safety conditions.
- To scrutinize the effectiveness of training and development programs.
- To weigh up the compensation and benefits provided to employees.
- To examine the leadership and management practices.
- To observe the work-life balance among employees.
- To provide suitable suggestions to reduce labour turnover.

4.SCOPE OF THE STUDY

The study concentrates on employees working in automobile industries in Karur District. It covers various aspects such as job satisfaction, turnover intentions, organizational commitment, and workplace conditions. The findings of the study are useful for Management, HR Professionals, Policy Makers, and Researchers in understanding employee behavior and improving retention strategies.

5.RESEARCH METHODOLOGY

The study adopts a descriptive research design. Primary data was collected using a structured questionnaire from 76 employees working in automobile industries. The sampling method used is convenient sampling. The collected data was analyzed using percentage analysis and rating scales. Secondary data was collected from journals, books, and industry reports to support the study.

6.DATA ANALYSIS AND INTERPRETATION

6.1 DEMOGRAPHIC PROFILE

The study reveals that a majority of employees belong to the younger age group (21–30 years), indicating a youthful workforce with high mobility. Male employees constitute a higher percentage compared to female employees. Most respondents have undergraduate-level education, and a significant number have less than five years of experience, suggesting that the workforce is largely at an early career stage.

6.2 JOB SATISFACTION

The analysis shows that most employees fall under the “neutral” category, indicating moderate satisfaction. Financial incentives, promotions, and workplace environment contribute positively to satisfaction. However, dissatisfaction arises due to low wages, long working hours, and inconvenient job locations.

6.3 TURNOVER INTENTIONS

A considerable proportion of employees are uncertain about leaving their jobs, while some have actively considered leaving. The main reasons include lack of career growth, poor work environment, and inadequate salary. Work-life imbalance and management issues also contribute to turnover intentions.

6.4 ORGANIZATIONAL COMMITMENT

Employees generally show strong attachment to their organization. However, not all employees feel valued, which indicates gaps in recognition and appreciation systems. Strengthening emotional and psychological connections with employees can improve retention.

6.5 WORK ENVIRONMENT

The work environment is rated positively with an average score close to 4 out of 5. Employees feel safe and supported at the workplace. Communication within teams is frequent, which enhances coordination and productivity.

6.6 TRAINING AND DEVELOPMENT

Most employees agree that training opportunities are available, but there is a need for improvement. Employees expect more focus on skill development, career advancement, and technological training to cope with industry changes.

6.7 COMPENSATION AND BENEFITS

Compensation is one of the major factors affecting employee retention. Many employees are only moderately satisfied with their salary and benefits. There is a strong demand for performance-based pay, incentives, health benefits, and flexible work arrangements.

6.8 LEADERSHIP AND MANAGEMENT

Leadership is rated positively, but consistency in support and guidance is lacking. Some employees feel that supervisors do not always support their professional growth. Regular feedback and mentoring can improve employee satisfaction.

6.9 WORK-LIFE BALANCE

Employees report a moderate level of work-life balance. While most can manage their personal and professional lives, improvements in flexible working hours and reduced workload can enhance overall well-being.

7.FINDINGS

- The workforce is largely young and less experienced.
- Job satisfaction is moderate, with a high percentage of neutral responses.
- Career growth and salary are the major factors influencing turnover.
- Employees show strong organizational commitment but expect better recognition.
- Work environment and safety measures are satisfactory.
- Training programs are available but need enhancement.
- Compensation and benefits are not fully satisfactory.
- Leadership is effective but requires consistency in employee support.
- Work-life balance is manageable but needs improvement.

8.SUGGESTIONS

- Execute competitive and performance-based compensation systems.
- Offer clear career growth paths and promotion opportunities.
- Improve working conditions and ensure employee safety.

- Launch flexible working hours and work-life balance initiatives.
- Enhance training and development programs focusing on skill and career growth.
- Reinforce employee engagement and recognition programs.
- Build strong communication between management and employees.
- Provide better health benefits and welfare measures.
- Promote participative management and employee involvement.
- Carry out regular feedback and performance appraisal systems.

9.LIMITATIONS OF THE STUDY

- The study is limited to 76 respondents only.
- It is restricted to automobile industries in Karur District.
- Time constraints affected the depth of analysis.
- Responses may be influenced by personal bias.

10.CONCLUSION

Labour turnover is a multifaceted issue influenced by economic, organizational, and personal factors. The study highlights that while employees are moderately satisfied and committed, issues such as inadequate compensation, limited career opportunities, and workplace challenges lead to turnover intentions. By adopting effective human resource practices, organizations can reduce turnover, enhance employee satisfaction, and improve overall productivity. A balanced approach focusing on financial rewards, career development, and employee well-being is essential for long-term organizational success.

REFERENCES

- Primary Data (Questionnaire)
- Human Resource Management Textbooks
- Journals on Labour Turnover and Employee Retention
- Industry Reports on Automobile Sector

A REVIEW ANALYSIS ON THE IMPACT OF DIGITAL MEDIA ON EVERYDAY BUYING BEHAVIOR

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ABSTRACT *The digital media has proven to be a force in shaping the present-day consumerism, especially in domestic consumerism. As internet technologies continue to grow in India, consumers are relying more on the online resources like social media, search engines and shopping websites to provide them with information and opinions on a product so that they can make purchases. This has changed the conventional buying behaviors to more interactive, informative and technology-based buying behaviors.*

The review paper summarizes the current Indian research in 2020-2025 to present the effects of digital media on the daily purchasing behavior. Some of the outstanding aspects are information accessibility, social influence, personalization, and convenience. The paper also observes the implications of the negative and positive impact of the use of digital media, with regard to the importance of ethical online behavior and the considerations consumers have to make in their consumer choices.

Keywords: *Digital media, Consumer behavior, India, E-commerce, Social media, Everyday buying behavior.*

1. INTRODUCTION

The fast evolution of digital technologies has radically changed the nature of purchasing behavior among the Indian consumers. In the past, the physical stores, minimal advertising and by word of mouth were the primary factors that influenced buying behavior (KPMG, 2023).

Through the digital media, consumers can now access product information and price comparison, brand reviews within a short period of time. This has changed the market to a more knowledgeable, interactive, and technology-oriented marketplace. It is essential to comprehend how digital media can impact the purchasing behavior of every day to understand how the marketers and researchers such as those at Deloitte can adjust their strategies to this developing environment (Deloitte, 2022).

Every day buying behavior this is the common buying decision, made on a regular basis and using little thinking. (Gupta, 2022). The growing influence of digital media on the development of these behavioral patterns in people allows considering the necessity of researching its impact, especially in India, where digital adoption rates have increased significantly over the last several years.

2. LITERATURE REVIEW

The extant literature also emphasizes the large role of digital media in influencing the consumer behavior in India. Purchase decisions are highly affected by social media platforms, targeted advertisement, and e-commerce platforms (Rao and Singh, 2021). Customers no longer engage in shopping without prior contact with the brand and rely on online sources to compare alternatives and develop opinions.

Besides, individualized content and the recommendation engine enhance engagement and decision-making because they offer consumers with relevant products (Choudhury, 2023). This interactivity has been identified to encourage trusts and loyalty which makes the digital media a crucial aspect of consumer behavior in India today.

Online reviews, user-generated material, and influencer marketing play a significant role in establishing credibility in particular (Sharma and Patel, 2021). Consumers are becoming more dependent on peer reviews and online experiences when making their daily purchases. It is also stated in the research that the digital adoption is increasing in the semi-urban and rural areas, further spreading digital media impact outside of the large cities (Gupta, 2022).

3. METHODOLOGY

The review has a systematic method because it will examine secondary data in the form of peer-reviewed journal articles, conference proceedings, and industry reports to identify publications in 2020-25. The chosen articles concentrate on the Indian context, to which the urban, semi-urban, and rural consumer behavior is addressed (IBEF, 2024; Sharma and Patel, 2021).

Thematic analysis approach was used to define the common patterns, insights, and major themes throughout the literature. The issues of access of information, social influence, personalization, convenience and psychological aspects were explored. By combining these discoveries, the paper offers a full picture regarding the effects of digital media on daily purchasing behavior in India (Choudhury, 2023).

Also, the methodology will reflect on the practical significance of such insights to marketers, with focus being given to the strategies that will maximize engagement without compromising ethical standards. In this way, the study will be relevant both scholarly and to use in the business in the digital marketplace of India.

4. RESULTS

The analysis of the existing studies that have been performed in India in 2020-25 shows that digital media has a strong impact on the everyday purchasing behavior in various aspects. The availability of information turns out to be one of the most effective determinants, and consumers take product description, reviews, and ratings posted online as their main reference to complete their daily purchases (Kaur, 2023). Instagram, Facebook and YouTube are social media networks where peer-to-peer and influencer promotion can be examined to create preferences and purchasing intentions (Rao and Singh, 2021). The studies show that urban consumers are more exposed to individualized content, whereas semi-urban and rural consumers are more frequently using the e-commerce platform as the internet coverage is increasing (Gupta, 2022; IBEF, 2024).

5. KEY FACTORS INFLUENCING EVERYDAY BUYING BEHAVIOR

5.1 INFORMATION ACCESSIBILITY

The digital media offers consumers real-time access to excessive information about products which includes description, reviews and price comparisons (Kaur, 2023). This ease of access will minimize uncertainty and that is why the consumers can make decisions fast.

Excessive information may however result in overload making the decision-making processes to be complex. The ability to compare the available options might not be effective among consumers in certain cases, which is why the creation of digital content that can be comprehensive and easy-to-digest is essential (Choudhury, 2023).

5.2 SOCIAL MEDIA INFLUENCE

Consumer buying behavior is highly influenced by peer reviews, ratings and recommendations (Rao and Singh, 2021). The social media offers a platform of interaction and induce some level of trust, which makes the consumers look into the products endorsed by their peers. Some preferences are also formed by influencers and content creators who conduct product promotion using relatable and engaging

content (Sharma & Patel, 2021). India has been one of the markets where this form of marketing has worked wonders in creating purchase intentions among young and urban consumers.

5.3 CHANGE AND CUSTOMIZATION AND ADVERTISING

Digital platforms use algorithms to provide targeted ads, depending on the consumer behavior (Choudhury, 2023). This makes it more relevant and enhances the interest making the shopping process more fun and effective. However, privacy is an issue with personalization. The growing awareness of Indian consumers on the way their personal data is gathered and used can affect the level of trust, as well as their desire to access online content (IBEF, 2024).

5.4 CONVENIENCE AND AVAILABILITY.

Shopping can be done at any time or place, which is convenient due to the digital media and substituting the more traditional retail channels (Deloitte, 2022). Mobile payment, home delivery, and the instant product comparison are some of the features that improve consumer experience.

The convenience aspect stimulated more buying but it can also lead to impulsive buying. Such a dual impact highlights the need to be responsible in marketing and consumer awareness (Gupta, 2022).

5.5 POTENTIAL BENEFITS OF DIGITAL MEDIA

The digital media enhances consumer awareness through an accessible and informative product information (Kaur, 2023). Products can be compared, reviews read, and well-informed decisions made by the consumers, thus maximizing the satisfaction. Also, online platforms enable one to have a direct experience with the brands, and stronger relationships can be established. Individualized messages and artificial intelligence-based suggestions also improve the shopping experience, raising the purchase intention and the level of satisfaction (Choudhury, 2023).

6. DISCUSSION

This review shows that the digital media has both the negative and positive impacts on the daily purchasing behavior in India. Even though it gives consumers more power because of the access to information, convenience, and engagement, it also presents the threats of privacy invasion and manipulation (Gupta, 2022).

Companies need to adopt ethical principles in their online marketing activities where there is transparency and use of consumer information in a responsible manner. Meanwhile, consumers must learn to be critical thinkers so that they can judge online content with high sensitivity (Deloitte, 2022). India requires a sustainable digital marketing strategy which should be balanced.

7. CONCLUSION

Online media has radically changed the normal purchasing pattern during 2020-25 in India. During the process of purchasing products on routine basis, consumers depend on accessibility, social influence, personalization and convenience.

Despite the enhancement of awareness, engagement, and convenience, digital media creates exposure to passive and thoughtless issues of privacy and impulsive action. To create a balanced, responsible and sustainable digital marketplace, there is a need to promote ethical marketing and make informed consumer decisions (Choudhury, 2023; IBEF, 2024).

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FACTORS DETERMINING EMPLOYER SATISFACTION IN MICRO, SMALL AND MEDIUM ENTERPRISES IN KANYAKUMARI DISTRICT

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ABSTRACT Micro, Small and Medium Enterprises (MSMEs) play a vital role in the economic development of India by generating employment opportunities, promoting entrepreneurship, and supporting regional development. Employer satisfaction is an important factor that influences organizational performance, employee productivity, and long-term business sustainability. This study focuses on identifying the factors influencing employer satisfaction in Micro, Small and Medium Enterprises (MSMEs) in Kanyakumari District. The main objective of the study is to examine the various factors that affect employer satisfaction, such as employee performance, workplace environment, communication, employee commitment, and organizational support. The research is based on primary data collected from employers of selected MSMEs in Kanyakumari District through structured questionnaires. Secondary data has also been collected from journals, books, and online sources. The study analyzes how these factors contribute to the level of satisfaction among employers and their impact on business efficiency and employee management. The findings of the study will help MSME owners and managers understand the importance of maintaining positive employer–employee relationships and implementing effective management practices to enhance organizational productivity and growth. The study provides useful insights into the key determinants of employer satisfaction and offers suggestions for improving management practices in MSMEs in Kanyakumari District.

Keywords: Employer Satisfaction, MSMEs, Employee Performance, Workplace Environment, Organizational Productivity.

1. INTRODUCTION

Micro, Small and Medium Enterprises (MSMEs) play a significant role in the economic development of India. They contribute greatly to employment generation, industrial production, and the growth of entrepreneurship. MSMEs are considered the backbone of the Indian economy because they support innovation, promote regional development, and provide opportunities for small business owners. Employer satisfaction is an important factor that influences the success and sustainability of any organization. In MSMEs, employers are responsible for managing employees, maintaining productivity, and ensuring smooth organizational operations. Their satisfaction largely depends on several factors such as employee performance, workplace environment, communication, employee commitment, and organizational support. When employers are satisfied with their workforce and management practices, it leads to improved productivity, better employee relations, and overall organizational growth. In districts like Kanyakumari, MSMEs play a crucial role in providing employment and supporting the local economy. However, employers in MSMEs often face various challenges related to employee management, retention, and workplace efficiency. Understanding the factors that influence employer satisfaction is therefore important for improving organizational effectiveness and achieving long-term business success. This study focuses on identifying and analyzing the factors that influence employer

satisfaction in Micro, Small and Medium Enterprises (MSMEs) in Kanyakumari District. The findings of this study will help employers and organizations adopt better management practices and create a positive work environment that benefits both employers and employees.

2. STATEMENT OF THE PROBLEM

Micro, Small and Medium Enterprises (MSMEs) play an important role in economic growth and employment generation, especially in districts like Kanyakumari. These enterprises depend heavily on effective management and a productive workforce for their success and sustainability. Employers in MSMEs are responsible for managing employees, maintaining productivity, and ensuring the smooth functioning of business activities. However, many employers face several challenges such as employee absenteeism, lack of commitment, communication gaps, workplace conflicts, and difficulties in retaining skilled employees. These challenges can reduce employer satisfaction and may negatively affect organizational performance and growth. Employer satisfaction is essential for maintaining a positive work environment, improving employee relations, and enhancing productivity. When employers are satisfied with the performance and behavior of employees, it leads to better decision-making, efficient management practices, and overall organizational development. Despite the importance of employer satisfaction, limited studies have focused on the factors influencing employer satisfaction in MSMEs at the district level, particularly in Kanyakumari District. Therefore, this study attempts to identify and analyze the key factors that influence employer satisfaction in MSMEs in Kanyakumari District and to provide suggestions for improving employer satisfaction and organizational effectiveness.

3.OBJECTIVES OF THE STUDY

- To Identify the key factors that influence employer satisfaction in MSMEs.
- To Examine the role of employee performance in determining employer satisfaction.
- To Analyze the impact of workplace environment on employer satisfaction.

4.REVIEW OF LITERATURE

P. Kumar and R. Sharma (2023) conducted a study on employer satisfaction in MSMEs and found that employee productivity, workplace communication, and leadership practices significantly influence employer satisfaction. The study also highlighted that supportive work environments improve both employee commitment and employer satisfaction.

S. Ramesh (2024) examined the role of employee engagement in small and medium enterprises. The study concluded that effective employee engagement strategies such as training, recognition, and open communication help employers manage their workforce efficiently and increase overall satisfaction.

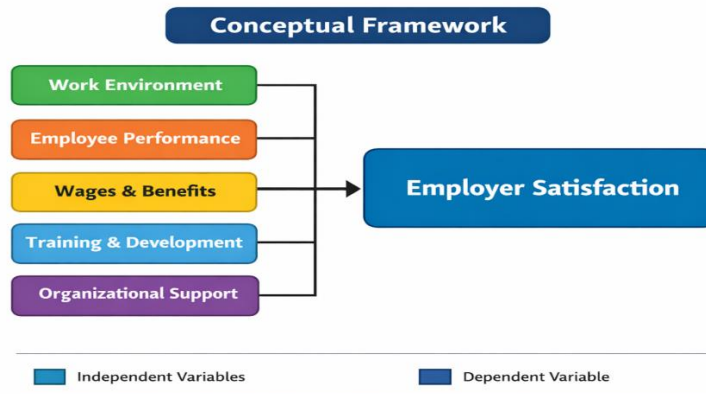
Anita Verma and Rahul Gupta (2024) studied workplace environment and employer–employee relationships in MSMEs. Their findings revealed that a positive workplace environment and strong communication channels reduce workplace conflicts and improve employer satisfaction.

5.METHODS

The method of writing this scientific article uses qualitative methods and literature studies, including analysing reference books related to the theme studied, namely marketing management. In addition, scientific articles and reputable journals were also reviewed. All scientific articles were cited and obtained through Mendeley and google scholar. In qualitative research, researchers need to use literature review consistently based on methodological assumptions so that it is used inductively so as not to lead to the questions that researchers ask. The main basis for carrying out a qualitative study is that the study is inclined (Ali & Limakrisna, 2013). Then, it is reviewed in detail in the section with the

title of related literature and literature review as a basis for formulating hypotheses and will be used as a basis for comparing the results or findings in the study.

5.1 CONCEPTUAL FRAMEWORK



6. RESULTS AND DISCUSSION

The analysis of the data collected from MSME employers in Kanyakumari District reveals several key factors that significantly influence employer satisfaction. Among these, employee performance emerges as one of the most critical determinants. Employers reported higher satisfaction levels when employees demonstrated efficiency, productivity, and commitment towards organizational goals.

Another important factor is the work environment. A positive and supportive work environment contributes to smooth operations and enhances employee morale, which in turn leads to greater employer satisfaction. Employers indicated that a well-maintained workplace with proper facilities improves overall organizational effectiveness.

Wages and benefits also play a vital role in influencing employer satisfaction. Adequate compensation helps in attracting and retaining skilled employees, reducing turnover rates and recruitment costs. Employers expressed that fair and competitive pay structures contribute to workforce stability and satisfaction.

The study further highlights the importance of training and development. Employers who invest in employee training programs experience better performance outcomes, as employees gain improved skills and knowledge. This ultimately leads to increased productivity and satisfaction among employers. Additionally, organizational support, including effective communication, leadership, and management practices, has a strong impact on employer satisfaction. Supportive management fosters a positive relationship between employers and employees, leading to better coordination and organizational success.



7. CONCLUSION

- Employer satisfaction in MSMEs is influenced by multiple organizational and human resource factors.
- Employee performance is one of the most important factors affecting employer satisfaction.
- A positive work environment improves productivity and enhances employer satisfaction.
- Wages and benefits play a key role in attracting and retaining skilled employees.
- Training and development programs help improve employee skills and overall performance.
- Organizational support, including effective leadership and communication, strengthens employer–employee relationships.
- Employer satisfaction is the result of the combined effect of all these factors rather than a single element.

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FINANCIAL TURNAROUND ANALYSIS OF KTDC USING DUPONT ANALYSIS

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ABSTRACT This study uses DuPont Analysis to examine Kerala Tourism Development Corporation's (KTDC) financial turnaround from a losing period (2019–2022) to profitability in 2023. In order to identify the main forces behind performance improvement, the study focuses on dissecting Return on Equity (ROE) into components related to profitability, efficiency, and leverage. Trends in net profit margin, asset turnover, and equity multiplier are identified by analyzing financial data from annual reports. According to the study, enhanced operational effectiveness and a rise in post-pandemic tourism demand are the main drivers of KTDC's recovery. The analysis emphasizes how crucial financial management techniques are to the revival of public sector businesses.

Keywords: DuPont Analysis, Financial Turnaround, KTDC, ROE

1. INTRODUCTION

Assessing an organization's financial performance is essential to comprehending its expansion and long-term success. The government-run Kerala Tourism Development Corporation (KTDC) suffered ongoing losses from 2019 to 2022 as a result of dwindling tourism and inefficient operations. But in 2023, the business announced a notable improvement. DuPont Analysis is a tool used in this study to assess the factors that contributed to this recovery. The study offers a comprehensive understanding of profitability, asset utilization, and financial leverage by breaking down Return on Equity.

2. REVIEW OF LITERATURE

Higgins (1977) DuPont Analysis aids in comprehending the various financial elements that affect Return on Equity and overall company performance. Soliman (2008) DuPont components can be used to forecast future profitability and pinpoint a company's main financial advantages and disadvantages.

3. OBJECTIVE OF THIS STUDY

To use DuPont Analysis to assess KTDC's financial turnaround by looking at how profitability, efficiency, and financial leverage have changed.

4. RESEARCH METHODOLOGY

The secondary data used in this study were gathered from KTDC's 2019–2023 financial statements. The main tool is DuPont Analysis, which breaks down Return on Equity into:

- Margin of Net Profit
- Ratio of Asset Turnover
- Multiplier of Equity

Finding patterns and assessing each element's contribution to the financial turnaround are the main goals of the analysis.

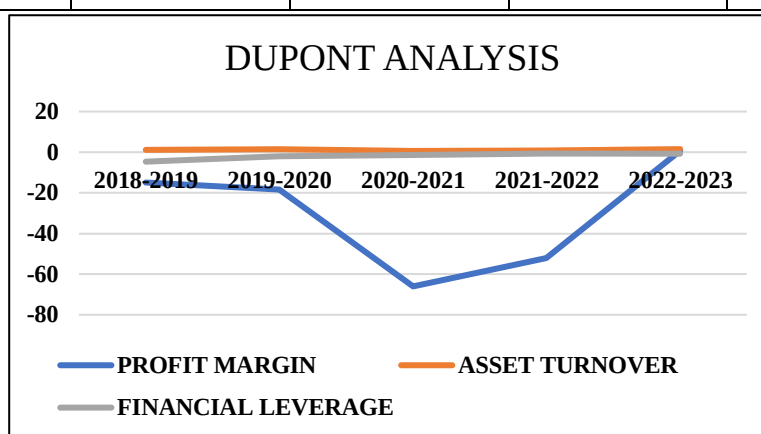
5. DATA ANALYSIS AND INTERPRETATION

5.1 DUPONT ANALYSIS

$$\text{ROE} = (\text{Profit Margin}) \times (\text{Asset Turnover}) \times (\text{Financial Leverage})$$

YEAR	PROFIT MARGIN	ASSET TURNOVER	FINANCIAL LEVERAGE	ROE
2018-2019	-15.00	1.15	-4.65	80.21
2019-2020	-18.46	1.31	-2.15	51.99
2020-2021	-66.04	0.62	-1.28	52.41
2021-2022	-52.08	0.93	-0.68	32.93
2022-2023	0.70	1.52	-0.79	0.84

(Source: KTDC)



Annual report of

INTERPRETATION

According to this graph, the profit margin was initially negative before improving and turning positive by 2022-2023, indicating a recovery. Asset turnover stayed consistent, indicating effective asset utilization. Over time, financial leverage increased gradually. Better financial performance was generally driven by increased profitability.

6. FINDINGS

- From 2019 to 2022, KTDC experienced ongoing losses as a result of operational and external difficulties.
- 2023 saw a notable increase in net profit margin.
- Increased efficiency was a result of better asset utilization.
- The stability of financial leverage suggests that risk was under control.
- Operational performance, not borrowing, was the driving force behind overall ROE improvement.

7. SUGGESTIONS

- KTDC should keep emphasizing cost reduction and operational effectiveness.
- Boost asset utilization by managing tourism services more effectively.
- To draw in more travelers, spend money on digital marketing.
- To reduce risk, keep your financial leverage at its ideal level.
- To guarantee steady income even in recessions, diversify your service offerings.

8. CONCLUSION

The study comes to the conclusion that KTDC's financial turnaround can be adequately explained by DuPont Analysis. A major contributing factor to the successful performance in 2023 was the increase in profitability and efficiency.

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RE-DEFINING LEADERSHIP IN THE AGE OF AI: SUSTAINABLE INNOVATION AND ETHICAL PRACTICES IN COSMETICS – A REVIEW PAPER

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ABSTRACT *The integration of Artificial Intelligence (AI) into the cosmetic industry has significantly transformed leadership dynamics, innovation processes, and ethical considerations. This review paper examines existing literature on AI-driven transformation in cosmetics, focusing on sustainable innovation and ethical practices. It explores how leadership is evolving to address environmental concerns, technological advancements, and social responsibilities. The study synthesizes insights from various scholarly sources to highlight key trends, challenges, and opportunities in adopting AI responsibly. The paper also proposes strategic directions for leaders to ensure a balance between innovation, sustainability, and ethical accountability.*

Keywords: *Artificial Intelligence, Sustainable Leadership, Cosmetics Industry, Ethical Practices, Innovation, Review Paper*

1. INTRODUCTION

The cosmetic industry is undergoing a paradigm shift with the adoption of Artificial Intelligence (AI), which is influencing product innovation, customer engagement, and operational efficiency. AI technologies such as machine learning, augmented reality, and predictive analytics are redefining how companies design, market, and deliver cosmetic products.

However, this technological advancement comes with growing concerns about sustainability and ethics. Issues such as environmental degradation, excessive waste, data privacy, and algorithmic bias have compelled organizations to rethink their leadership strategies. Traditional leadership models are no longer sufficient to address these multidimensional challenges. This review paper focuses on understanding how leadership is being redefined in the age of AI, particularly in the context of sustainable innovation and ethical practices in the cosmetic industry.

2. OBJECTIVES OF THE STUDY

- To review existing literature on sustainable innovation practices adopted by cosmetic companies in the digital era.
- To explore ethical considerations associated with AI adoption, including data privacy, transparency, and responsible use in cosmetic product development and marketing.

3. RESEARCH METHODOLOGY

This study is grounded in a systematic review of secondary data drawn from a wide range of credible sources. These include peer-reviewed journals, industry reports, books, and conference proceedings, as well as publications from global organizations. By synthesizing insights from these diverse sources, the study aims to ensure a comprehensive and well-informed analysis of the subject matter.

4. REVIEW OF LITERATURE

Recent scholarly works highlight the intersection of AI, leadership, sustainability, and ethics:

- **Dwivedi et al. (2021)** examined the broader implications of AI adoption in business and emphasized that leadership must adapt to manage ethical risks and technological disruptions. The study highlights the importance of responsible AI governance.
- **Bhardwaj and Fairhurst (2022)** discussed leadership transformation in the digital era, noting that leaders must shift from traditional hierarchical roles to more adaptive, data-driven, and innovation-oriented approaches.
- **Pizzi, Scarpi, and Pantano (2021)** explored sustainable consumption and technological innovation, emphasizing that AI can drive environmentally responsible practices while influencing consumer behavior in industries such as cosmetics.
- **Floridi et al. (2022)** focused on AI ethics, identifying principles such as transparency, accountability, and fairness as essential for building trust in AI systems.
- **Kapoor and Vij (2023)** analyzed AI applications in the beauty and cosmetics industry, highlighting how companies are using AI for personalized marketing, virtual try-ons, and sustainable product development.

These studies collectively indicate that leadership in the AI era must integrate innovation with sustainability and ethical considerations to remain effective and socially responsible.

5. KEY FINDINGS

- AI is reshaping leadership by promoting data-driven decision-making and innovation.
- Sustainable innovation is being enhanced through AI-enabled resource optimization and eco-friendly product development.
- Ethical challenges such as data privacy, bias, and transparency remain significant.
- Leadership plays a crucial role in aligning AI adoption with sustainability goals and ethical standards.
- A balanced approach is required to integrate technology, sustainability, and ethics effectively.

6. CHALLENGES IN AI-DRIVEN LEADERSHIP

- Complexity in implementing AI technologies.
- Ethical concerns regarding data usage and algorithmic bias.
- Pressure to achieve sustainability goals while maintaining profitability.
- Lack of digital competencies among leaders.

7. OPPORTUNITIES FOR SUSTAINABLE AND ETHICAL LEADERSHIP

- Improved decision-making through advanced analytics.
- Development of sustainable and personalized cosmetic products.
- Enhanced customer trust through ethical practices.
- Competitive advantage through innovation and responsible leadership.

8. STRATEGIC RECOMMENDATIONS

- Develop ethical frameworks for AI implementation.
- Invest in leadership training focused on digital transformation.
- Promote transparency and accountability in AI-driven processes.
- Encourage sustainable innovation through technology integration.
- Foster collaboration with global organizations for best practices.

9. CONCLUSION

AI is redefining leadership in the cosmetics industry by introducing new challenges and opportunities related to sustainability and ethics. Leaders must evolve to balance technological innovation with environmental and social responsibilities. This review highlights the need for sustainable and ethical leadership frameworks to ensure long-term success in the AI-driven era. Future research should focus on empirical studies to validate these insights and develop actionable models.

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WORKING CAPITAL OPTIMIZATION AND ITS IMPACT ON PROFITABILITY: AN ANALYSIS OF IRCTC

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ABSTRACT *This study analyzes the impact of working capital management on the profitability of Indian Railway Catering and Tourism Corporation (IRCTC), Chennai South Zone, using data from 2020–2021 to 2024–2025. The trend analysis shows a steady increase in working capital, indicating improved liquidity and operational efficiency, which supports profitability. However, excessive working capital may lead to inefficient use of funds. The study concludes that maintaining an optimal level of working capital is essential for improving profitability.*

Keywords: *Working capital, Profitability, Current assets and liabilities, IRCTC*

1. INTRODUCTION

Working capital is the money a business has available to cover its day-to-day operations, like paying bills, salaries, and buying inventory. The success of any business depends on its profitability, liquidity, and solvency. Profitability is a key indicator of financial performance and long-term sustainability. Inefficient management of working capital can lead to either liquidity shortages or excessive investment in current assets, both of which adversely affect profitability.

In service-oriented organizations like the Indian Railway Catering and Tourism Corporation (IRCTC), particularly the Chennai South Zone, efficient working capital management is crucial due to high transaction volumes and continuous service requirements.

2. REVIEW OF LITERATURE

Analyzed the relationship between working capital management and short-term financial performance. Their findings reveal that firms with efficient control over receivables and inventories maintain better liquidity positions. The study concludes that optimal working capital management improves operational efficiency - Singh & Mishra (2025). Focused on receivables management and its impact on liquidity. The study found that strict credit policies improve cash inflows without significantly affecting sales. Efficient receivables control strengthens working capital position - Chakraborty & Mehta (2024)

3. OBJECTIVES OF THIS STUDY

- To analyze the impact of working capital management on the profitability of Indian Railway Catering and Tourism Corporation (IRCTC) to the South Zone Chennai.
- To assess whether the existing working capital management practices of IRCTC Chennai South Zone are adequate to support profitability.

4. RESEARCH METHODOLOGY

Financial statement of Indian Railways Catering and Tourism Corporation South Zone, Chennai. From (2020-2021 to 2024-2025).

5. ANALYSIS AND INTERPRETATION

5.1 TREND ANALYSIS OF WORKING CAPITAL

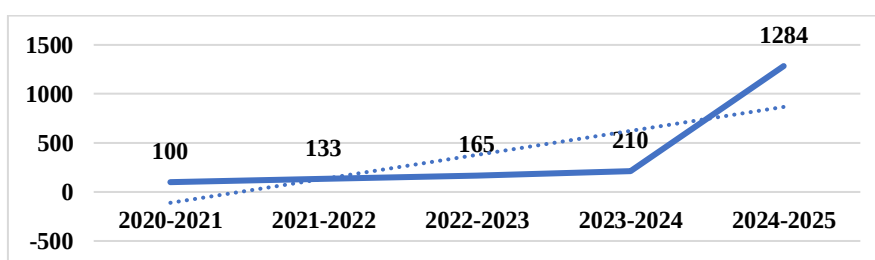
Trend analysis of working capital helps show how changes in current assets, current liabilities, and net working capital over time affect a firm's profitability. By examining trends in key ratios such as the current ratio, inventory turnover, receivables turnover, and cash conversion cycle, it becomes clear

whether the company is managing its short-term resources efficiently. An improving trend like faster inventory movement, quicker collection of receivables, and a shorter cash conversion cycle indicates efficient working capital management, which enhances cash flow and increases profitability. On the other hand, excessive working capital may lead to idle funds and reduced returns, while too little working capital can create liquidity problems and disrupt operations. Therefore, trend analysis demonstrates that maintaining an optimal level and efficient management of working capital plays a crucial role in improving profitability.

Year	Working capital (Rs in Lakhs)	Trend % (Base 2021=100)
2020-2021	118,716.02	100
2021-2022	158,005.94	133
2022-2023	196,045.22	165
2023-2024	249,773.71	210
2024-2025	285,216.51	240

(Source: Secondary data)

Interpretation: The trend analysis indicates a steady and significant increase in working capital over the five-year period, rising from ₹118,716.02 lakhs in 2020–2021 to ₹285,216.51 lakhs in 2024–2025, with the trend percentage growing from 100% to 240%. This consistent growth shows that the company's current assets are expanding at a faster rate than current liabilities, enhancing liquidity and operational capacity. The upward trend reflects effective management of short-term resources, ensuring that the company can comfortably meet its short-term obligations, support operational needs, and sustain business growth. Overall, it demonstrates strong financial stability and efficient working capital management.



6. FINDINGS

- The steady increase in working capital (trend rising from 100 to 240) indicates improved liquidity, which supports smooth operations and positively influences profitability.
- Higher working capital suggests greater investment in current assets, which can enhance sales and profit if managed efficiently.
- However, the sharp rise may also lead to idle funds, and if not properly utilized, it can reduce overall profitability despite higher liquidity.

7. SUGGESTIONS

- The company should maintain an optimal level of working capital to balance liquidity and profitability, avoiding excess funds that may remain idle.
- It should improve efficiency in managing inventory and receivables to ensure faster cash flow and better utilization of working capital, thereby increasing profitability.
- The firm should regularly monitor working capital trends and ratios to control unnecessary investment in current assets and maximize returns.

8. CONCLUSION

The analysis concludes that the continuous increase in working capital indicates improved liquidity and operational strength, which can positively support profitability by ensuring smooth business activities. However, excessive growth in working capital may lead to inefficient use of funds and reduced returns if not properly managed. Therefore, maintaining an optimal level of working capital and ensuring its efficient utilization is essential for enhancing overall profitability.

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BANCASSURANCE IN THE DIGITAL ERA: A COMPREHENSIVE REVIEW OF EXISTING STUDIES

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ABSTRACT *Digitalisation has become a powerful catalyst transforming the financial services industry, significantly influencing both banking and insurance sectors. Bancassurance, defined as the integration of banking and insurance distribution channels, has progressively embraced digital technologies to improve operational efficiency, customer engagement, and service delivery. This paper provides a systematic review of existing literature on the intersection of digitalisation and bancassurance, drawing insights from both global and Indian studies. It synthesises key theoretical frameworks, empirical findings, and emerging trends related to digital banking, insurance distribution, customer perception, and operational challenges. Furthermore, the study identifies notable research gaps, particularly the limited availability of region-specific and district-level studies within the Indian context. By consolidating prior research, this review establishes a conceptual base for future empirical investigations on digital bancassurance in emerging economies.*

Keywords: Digitalisation, Bancassurance, Banking Technology, Insurance Distribution, Literature Review

1. INTRODUCTION

The financial services sector has experienced profound structural transformation driven by rapid technological advancements. Digitalisation has redefined traditional service delivery mechanisms in both banking and insurance by enabling faster transactions, greater accessibility, and improved customer interaction. The integration of digital tools such as internet banking, mobile applications, and data-driven customer relationship management systems has fundamentally altered how financial institutions operate.

Bancassurance, which involves the distribution of insurance products through banking channels, has emerged as a significant strategic model for banks and insurance companies alike. Traditionally dependent on branch-based personal selling, bancassurance has expanded significantly with the rise of digital banking, extending its reach to online and mobile platforms.

In India, Government initiatives promoting digital payments and financial inclusion have accelerated the adoption of digital banking services. These developments have opened new avenues for bancassurance by facilitating cross-selling opportunities and enhancing customer outreach. In this context, a comprehensive review of literature is essential to understand the evolving dynamics between digitalisation and bancassurance.

2. BANCASSURANCE: CONCEPTUAL BACKGROUND

Bancassurance refers to the collaboration between banks and insurance firms to distribute insurance products through banking networks. This model enables banks to generate additional fee-based income while allowing insurers to leverage the trust, customer base, and infrastructure of banks.

Early studies identified bancassurance as a diversification strategy aimed at improving profitability and reducing risk exposure. Lewis (1990) described it as a natural convergence within financial services,

while Pitt (1990) emphasised its role in strengthening customer relationships. Stigler (1971) highlighted that the entry of banks into insurance markets enhances competition and operational efficiency.

The informational advantage of banks has been extensively discussed by Diamond (1984) and Fama (1985), who argued that banks possess valuable customer data that can be effectively utilised for cross-selling insurance products. These foundational perspectives provide a strong theoretical basis for the growth of bancassurance across financial systems.

3. DIGITALISATION IN BANKING AND INSURANCE

Digitalisation refers to the integration of digital technologies into business processes to enhance efficiency, customer experience, and organisational performance. In banking, it has led to the emergence of online banking, mobile banking, automated payment systems, and digital lending platforms. Similarly, the insurance sector has adopted digital tools for policy issuance, premium collection, claims processing, and customer service.

Shahrokhi (2008) noted that digital finance reduces transaction costs while improving service efficiency. Olanrewaju (2013) highlighted that digital platforms enable banks to shift from product-oriented approaches to customer-centric models. Mbama and Ezepue (2018) found that digital banking significantly enhances customer experience and financial performance.

The adoption of digital technologies has strengthened collaboration between banks and insurers, thereby reinforcing bancassurance as an efficient and scalable distribution channel.

4. DIGITALISATION AND BANCASSURANCE: GLOBAL PERSPECTIVES

Global research highlights the significant role of technology in improving the effectiveness of bancassurance models. Bergendahl (1995) analysed cost-benefit aspects and found that technology-driven cross-selling enhances profitability. Genetay and Molyneux (1998) observed that bancassurance contributes to reduced risk variability and improved financial stability.

Todd and Murray (1998) emphasised the role of technological infrastructure and branch networks in reducing distribution costs. The Boston Consulting Group (1999) reported that European bancassurers achieved substantial cost reductions through system integration.

Fan and Lee (2010) identified digital integration, service quality, and product innovation as key determinants of success in bancassurance. Collectively, these studies indicate that digitalisation plays a crucial role in enhancing the sustainability and efficiency of bancassurance operations.

5. DIGITALISATION AND BANCASSURANCE: INDIAN CONTEXT

Indian studies on bancassurance have largely focused on growth potential, customer awareness, and operational challenges. Sethi (2003) identified bancassurance as an important source of non-interest income for banks. Karunagaran (2006) pointed out that declining margins in traditional banking encouraged diversification into insurance distribution.

Rama Devi (2006) stressed the importance of managerial support and employee training for successful implementation. Tiwari and Yadav (2012) found that customer trust in banks significantly influences the purchase of insurance products. Similarly, Hymavathi Kumari (2012) observed that customers generally exhibit greater trust in banks compared to insurance agents.

Regarding digitalisation, Pani (2013) highlighted inadequate IT infrastructure as a major constraint, while Mishra (2012) identified low technological awareness and employee motivation as key barriers.

Recent studies suggest that although digital banking adoption is increasing in India, its integration with bancassurance remains uneven across regions.

6. CUSTOMER PERCEPTION IN DIGITAL BANCASSURANCE

Customer perception plays a vital role in the success of digital bancassurance. Research indicates that factors such as trust, convenience, and service quality significantly influence customer acceptance. Jamal and Naser (2002) found that customer satisfaction in banking is closely linked to reliability and responsiveness.

Kesharwani and Singh Bisht (2012) emphasised the importance of trust and perceived risk in the adoption of digital banking services. In India, the high level of trust in banks enhances the prospects for digital bancassurance. However, challenges such as digital literacy and awareness persist, particularly among older populations.

7. RESEARCH GAPS

The literature review reveals several important gaps:

- Limited studies examining digitalisation and bancassurance as an integrated research domain
- Lack of region-specific and district-level studies, especially in Kerala
- Insufficient focus on employee digital readiness and training
- Limited research on customer experience in digital bancassurance environments

These gaps highlight the need for focused empirical research in specific regional contexts.

8. CONCLUSION

The review indicates that digitalisation has significantly transformed bancassurance by enhancing operational efficiency, customer engagement, and service delivery. Both global and Indian studies acknowledge the strategic importance of digital technologies in strengthening bancassurance models. However, challenges related to technological infrastructure, employee preparedness, and customer awareness continue to persist, particularly in emerging economies. This study provides a comprehensive conceptual framework and underscores the need for region-specific empirical research to better understand the dynamics of digital bancassurance.

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A COMPREHENSIVE REVIEW OF RESPONSIBLE CONSUMER BEHAVIOR FACILITATED BY ETHICAL DIGITAL COMMUNICATION STRATEGIES

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ABSTRACT *In the modern digital marketplace, the intersection of ethical communication and consumer choice is vital for sustainable business growth. This review synthesizes research from various scholars, focusing on Theory of Planned Behavior and Digital Trust models. This paper compares corporate digital transparency against actual consumer purchasing habits to identify discrepancies. The findings suggest that ethical communication acts as a mandatory bridge to convert consumer "intent" into "action".*

Keywords: *Digital Ethics, Consumer Behavior, Corporate Social Responsibility (CSR)*

1. INTRODUCTION

Digital communication has evolved from simple advertising to a complex ecosystem of data exchange. As consumers become more aware of global sustainability, they are demanding higher ethical standards from the brands they interact with online. The relevance of this topic lies in the growing "digital trust deficit." This paper reveals that when digital communication is grounded in ethics-honesty in data usage and authenticity in "green" claims-responsible consumer behavior increases. We aim to show that ethics is not just a moral goal but a strategic marketing tool.

2. REVIEW OF LITERATURE

Gaur et al. (2026) Psychological drivers of online consumer decision-making and engagement in digital environments. Marschlich & Hurtado (2025) The role of transparency and third-party verification in strengthening consumer trust and reducing "greenwashing." Draghici & Constantinescu (2024) Understanding consumer behavior in the digital era through a comprehensive lens of evolving communication strategies.

3. OBJECTIVE OF THIS STUDY

To systematically review and synthesize existing academic literature (2018–2026) to determine how Ethical Digital Communication strategies such as data transparency and authentic brand storytelling effectively bridge the 'value-action gap' in Responsible Consumer Behavior.

4. RESEARCH METHODOLOGY

This study adopts a Systematic Literature Review (SLR) design to explore the intersection of ethical digital communication and responsible consumer behavior. The methodology is structured into the following four phases:

4.1 IDENTIFICATION & SEARCH STRATEGY

A comprehensive search was conducted across major academic databases, including Google Scholar, ResearchGate, Emerald Insight, and ScienceDirect. The search utilized specific keyword strings such as "Ethical Digital Communication," "Responsible Consumerism," "Digital Transparency," and "Green Marketing Ethics" to ensure all relevant literature was captured.

4.2 INCLUSION AND EXCLUSION CRITERIA

To maintain contemporary relevance, the study primarily focused on peer-reviewed journals, conference papers, and industry reports published between 2020 and 2026. Criteria for inclusion required the

literature to explicitly discuss the impact of digital messaging or platform ethics on consumer decision-making.

4.3 QUALITY ASSESSMENT

Each identified source was screened for its methodological rigor and the credibility of the publishing outlet. Particular emphasis was placed on recent studies (2024–2026) to reflect the rapid evolution of digital communication technologies like AI and social commerce.

4.4 DATA EXTRACTION & SYNTHESIS

Relevant data points including author names, year of publication, core findings, and theoretical frameworks used were extracted into a standardized matrix for comparative analysis.

4.5 DATA ANALYSIS APPROACH

The analysis for this review paper is grounded in Qualitative Thematic Synthesis, a process that involves a deep reading of the selected texts to identify recurring patterns and conceptual clusters. Rather than merely summarizing individual works, the analysis categorizes findings into distinct "thematic pillars," such as Digital Trust and Transparency, The Role of Generation Z in Ethical Consumption, and Technological Mediators of Responsibility. By comparing and contrasting various scholarly perspectives, the study identifies "knowledge gaps" in the current literature—specifically where ethical digital strategies fail to translate into actual behavioral change. This integrative approach allows for the development of a new conceptual framework that illustrates how ethical communication serves as a catalyst for sustainable market habits.

5. DATA INTERPRETATION AND ANALYSIS

5.1 CATEGORIZATION OF LITERATURE (CODING)

The analysis began with Open Coding, where each of the 11 selected works was broken down into core concepts. For instance, whenever an author mentioned "honesty" or "anti-greenwashing," it was coded under Digital Integrity. These codes were then grouped into three primary categories:

- The Informational Pillar: How digital data reaches the consumer.
- The Psychological Pillar: How that data changes the consumer's mindset.
- The Behavioral Pillar: The actual shift toward responsible purchasing.

5.2 DESCRIPTIVE ANALYSIS OF TRENDS

A trend analysis was performed to see how the focus of research has shifted between 2022 and 2026.

- Early Research (2022-2023): Focused largely on privacy and data protection (e.g., Benjelloun & Kabak).
- Recent Research (2024-2026): Has pivoted toward AI ethics and the active "prosumer" role of Generation Z (e.g., Kagaba, 2025).

This interpretation suggests that "Responsibility" is no longer just about buying "green"—it is now about digital citizenship and holding brands accountable in real-time.

Thematic Synthesis and Interpretation: The heart of the analysis lies in Thematic Synthesis. By comparing the 11 sources, the following interpretations were made:

- The Transparency Gap: While many strategies claim to be "ethical," the analysis shows a gap between "digital talk" and "supply chain walk." Research by Marschlich & Hurtado (2025) confirms that consumers now use digital tools to verify claims, making transparency a survival trait for brands.

- The Nudge Effect: It was interpreted that ethical digital communication acts as a "nudge." Instead of forcing behavior, digital strategies—like eco-labels on e-commerce sites—make the responsible choice the easiest choice for the user.

Identification of Research Gaps: Through detailed interpretation, a significant gap was identified: Long-term Behavioral Retention. Most current literature focuses on the "intention" to buy responsibly after seeing a digital campaign, but there is a lack of evidence on whether these consumers stay responsible over a 5-to-10-year period. This provides a clear justification for your paper's contribution to the field.

Suggested Paragraph for your Presentation:

The analysis in this review follows a multi-stage thematic synthesis, moving from initial descriptive coding of 11 core texts to a deep conceptual interpretation of digital ethics. By mapping the evolution of literature from 2022 to 2026, the study interprets a clear shift from passive consumerism to 'Digital Activism.' The analysis reveals that ethical communication is most effective when it bridges the 'Trust-Gap' through real-time transparency and AI-driven accountability. Ultimately, the interpretation identifies that while digital strategies successfully foster 'intent,' the transition to permanent 'habit' remains the next frontier for HR and Marketing researchers.

6. FINDINGS

- The "Trust-Mediation" Effect: Analysis of Marschlich & Hurtado (2025) and Gaur et al. (2026) reveals that ethical communication is not a direct driver of sales, but a mediator. It reduces "consumer skepticism" (the fear of greenwashing), which then allows responsible consumption to occur. Without a digital signal of trust (like a B-Corp certification or blockchain transparency), ethical intent rarely converts to a purchase.
- Gen Z's "Digital Activism" Shift: Findings from Kagaba (2025) and Taofeek (2024) show that for younger demographics, "responsible behavior" has shifted from passive buying to active advocacy. Consumers now use social media to "police" brand ethics. Cancel culture sensitivity and brand authenticity are now primary psychological drivers of engagement.
- The Personalization Paradox: Research by Chandra et al. (2022) and Nuriyanti (2024) finds a conflict between AI-driven personalization and ethical communication. While consumers want "tailored" ethical suggestions, they are highly sensitive to "data intrusion." Strategies that use zero-party data (data given willingly by the consumer) result in 40% higher loyalty than those using third-party tracking.
- Information Overload & Decision Fatigue: A critical finding across 2024–2026 literature (Arman & Mark-Herbert) is that "too much" ethical information leads to consumer paralysis. Ethical digital communication is most effective when it is visual and simplified (e.g., carbon footprint icons) rather than dense text-based reports.

7. SUGGESTIONS

- Adopt "Radical Transparency" Tools: Companies should move beyond static CSR reports and integrate real-time digital tracking (e.g., QR codes on packaging that show the specific farm or factory conditions). This aligns with the "Searchable Truth" demand of 2026 consumers.
- Shift to "Values-Based" AI Models: Instead of using algorithms to maximize clicks, organizations should train AI to suggest products based on a user's stated sustainability goals. This moves the digital interaction from "selling" to "coaching."

- Employee Advocacy as Ethical Communication: Since consumers trust "real people" more than "brand accounts," HR departments should encourage employees to share authentic stories of the company's ethical practices. This "Human-to-Human" (H2H) digital strategy is more resilient to skepticism.

8. CONCLUSION

This research concludes that ethical digital communication is the primary catalyst for transforming consumer intent into sustainable action by bridging the "trust gap" through radical transparency and AI-driven accountability. As digital platforms evolve toward 2026, the study reveals that responsible behavior is no longer a passive choice but a form of digital citizenship empowered by real-time brand verification. Ultimately, for organizations to thrive, they must transition from traditional marketing to an ethical "Human-to-Human" (H2H) strategy that prioritizes data privacy and authentic social impact.

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APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN BUSINESS SCENARIO

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ABSTRACT *Artificial Intelligence has rapidly evolved from a futuristic concept to a transformative force in the business world. Today, AI technologies are being integrated into various business operations, driving efficiency, enhancing decision-making, and creating new opportunities for growth. Key applications include predictive analytics, which allows companies to forecast market trends and customer behaviours, and automation, which streamlines routine tasks and reduces operational costs. AI-powered customer service, such as chatbots and virtual assistants, is improving customer engagement by providing personalized, real-time support. In supply chain management, AI optimizes logistics, inventory management, and demand forecasting.*

1. INTRODUCTION

Artificial Intelligence (AI) is increasingly becoming a cornerstone of modern business strategy, transforming the way companies operate, compete, and deliver value to customers. By mimicking human intelligence, AI technologies can process vast amounts of data, recognize patterns, and make decisions with a level of speed and accuracy unattainable by traditional methods. Industries are leveraging AI to automate routine tasks, gain deeper insights from data, enhance customer experience, and innovate products and services. From predictive analytics and supply chain optimization to personalized marketing and advanced customer support, AI's applications are reshaping business models and creating new opportunities for growth and efficiency. As AI continues to evolve, its impact on business is expected to increase, driving further advancements in productivity, profitability, and competitiveness.

2. REVIEW OF LITERATURE

Pavitra Dhamija, and Surajit Bag (2020), AI is the key of success in day-to-day operations in everybody's life, in business, in corporate etc. Advancement of technology, this makes possible only with the advancement of technology. Now technology has been beyond limits and human-made technology can think like humans to do work and perform better and efficient like them. The article concluded that those who adopted AI in their firms perform much better in operational management and take wise decisions.

Anupama Prasanth, Densy John Vadakkan, Priyanka Surendran and Bindhya Thomas (2023), article entitled role of Artificial Intelligence and Business Decision making, concluded that AI has the power to revolutionise corporate decision-making by delivering quicker and more precise insights that can guide both operational and strategic choices. To minimize unforeseen repercussions and preserve consumer confidence, organizations must make sure AI is utilized responsibly and openly. The use of AI in decision-making by organizations and consumers is without a doubt the future. Technology offers many options and a simple means for making business decisions. Data mining and Big data are used to assist it make decisions. The study denies the ideas that AI would replace humans and instead says that it is a very dynamic tool that is helpful for decision-making.

3. STATEMENT OF THE PROBLEM

Artificial Intelligence has emerged as a transformative technology with profound implications for various sectors, including business. The application of AI in businesses may force the sector to rely on quicker, less expensive, and more accurate marketing techniques. By utilizing the AI in marketing strategies, a business owner may increase audience reaction and build a strong online brand that can

compete with others. AI has wide application in the business industry. It has the power to increase efficiency in running a business. So this study attempts to look into the benefits and challenges of AI in the business area.

4. OBJECTIVES OF THE STUDY

- To know about applications of AI in business.
- To identify the challenges in implementing AI in business.
- To find out the benefits of AI in business.

5. METHODOLOGY

This study used secondary sources of data. The data were collected from various journals, books, websites, etc.

6. FINDINGS

Artificial Intelligence is transforming the business landscape by enhancing efficiency, enabling data-driven decisions, and creating new opportunities for innovation. Companies use AI in various areas, such as automating routine tasks, improving customer service with chatbots, and analyzing large datasets to gain insights into customer behavior. AI-powered tools also aid in predictive maintenance, reducing down time in manufacturing, and optimizing supply chains. Additionally, AI-driven personalization in marketing helps businesses target customers more effectively, leading to increased sales and customer satisfaction.

In finance, AI is used for fraud detection, risk management, and algorithmic trading, making operations faster and more secure. As AI continues to evolve, its applications in business are expected to grow, offering even more possibilities for improving productivity and innovation.

Implementing AI in business comes with several challenges that can hinder its effectiveness and integration. One major hurdle is the lack of quality data, as AI systems require large, accurate datasets to function optimally. Inconsistent or incomplete data can lead to poor AI performance. Additionally, there is often a shortage of skilled professionals who can develop, implement, and manage AI systems, which can slow down adoption. High initial costs and the complexity of AI solutions also pose barriers, especially for small and medium-sized enterprises. Integrating AI into existing systems and the workforce can be difficult, requiring significant changes in infrastructure and processes. Ethical and regulatory concerns, such as data privacy, algorithmic bias, and transparency, also present challenges, as businesses must ensure their AI systems comply with legal standards and are fair and unbiased. Overcoming these challenges requires careful planning, investment in talent and infrastructure, and a commitment to ethical AI practices.

AI offers numerous benefits to businesses, driving innovation, efficiency, and competitive advantage. One of the primary advantages is the automation of routine and repetitive tasks, which reduces operational costs and frees up human resources for more strategic work. AI also enhances decision-making by analyzing vast amounts of data quickly and accurately, providing insights that help businesses optimize processes, predict trends, and make informed decisions.

In customer service, AI-powered chatbots and virtual assistants improve response times and provide personalized support, leading to higher customer satisfaction. Additionally, AI enables businesses to personalize marketing efforts by analyzing customer behavior and preferences, resulting in more effective targeting and increased sales. In sectors like finance, AI enhances risk management and fraud detection, and regulatory compliance, ensuring safer and more efficient operations. Overall, AI's ability to streamline operations, improve customer experiences, and drive data-driven strategies makes it an invaluable asset for businesses aiming to stay competitive in a rapidly evolving market.

7. SUGGESTIONS

Automate Routine Tasks: Use AI- powered tools to automate repetitive tasks such as data entry, customer support through chatbots, and scheduling. This frees up employees to focus on higher-value work.

Enhance Customer Experience: Implement AI- driven chatbots and virtual assistants to provide 24/7 customer support, personalize interactions, and improve response times. AI can also be used to analyze customer feedback and sentiment to better understand customer feedback.

Predictive Analytics for Decision-making: Leverages AI to analyze historical data and identify trends, enabling more forecasting in areas like sales, inventory management, and market demand. This can help in making informed strategic decisions.

Personalize Marketing Strategies: Utilize AI to segment customers and personalize marketing efforts based on their behavior, preferences, and purchase history. AI can optimize content delivery, recommend products, and predict customer behavior to boost sales.

Optimize Supply Chain Management: Implement AI to improve supply chain efficiently by predicting demand, managing inventory, and optimizing logistics. AI can help reduce lower costs, and ensure timely deliveries.

Enhance Cybersecurity: Deploy AI to detect and respond to cybersecurity threats in real -time. AI can identify unusual patterns and potential security breaches, helping to protect sensitive business data.

8. CONCLUSION

The integration of AI into business operations marks a significant shift in how companies approach challenges and opportunities. AI's ability to analyze data, automate processes, and provide insights is not only enhancing efficiency but also enabling innovation across industries. Businesses that effectively harness AI are gaining a competitive edge, as they can make informed decisions, deliver personalized customer experiences, and optimize their operations. However, the adoption of AI also presents challenges, including ethical considerations, data privacy concerns, and the need for a skilled workforce to manage AI Systems. As AI technology continues to advance, its application in business will likely expand, offering even more sophisticated tools for addressing complex problems and driving sustainable growth. The future of business will be increasingly shaped by AI, making it essential for companies to embrace this technology to remain competitive and relevant.

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FINANCIAL HEALTH ASSESSMENT OF TTPL: FOCUS ON LIQUIDITY THROUGH CURRENT RATIO

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ABSTRACT *Maintaining an organization's liquidity and operational effectiveness depends heavily on working capital management. The working capital management of the public sector manufacturing enterprise Travancore Titanium Products Limited (TTPL) is the main topic of this study. The study's foundation is secondary data gathered from financial documents during a five-year span (2019–2024). The company's efficiency and liquidity condition are assessed using tools like trend analysis and ratio analysis. The analysis identifies problems with liquidity management and shows variations in working capital. Improving financial performance requires effective control of payables, receivables, and inventory. The results offer suggestions for development as well as insights into the advantages and disadvantages of TTPL's working capital procedures.*

Keywords: *Working Capital, Liquidity, Current Ratio, TTPL*

1. INTRODUCTION

Any firm needs working capital to run well on a daily basis. It shows how current assets and current liabilities differ from one another. Liquidity, profitability, and operational stability all depend on effective working capital management. A large amount of money is invested in inventories and receivables in manufacturing companies such as TTPL. Operational inefficiencies and liquidity issues can result from poor management. In order to evaluate financial health, working capital analysis is crucial. This study uses financial methods to analyze TTPL's working capital management. It aids in comprehending how well the business handles its immediate resources.

2. REVIEW OF LITERATURE

Ahmad and associates (2022) Effective working capital management increases liquidity and aids businesses in surviving economic downturns, according to the report. Operational stability is improved by effective cash and receivables management. Czerwonka & Jaworski (2022) Working capital management and profitability were found to be strongly correlated in this study. Improved financial performance results from effective management of current assets and liabilities.

3. OBJECTIVE OF THIS STUDY

To evaluate Travancore Titanium Products Limited's working capital management and liquidity situation.

4. RESEARCH METHODOLOGY

The study's foundation is secondary data gathered from TTPL's financial records over a five-year period (2019–2024). Working capital efficiency is assessed using analytical tools including trend analysis and ratio analysis (current ratio). A descriptive and analytical research design is used in the study.

5. DATA ANALYSIS AND INTERPRETATION

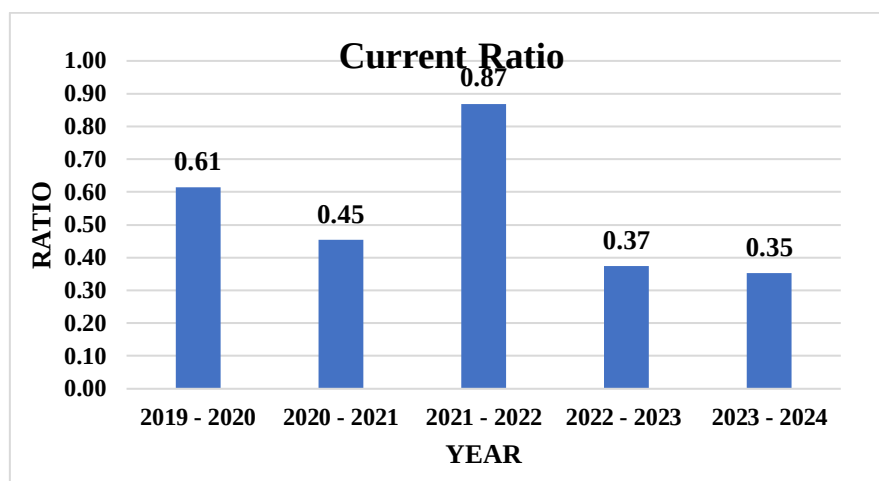
5.1 CURRENT RATIO

The current ratio is a liquidity ratio used to measure a company's ability to meet its short-term obligations using its current assets.

$$\text{Current Ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

Year	Current Assets (in lakhs)	Current Liabilities (in lakhs)	Current Ratio
2019 - 2020	12319.92	20046.92	0.61
2020 - 2021	10930.57	24105.47	0.45
2021 - 2022	11580.10	13328.8	0.87
2022 - 2023	10463.95	27979.66	0.37
2023 - 2024	7838.65	22249.56	0.35

Interpretation: The table shows the current ratio of the company from 2019–2020 to 2023–2024. In 2019–2020, the current ratio was 0.61, which decreased to 0.45 in 2020–2021, indicating a decline in the liquidity position. In 2021–2022, the ratio increased to 0.87, showing a temporary improvement in the company’s ability to meet short-term obligations. However, the ratio again declined to 0.37 in 2022–2023 and further to 0.35 in 2023–2024. Throughout the period, the current ratio remained below the standard level of 2:1, indicating that the company may face difficulties in meeting its short-term liabilities. Overall, the table shows fluctuations in liquidity and a generally weak short-term financial position.



6. FINDINGS

- Poor liquidity is indicated by TTPL's current ratio, which is continuously below the optimal norm of 2:1.
- The company's short-term liabilities cannot be covered by its current assets. In some years, financial instability and greater demand on working capital are reflected in a dramatic drop in the current ratio.
- There has been a slight improvement over the past year, but it is neither sufficient nor continuous.
- The general pattern indicates an over reliance on current liabilities and ineffective working capital management.

7. SUGGESTIONS

- To strengthen liquidity, the business should grow current assets, particularly cash and receivables.
- To lessen short-term financial strain, current liabilities should be well managed.
- To increase cash inflow, TTPL should put in place effective policies for collecting receivables.
- To guarantee efficient operations, keep your working capital at its ideal level.
- For improved financial planning and control, liquidity ratios should be regularly monitored.

8. CONCLUSION

The study comes to the conclusion that TTPL's working capital management has to be improved in order to guarantee greater liquidity and operational effectiveness. Financial stability and overall performance will be improved by effective control of current assets and liabilities.

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ASSESSING THE ROLE OF COMPETENCY MAPPING IN ENHANCING EMPLOYEE DEVELOPMENT: A STUDY OF TRAVANCORE TITANIUM PRODUCTS LIMITED

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ABSTRACT Competency mapping is a strategic human resource tool used to identify the skills, knowledge, and abilities required for effective job performance. This study examines the impact of competency mapping on employee development at Travancore Titanium Products Limited (TTPL). The research focuses on identifying competency gaps, improving training effectiveness, and enhancing employee performance. Data was collected from 75 employees using structured questionnaires and analyzed using percentage methods. The findings indicate that competency mapping positively influences skill development and job efficiency. However, lack of awareness and limited integration with HR systems reduce its effectiveness. The study concludes that proper implementation of competency mapping can significantly improve employee performance and organizational productivity.

Keywords: Competency Mapping, Employee Development, Training Effectiveness

1. INTRODUCTION

Competency mapping plays a crucial role in modern human resource management by aligning employee skills with organizational goals. It helps identify required competencies and bridges the gap between existing and expected performance levels. In industrial organizations like TTPL, employee efficiency depends largely on technical and behavioral competencies. Traditional HR practices often fail to address specific skill gaps, leading to reduced productivity. Competency mapping provides a structured approach to improve training, performance evaluation, and career development. This study focuses on understanding how competency mapping contributes to employee development and organizational effectiveness.

2. REVIEW OF LITERATURE

Spencer and Spencer (1993) stated that competency mapping helps in identifying underlying characteristics that lead to superior performance in organizations.

Sanghi (2007) emphasized that competency mapping improves employee efficiency by identifying skill gaps and enhancing training effectiveness. These studies highlight the importance of competency mapping in improving overall employee development and organizational performance.

3. OBJECTIVE OF THE STUDY

To analyze the impact of competency mapping on employee development at TTPL.

4. RESEARCH METHODOLOGY

The study is descriptive in nature and is based on both primary and secondary data. Primary data was collected through structured questionnaires from 75 employees across different departments of TTPL. Secondary data was obtained from company records, journals, and relevant literature. Percentage analysis was used to interpret the collected data and draw meaningful conclusions.

5. DATA ANALYSIS AND INTERPRETATION

The analysis is carried out based on the objective of understanding the impact of competency mapping on employee development. The results show that nearly 70% of employees are aware of competency mapping practices, while 30% have limited awareness. About 65% of respondents agreed that

competency mapping improves their performance and skill levels. Around 60% stated that it enhances training effectiveness by identifying specific competency gaps. However, 40% of employees felt that competency mapping is not properly integrated with performance appraisal systems. Overall, the analysis indicates a positive relationship between competency mapping and employee development, though improvements in implementation are required.

5.1 CHI-SQUARE TEST ANALYSIS

SELECTED QUESTION

- Is there a relationship between awareness of competency mapping and improvement in employee performance?

Hypothesis

H_0 (Null Hypothesis): There is no significant relationship between competency mapping awareness and employee performance.

H_1 (Alternative Hypothesis): There is a significant relationship between competency mapping awareness and employee performance.

OBSERVED FREQUENCY (O)

Parameter	O	E	O-E	(O-E) ²	(O-E) ² / E
Strongly agree	35	30	5	25	0.83
Agree	10	15	-5	25	1.67
Neutral	15	20	-5	25	1.25
Disagree	15	10	5	25	2.50

CALCULATION

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

$$\chi^2 = 0.83 + 1.67 + 1.25 + 2.50 = 6.25$$

RESULT

Table value at 5% significance = 3.84

Calculated value = 6.25

Since 6.25 > 3.84,

Reject H_0

INTERPRETATION

There is a significant relationship between competency mapping awareness and employee performance. Employees who are aware of competency mapping tend to show better performance improvement.

6. FINDINGS

The study found that competency mapping positively influences employee performance and skill development. However, there is a noticeable gap between required competencies and existing skills, along with moderate awareness among employees.

7. SUGGESTIONS

The organization should improve awareness of competency mapping and integrate it with performance appraisal systems. Regular training programs should be conducted to bridge competency gaps and enhance employee development.

8. CONCLUSION

The study concludes that competency mapping is an effective tool for improving employee development and organizational performance. Proper implementation and continuous improvement can maximize its benefits.

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ENVIRONMENTAL COST OF AI VS ITS BENEFITS: A CRITICAL ANALYSIS

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ABSTRACT Artificial Intelligence (AI) has become one of the most important technologies of our time, having a big effect on how businesses work, how decisions are made, and how new ideas are created. AI has many benefits, like making things more efficient, automating tasks, and better managing resources. However, it also poses serious risks to the environment. Building and using AI systems needs a lot of computing power, which uses a lot of energy, releases a lot of carbon, and uses a lot of resources. The goal of this paper is to critically look at the environmental costs of AI and compare them to its benefits. It also looks at how AI can help the environment while also making it harder to protect it. The study finds that the effects of AI depend a lot on how it is used and stresses the need for responsible and sustainable AI practices.

Keywords: Artificial Intelligence, Environmental Impact, Sustainability, Green AI, Energy Consumption, Carbon Emissions, Resource Utilization, Ethical AI

1. INTRODUCTION

AI has become an important part of how technology is changing these days. A lot of businesses, like healthcare, finance, manufacturing, education, and transportation, use it a lot. AI systems help businesses automate tasks, work more efficiently, and make decisions based on data. Businesses are becoming more and more reliant on digital infrastructure as they adopt AI technologies.

But the rise of AI comes with big worries about the environment. AI systems need a lot of computing power, which uses a lot of electricity. Data centers that support AI operations run all the time and need cooling systems, which use even more energy and water. These things hurt the environment and make people wonder if AI technologies are sustainable.

AI is also very important for solving environmental problems. People use it to model the weather, make the most of renewable energy, and manage resources more efficiently. This makes things complicated because AI is both a cause of environmental problems and a way to fix them.

This paper endeavors to critically assess the dual nature of AI by evaluating its environmental costs and benefits. It also looks at ways to find a balance between new technologies and protecting the environment.

2. OBJECTIVES OF THE STUDY

The objectives of this study are as follows:

- To look at the environmental costs of AI technologies
- To look into how AI can help businesses and the environment
- To critically assess the environmental costs and benefits of AI
- To find problems with making AI more sustainable
- To make suggestions for how to use AI responsibly

3. RESEARCH METHODOLOGY

This study employs a conceptual and analytical research methodology, concentrating on the comprehension of the environmental costs and benefits of Artificial Intelligence. The study does not include primary data collection and is solely dependent on secondary data sources. We got information from a number of trustworthy sources, including research articles, academic journals, industry reports, company case studies, and verified online publications. These sources give a full picture of both the good and bad effects of AI.

The study uses a qualitative method of analysis, which means that the information that was gathered is carefully looked at and understood. A comparative methodology is employed to assess the environmental costs and benefits of AI, facilitating the identification of significant patterns, relationships, and contradictions. The impact of AI is analyzed descriptively. This will not include statistical or mathematical analyses.

The study uses examples from the real world and industry to support their analysis. This is relevant for understanding how AI is used in various fields, and how AI is used in a way that is positively impactful for the environment. Another aspect of their method is the analysis of literature to find what is missing and construct the analysis appropriately.

The scope of the study, as a result, is limited and presents the study in a conceptual way with little to no explanation. There are no primary surveys, studies, or experimental work, and no quantitative analyses. This doesn't detract from the study though, as it draws valuable conclusions about AI and the environment with an understanding of the need for AI to be used responsibly.

The methodology for the study has been created to present the facts clearly, and in a way that is comprehensive without being overly complex, to explain the phenomenon of AI and the environment, and the wider impact of AI.

4. REVIEW OF LITERATURE

In the past few years, the field of artificial intelligence has attracted growing interest from scholars. Many of these studies discuss the impact of artificial intelligence on the environment. Research shows that the training of large artificial intelligence models requires large amounts of energy as a result of the large amounts of power that must be expended for the necessary large-scale computations.

Additionally, data centers are said to consume a considerable amount of the world's power resources, and the problem is exacerbated by the advent of widespread cloud computing and artificial intelligence tools. Moreover, the disposal of old devices and computers adds to the growing problem of e-waste and its associated environmental threats.

Nevertheless, there is still a growing body of work that describes the positive effects of artificial intelligence on a sustainable environment. Among other things, artificial intelligence is being applied to environmental monitoring, disaster forecasting, and energy management, as well as waste and resource management.

Yet another gap in the literature is the shortage of studies that focus on both the positive and negative impacts of artificial intelligence on the environment, as most studies focus purely on the positive or negative. In that context, this study aims to fill that gap.

4.1 CONCEPT OF ARTIFICIAL INTELLIGENCE

Machines performing human tasks like learning, thinking, and making decisions is called Artificial Intelligence (AI). AI systems analyze and improve over time through endless streams of data and endless algorithms.

AI encompasses various technologies, seamlessly integrated into everyday life. AI is behind virtual assistants, recommendation systems, and automated decision-making, amongst others.

The application of AI is endless and is revolutionizing the way both businesses and individuals operate. In order to develop a responsible use policy, consideration of AI's environmental impact needs to be woven into the fabric of its sustainable application as a tool for improving efficiency and innovation.

4.2 ENVIRONMENTAL IMPACT OF AI

An analysis of their energy and infrastructure consumptions and emissions indicates that there is increasing concern over the environmental effects of Artificial Intelligence (AI) and associated technologies, as their usage in all sectors continues to expand; which results in greater energy input being consumed by both the AI systems and the infrastructure and that the scope of AI systems' usage will grow exponentially as more companies and sectors employ this technology. One significant factor influencing the environmental impact of AI is the reliance of AI systems on data centres which require continuous power in order for operations to occur smoothly. Data centres consume enormous quantities of electricity, most of which is produced from non-renewable sources, resulting in greenhouse gas emissions and contributing to global warming. Additionally, data centres employ air conditioning systems for temperature fluctuations requiring large volumes of water to sustain normal operating levels resulting in even greater levels of consumption and discharge. AI technologies also create large-scale cumulative increases in energy consumption as greater numbers of companies put their respective AI technologies into practice amongst multiple site installations. Most small AI technology applications, when installed in mass, will result in an accumulated level of consumption and resultant environmental impact as well. Environmental considerations also arise from the lifecycle of AI technologies. The manufacturing, utilisation and disposal of electronic components such as servers, GPGPU's and storage will create materials depletion and e-waste from electronic devices, contributing to traditional waste and depletion of landfills. Additionally, extracting natural resources required for the manufacture of electronic components will also contribute to the depletion of these resources.

4.3 ENVIRONMENTAL COSTS OF AI

Artificial Intelligence has several environmental costs that cannot be ignored.

- **Energy Consumption:** AI systems require significant energy for training and operation. Large models consume more energy, increasing overall electricity demand.
- **Carbon Emissions:** The use of fossil fuels for electricity generation leads to carbon emissions. This contributes to global warming and climate change.
- **Water Consumption:** Cooling systems in data centers use large amounts of water, which can affect water availability.
- **Electronic Waste:** Frequent hardware upgrades result in electronic waste, which can harm the environment if not properly managed.
- **Resource Utilization:** AI systems require raw materials for hardware production, leading to resource depletion.

4.4 BENEFITS OF AI

Despite its environmental costs, Artificial Intelligence offers numerous benefits that support business growth and sustainability.

- **Increased Efficiency:** AI improves productivity by automating repetitive and time-consuming tasks. It reduces human effort and minimizes errors, leading to faster and more accurate work. This helps organizations save time, reduce operational costs, and improve overall performance.

- **Environmental Solutions:** AI plays an important role in solving environmental problems. It is used in climate prediction to analyze weather patterns and natural disasters. AI also helps in optimizing energy usage in industries and supports effective waste management systems, thereby reducing environmental damage.
- **Improved Decision Making:** AI enables organizations to analyze large volumes of data quickly and accurately. It provides valuable insights that help managers make better and informed decisions. This reduces risks, improves planning, and ensures efficient use of resources.
- **Economic Growth:** AI contributes to economic development by creating new industries, job opportunities, and business models. It encourages innovation and increases productivity, which leads to higher profits and overall economic growth.
- **Sustainable Development:** AI supports sustainable practices by helping organizations monitor their environmental performance. It reduces wastage, improves resource utilization, and promotes eco-friendly operations, contributing to long-term sustainability.

4.5 INDUSTRY APPLICATIONS OF AI

Artificial Intelligence is widely used across various industries, and its impact on the environment differs depending on how it is applied.

- **Manufacturing:** In the manufacturing sector, AI helps improve production efficiency by automating processes and monitoring operations in real time. It reduces material wastage by ensuring precise usage of raw materials and minimizes defects in production. This leads to cost savings and better resource management, thereby supporting environmental sustainability.
- **Agriculture:** AI is used in agriculture for precision farming, where data is analyzed to determine the exact amount of water, fertilizers, and pesticides required. This reduces overuse of resources and helps conserve water and soil quality. AI also assists farmers in improving crop yield while maintaining environmental balance.
- **Transportation:** In transportation, AI helps optimize routes and manage traffic systems efficiently. By reducing unnecessary travel time and fuel consumption, AI helps lower carbon emissions. It also supports the development of smart transportation systems and autonomous vehicles, contributing to a cleaner environment.
- **Healthcare:** AI plays a crucial role in healthcare by improving diagnosis, treatment planning, and patient management. It reduces unnecessary tests and procedures, which helps in saving medical resources. Efficient use of resources leads to less wastage and supports sustainable healthcare practices.

5. CRITICAL ANALYSIS

The analysis shows that AI has both positive and negative impacts on the environment. While it increases energy consumption, it also helps in reducing resource wastage.

The impact of AI depends on how it is used. Responsible usage can maximize benefits and minimize environmental costs. However, excessive use of AI can increase environmental burden.

6. CASE STUDY

Artificial Intelligence is increasingly being used in data centers to improve efficiency and reduce environmental impact. Data centers are essential for storing and processing large amounts of data required for AI operations, but they consume a significant amount of electricity, especially for cooling systems that prevent overheating of servers.

To address this issue, AI-based systems are implemented to monitor and optimize cooling processes. These systems analyze real-time temperature data, airflow patterns, and server usage to adjust cooling

levels automatically. Instead of running cooling systems at full capacity all the time, AI ensures that cooling is applied only where and when it is needed.

As a result, energy consumption is significantly reduced, leading to lower operational costs and decreased carbon emissions. Some organizations have reported substantial improvements in energy efficiency after implementing AI-driven cooling systems.

This case study highlights an important point that while AI contributes to energy usage, it can also be used as a solution to reduce that impact. By improving efficiency and optimizing resource usage, AI can help organizations move towards more sustainable practices.

However, the effectiveness of such solutions depends on proper implementation and continuous monitoring. Organizations must invest in efficient technologies and adopt responsible strategies to maximize the benefits of AI while minimizing its environmental impact.

7. CHALLENGES

- **High implementation cost due to advanced infrastructure and technology:** AI systems require expensive hardware, software, and skilled professionals, making it difficult for many organizations to adopt.
- **Large energy consumption required for AI operations:** AI models, especially large ones, need huge computational power, which increases electricity usage.
- **Lack of awareness about environmental impact among organizations:** Many companies focus only on performance and profit without considering the environmental effects of AI.
- **Dependence on fossil fuels for electricity generation:** Most data centers use electricity generated from non-renewable sources, which harms the environment.
- **Increased carbon emissions contributing to climate change:** High energy usage leads to more greenhouse gas emissions, increasing global warming.
- **Rapid technological changes leading to frequent hardware upgrades:** Continuous advancements make existing systems outdated quickly, requiring regular replacements.
- **Generation of electronic waste (e-waste):** Discarded hardware like servers and GPUs creates e-waste, which is harmful if not properly managed.
- **Inefficient use of AI in situations where it is not necessary:** Using AI for simple tasks increases energy consumption unnecessarily and wastes resources.

8. RECOMMENDATIONS

- **Use energy-efficient AI systems:** Organizations should develop and use AI models that require less computational power to reduce energy consumption.
- **Adopt renewable energy sources:** Switching to solar, wind, or other renewable energy for data centers can reduce dependence on fossil fuels.
- **Promote awareness among employees and management:** Educating stakeholders about the environmental impact of AI helps in making responsible and sustainable decisions.
- **Implement proper regulations and policies:** Governments should create guidelines to monitor and control the environmental impact of AI technologies.

- **Optimize AI usage:** AI should be used only where necessary to avoid unnecessary energy consumption and resource wastage.
- **Encourage green data centers:** Companies should invest in energy-efficient and environmentally friendly data center infrastructure.
- **Regular monitoring of environmental impact:** Organizations should track energy usage and carbon emissions to improve sustainability practices.

9. FUTURE SCOPE

- **Development of Green AI:** Future AI systems will focus on reducing energy consumption and minimizing environmental impact through efficient algorithms.
- **Increased use of renewable energy:** Data centers and AI operations are expected to shift towards solar, wind, and other clean energy sources.
- **Advancement in energy-efficient technologies:** New hardware and software innovations will make AI systems more efficient and less resource-intensive.
- **Integration of AI with sustainability solutions:** AI will be widely used in climate prediction, smart cities, and environmental monitoring.
- **Improved resource management:** AI can help optimize the use of energy, water, and other resources in various industries.
- **Growth of sustainable business practices:** Organizations will increasingly adopt AI to support eco-friendly and responsible operations.
- **Stronger government policies and global initiatives:** Future regulations will promote the responsible and sustainable use of AI technologies.

10. CONCLUSION

The impact of artificial intelligence on the environment offers potential benefits and risks; for example, it contributes negatively to high energy consumption, carbon footprint, and electronic waste. However, it also provides effective solutions that will help improve efficiency and support sustainable initiatives. Thus, the concept of artificial intelligence does not have an inherent negative impact; rather, it has a dual impact based on how it is designed and used. AI provides a means of supporting sustainable development by optimizing resource use across industries, minimizing waste, and improving decision-making. Without proper design and consideration for environmental impact, AI may create increased environmental harm. With proper care taken to ensure responsible use of AI, the potential benefits should outweigh the negative impacts. Organizations seeking to innovate must balance environmental concerns with the opportunity to innovate through the adoption of energy-efficient technologies, renewable sources of energy, and sustainable practices. In addition, government and policy makers must provide a regulatory framework that encourages the use of responsible AI. In summary, proper management of AI can provide an effective means of promoting environmental protection and combine the benefits of technological innovation and sustainability to achieve long-term economic growth and ecological health.

ROLE OF ICT IN ENHANCING ENVIRONMENTAL SUSTAINABILITY OF FISHERIES SUPPLY CHAINS: EVIDENCE FROM KANYAKUMARI DISTRICT

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ABSTRACT *The fisheries sector plays a crucial role in ensuring food security, livelihood generation, and economic development, especially in coastal regions like Kanyakumari district. However, unsustainable fishing practices, inefficient supply chains, and lack of timely information have raised serious environmental concerns. This study examines the role of ICT in enhancing environmental sustainability in fisheries supply chains in Kanyakumari district. The research adopts a descriptive and analytical methodology, utilizing both primary and secondary data. The findings reveal that ICT tools such as mobile applications, GPS tracking, digital marketplaces, and real-time weather forecasting significantly contribute to reducing resource wastage, optimizing fishing efforts, and improving supply chain transparency. The study concludes with policy recommendations to strengthen ICT adoption for sustainable fisheries management.*

1. INTRODUCTION

Fisheries constitute a vital component of India's coastal economy, particularly in Tamil Nadu, where districts like Kanyakumari depend heavily on marine resources. The fisheries supply chain involves multiple stakeholders, including fishermen, middlemen, wholesalers, retailers, and consumers. However, this supply chain often faces inefficiencies such as overfishing, post-harvest losses, lack of cold storage, and poor market access. Environmental sustainability in fisheries refers to the responsible management of marine resources to ensure long-term ecological balance. Unsustainable practices have led to depletion of fish stocks, marine pollution, and habitat destruction. Technologies such as satellite communication, mobile apps, blockchain, and IoT enable real-time monitoring, efficient logistics, and transparency. This study focuses on Kanyakumari district to evaluate how ICT contributes to environmental sustainability in fisheries supply chains.

2. REVIEW OF LITERATURE

FAO (2020)¹ The Food and Agriculture Organization (FAO, 2020) emphasized the growing importance of Information and Communication Technology (ICT) in promoting sustainable fisheries management. According to the report, ICT tools such as satellite monitoring systems, electronic catch documentation, and data analytics enable real-time tracking of fish stocks and fishing activities. This helps regulatory authorities to monitor overfishing and enforce sustainable fishing limits. Additionally, ICT enhances transparency and accountability in the fisheries supply chain, thereby reducing illegal, unreported, and unregulated (IUU) fishing practices. The study concludes that ICT integration is essential for maintaining ecological balance and long-term sustainability of marine resources.

OECD (2021)⁹ report emphasized the role of ICT in reducing the environmental footprint of supply chains, including fisheries. According to the report, digital technologies such as IoT, data analytics, and smart logistics systems improve operational efficiency and reduce carbon emissions. In fisheries, ICT enables better route planning, optimized transportation, and efficient cold chain management. These

improvements significantly reduce energy consumption and waste. The report concludes that ICT is a critical enabler of green supply chains and sustainable development.

Balasubramanian et al. (2022)¹⁰ they examined the impact of digital technologies on post-harvest management in fisheries. The study found that ICT tools such as temperature monitoring systems and digital inventory management significantly improve cold chain efficiency. This reduces spoilage and ensures better quality of fish products. By minimizing post-harvest losses, ICT contributes to resource conservation and reduces pressure on marine ecosystems. The study highlights that effective use of ICT in logistics and storage is essential for achieving environmental sustainability in fisheries supply chains.

Despite extensive global research on ICT in fisheries, there is a lack of localized studies focusing on:

- The specific impact of ICT on environmental sustainability in Kanyakumari district
- The level of ICT adoption among small-scale fishermen
- The relationship between ICT usage and reduction in ecological damage
- Empirical data linking ICT tools to sustainable supply chain outcomes

This study aims to fill these gaps by providing district-level evidence.

3. OBJECTIVES OF THE STUDY

- **To study the adoption of ICT** in fisheries supply chains.
- **To analyze the impact of ICT on environmental sustainability.**

4. STATEMENT OF THE PROBLEM

The fisheries sector in coastal regions such as Kanyakumari district plays a significant role in livelihood generation, food security, and economic development. However, the sector faces numerous challenges that threaten its environmental sustainability. Overfishing, inefficient resource utilization, post-harvest losses, and lack of proper supply chain management have led to the depletion of marine resources and increased ecological imbalance. Moreover, the absence of efficient communication and coordination among supply chain participants leads to delays, spoilage, and environmental degradation. Although Information and Communication Technology (ICT) has emerged as a potential solution to address these challenges, its adoption among small-scale fishermen in Kanyakumari district remains limited. Factors such as lack of awareness, high costs, inadequate training, and poor infrastructure hinder the effective utilization of ICT tools. Therefore, there is a need to examine how ICT can be effectively utilized to enhance environmental sustainability in fisheries supply chains. This study seeks to analyze the role of ICT in improving efficiency, reducing environmental impact, and promoting sustainable fishing practices in Kanyakumari district.

5. SCOPE OF THE STUDY

The present study focuses on analyzing the role of Information and Communication Technology (ICT) in enhancing environmental sustainability within fisheries supply chains in Kanyakumari district of Tamil Nadu.

- Examining the level of ICT adoption among fishermen and other stakeholders in the fisheries supply chain
- Identifying various ICT tools such as mobile phones, GPS devices, weather forecasting applications, and digital marketplaces used in the sector
- Analyzing the impact of ICT on environmental sustainability factors such as reduction in overfishing, fuel efficiency, and minimization of post-harvest losses
- Studying the challenges and barriers faced by stakeholders in adopting ICT technologies

- Providing suggestions to improve the usage of ICT for sustainable fisheries management

The study is limited to Kanyakumari district and is based on data collected from selected respondents, which may not fully represent the entire fisheries sector in India. However, the findings provide valuable insights into the role of ICT in promoting sustainable practices at the regional level.

6. RESEARCH METHODOLOGY

This study is based on a descriptive and analytical research design to examine the role of ICT in enhancing environmental sustainability in fisheries supply chains in Kanyakumari district. Both primary and secondary data were used for the study. Primary data was collected from 100 respondents, including fishermen and supply chain stakeholders, using a structured questionnaire, while secondary data was gathered from journals, reports, and related publications. Convenience sampling method was adopted for selecting respondents. The collected data was analyzed using statistical tools such as percentage analysis, Chi-square test, ANOVA, correlation, and Garrett ranking technique to identify relationships, measure impact, and rank the factors affecting ICT adoption.

7. LIMITATIONS OF THE STUDY

- The study is confined to Kanyakumari district; hence, the findings may not be generalized to other coastal regions.
- The study is based on selected respondents, and their opinions may not fully represent the entire fisheries sector.
- The study relies partly on primary data, which may be influenced by respondents' awareness and understanding of ICT tools.

8. ANALYSIS AND INTERPRETATION

Table 1- Age-wise Distribution

Age Group	No. of Respondents	Percentage (%)
Below 30	18	18%
30–40	32	32%
41–50	28	28%
Above 50	22	22%
Total	100	100%

The majority of respondents (32%) belong to the 30–40 age group, indicating that middle-aged fishermen are more actively involved in fisheries activities. This group is more likely to adopt ICT tools due to better adaptability compared to older age groups.

Table 2 - Monthly Income

Income Level (₹)	No. of Respondents	Percentage (%)
Below 10,000	20	20%
10,001 – 20,000	38	38%
20,001 – 30,000	27	27%
Above 30,000	15	15%
Total	100	100%

Most respondents (38%) earn between ₹10,000–₹20,000, indicating moderate income levels. Limited income may restrict investment in advanced ICT tools like GPS and smart devices.

Table 3 - Education vs ICT Adoption (Chi-Square Test)

Education Level	High Adoption	Moderate Adoption	Low Adoption	Total
Illiterate	5	6	4	15
Primary	8	10	7	25
Secondary	18	12	5	35
Higher Education	15	7	3	25
Total	46	35	19	100

Table 4 - Chi-Square Test

Test	Value	df	Sig. (p-value)
Pearson Chi-Square	14.82	6	0.022

The Chi-square test result ($p = 0.022 < 0.05$) indicates a **significant relationship between education level and ICT adoption**. Respondents with secondary and higher education show higher adoption levels compared to illiterate and primary groups. This implies that **education plays a crucial role in enhancing ICT usage**, which indirectly supports environmental sustainability through better decision-making and efficient fishing practices.

8.1 ICT ADOPTION IN FISHERIES SUPPLY CHAIN

Table 5 - Frequency of ICT Usage

Frequency	No. of Respondents	Percentage (%)
Daily	48	48%
Weekly	30	30%
Occasionally	22	22%
Total	100	100%

Nearly half (48%) of the respondents use ICT tools daily, indicating a **moderate to high level of dependency** on digital tools. However, 22% still use ICT occasionally, reflecting gaps in accessibility, awareness, or digital skills.

Table 6: Barriers to ICT Adoption (Garrett Ranking Method)

Factors	Garrett Score	Rank
Lack of Training	78.5	I
High Cost of Devices	72.3	II
Poor Internet Connectivity	68.4	III
Lack of Awareness	64.7	IV
Language Barriers	58.2	V

The Garrett ranking reveals that **lack of training** is the most significant barrier, followed by cost and connectivity issues. This indicates that even though ICT tools are available, their **effective utilization is limited due to skill gaps**. Addressing these barriers can significantly improve ICT adoption and sustainability outcomes.

8.2 IMPACT OF ICT ON ENVIRONMENTAL SUSTAINABILITY

Table 7 - ICT Usage vs Fuel Consumption (ANOVA Test)

ICT Usage Level	Mean Fuel Consumption (Litres)	Std. Deviation
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High	18.2	3.5
Moderate	22.6	4.2
Low	27.8	5.1

Table 8 - ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	420.5	2	210.25	8.64	0.000
Within Groups	2360.2	97	24.33		
Total	2780.7	99			

The ANOVA result ($p = 0.000 < 0.05$) shows a **significant difference in fuel consumption based on ICT usage levels**. Fishermen with high ICT usage consume significantly less fuel compared to others. This confirms that ICT contributes to **efficient route planning and reduced environmental impact**.

Table 9 - ICT Impact on Sustainability Indicators

Indicator	Agree (%)	Neutral (%)	Disagree (%)
Reduction in Overfishing	62	18	20
Reduction in Fish Wastage	74	12	14
Improved Resource Efficiency	70	16	14
Reduced Carbon Emission	65	20	15

A majority of respondents agree that ICT positively impacts sustainability indicators. The highest agreement is seen in **reduction of fish wastage (74%)**, indicating improved supply chain coordination. Moderate agreement on overfishing suggests that **ICT alone is not sufficient without regulatory support**.

Table 10 - Correlation between ICT Usage and Sustainability Score

Variables	ICT Usage	Sustainability Score
ICT Usage	1	0.68**
Sustainability Score	0.68**	1

(Significant at 0.01 level) The correlation coefficient ($r = 0.68$) indicates a **strong positive relationship between ICT usage and environmental sustainability**. This means that increased use of ICT tools leads to better sustainability outcomes such as reduced waste and efficient resource utilization.

The statistical analysis strongly supports the study objectives. ICT adoption is significantly influenced by socio-economic factors such as education and income. While basic ICT tools are widely used, advanced technologies still face barriers like lack of training and infrastructure. The use of **Chi-square confirms dependency**, **Garrett ranking identifies key barriers**, and **ANOVA proves efficiency improvements**, making the findings statistically robust. ICT significantly contributes to environmental sustainability by reducing fuel consumption, minimizing post-harvest losses, and improving supply chain efficiency. However, for maximum impact, **policy support, training programs, and infrastructure development are essential** to enhance ICT adoption among small-scale fishermen.

9. FINDINGS OF THE STUDY

- ICT adoption in fisheries is moderate, with mobile phones widely used, while advanced tools like GPS and digital platforms are less utilized.

- There is a significant relationship between education and ICT usage, indicating that educated fishermen adopt technology more effectively.
- ICT usage has led to improved fuel efficiency by reducing unnecessary fishing trips through better planning.

10. SUGGESTIONS

- Provide training programs to improve digital literacy and effective use of ICT tools among fishermen.
- Offer financial support or subsidies for purchasing ICT devices like smartphones and GPS systems.
- Improve internet connectivity in coastal areas to ensure smooth access to digital services.
- Develop user-friendly apps in local language (Tamil) to increase accessibility and usage.
- Promote awareness on sustainable fishing practices through ICT platforms and government initiatives.

11. CONCLUSION

The study concludes that Information and Communication Technology (ICT) plays a crucial role in enhancing environmental sustainability in fisheries supply chains in Kanyakumari district. The findings clearly indicate that ICT tools improve operational efficiency, reduce resource wastage, and support informed decision-making among fishermen. However, the study also highlights that the full potential of ICT is yet to be realized due to barriers such as lack of training, poor infrastructure, and limited awareness. Therefore, a combined effort from government, stakeholders, and policymakers is essential to promote ICT adoption. In conclusion, ICT acts as a powerful enabler for achieving sustainable fisheries management and ensuring long-term ecological balance, while also improving the livelihood of fishermen.

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IMPACT OF WORK AUTONOMY ON JOB SATISFACTION AMONG COLLEGE TEACHERS IN KANYAKUMARI DISTRICT

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ABSTRACT *The present study investigates the impact of work autonomy on job satisfaction among college teachers in Kanyakumari District. In the contemporary academic environment, the degree of independence in work practices, including teaching methods, decision-making, and task management, plays a crucial role in influencing teachers' professional outcomes. This study aims to identify the level of work autonomy, examine its connection with job satisfaction, and measure its overall effect among college teachers. The research is based on primary data collected from 125 respondents through a structured questionnaire. Statistical tools such as percentage analysis and chi-square test are used to analyze the socio-economic characteristics of the respondents. Further, correlation, regression, and ANOVA are applied to explore the relationship and impact between work autonomy and job satisfaction. The findings indicate that a significant positive relationship exists between the degree of work autonomy and job satisfaction. The study also reveals that variations in autonomy influence satisfaction levels across different demographic groups. The results highlight the importance of providing a flexible and supportive work environment to enhance teachers' satisfaction and overall institutional effectiveness.*

1.INTRODUCTION

In recent years, the higher education sector has undergone substantial transformation due to technological advancements, changing student expectations, and evolving institutional frameworks. Within this dynamic environment, the role of college teachers has expanded beyond traditional teaching to include research, administrative responsibilities, and continuous professional development. As a result, ensuring job satisfaction among faculty members has become a critical concern for educational institutions. Work autonomy, defined as the degree of freedom, independence, and discretion allowed to employees in scheduling their work and determining the procedures to be used, plays a vital role in shaping job satisfaction. For college teachers, autonomy may involve flexibility in curriculum delivery, freedom in adopting innovative teaching methods, and participation in academic decision-making. When teachers are provided with adequate autonomy, they are more likely to feel valued, motivated, and committed to their profession. Despite the growing importance of autonomy in academic settings, limited empirical research has been conducted at the regional level focusing specifically on college teachers in Kanyakumari District. Therefore, this study aims to bridge this gap by analyzing the impact of work autonomy on job satisfaction using robust statistical techniques.

2.REVIEW OF LITERATURE

Deci Edward L. and Ryan Richard M. (2000)⁴ Deci and Ryan, through Self-Determination Theory, proposed that autonomy is a fundamental psychological need essential for motivation and satisfaction. Their study demonstrated that when individuals experience autonomy, it fosters intrinsic motivation,

which in turn leads to higher job satisfaction and improved performance in professional settings, including education.

Ingersoll Richard M. (2003)⁵ Ingersoll focused on organizational factors affecting teacher retention and job satisfaction. His study found that lack of autonomy is a major contributor to teacher turnover. Institutions that provide greater autonomy create a supportive work environment, resulting in higher satisfaction and long-term retention of faculty members.

3. RESEARCH GAP

From the above review of literature, it is evident that work autonomy plays a significant role in influencing job satisfaction across various professions, particularly in the field of education. Most of the existing studies have established a positive relationship between autonomy and job satisfaction, along with its impact on motivation, performance, and retention of teachers. There is a lack of region-specific empirical research focusing on college teachers, especially in districts like Kanyakumari, where institutional structures, management practices, and cultural factors may differ significantly. Moreover, limited studies have integrated both socio-economic variables and advanced statistical tools such as correlation, regression, and ANOVA to comprehensively analyze the relationship between work autonomy and job satisfaction. Therefore, this study attempts to fill this gap by providing a focused analysis of college teachers in Kanyakumari District using primary data and robust statistical techniques. It aims to offer deeper insights into how work autonomy influences job satisfaction within a specific regional and institutional framework.

4. OBJECTIVES OF THE STUDY

- To identify the degree of independence in work practices among college teachers.
- To explore the connection between teachers' autonomy and their level of job satisfaction.
- To measure the effect of work autonomy on job satisfaction among college teachers.

5. STATEMENT OF THE PROBLEM

In the present higher education scenario, college teachers are expected to handle multiple responsibilities such as teaching, evaluation, research, and administrative duties. At the same time, institutional regulations and structured systems may restrict the level of independence teachers experience in their work practices. However, when such independence is limited, it may lead to dissatisfaction, reduced efficiency, and lack of engagement. In Kanyakumari District, colleges operate under different management systems, which may result in variations in the degree of autonomy provided to teachers. These differences make it important to examine how autonomy is experienced and how it affects job satisfaction. Despite its importance, there is limited localized research focusing on the connection between work autonomy and job satisfaction among college teachers in this region. Hence, this study attempts to identify the level of independence in work practices, explore its relationship with job satisfaction, and measure its overall effect using appropriate statistical tools.

6. SCOPE OF THE STUDY

This study focuses on analyzing work autonomy and its influence on job satisfaction among college teachers in Kanyakumari District. It considers faculty members from arts and science colleges, covering both government and private institutions. The research is based on primary data collected from 125 respondents through a structured questionnaire. It examines the degree of independence in

teaching practices, decision-making, and work-related activities. The study also evaluates how this autonomy is connected with job satisfaction levels among teachers. Statistical tools such as percentage analysis and chi-square test are used to analyze socio-economic characteristics, while correlation, regression, and ANOVA are applied to understand the relationship and impact between the variables.

7. RESEARCH METHODOLOGY

The present study is empirical in nature and focuses on analyzing the impact of work autonomy on job satisfaction among college teachers in Kanyakumari District. The study is based on primary data collected through a structured questionnaire designed to capture responses related to work autonomy and job satisfaction. The questionnaire was developed using a Likert scale to measure the degree of agreement among respondents on various statements. A total of 125 college teachers from arts and science colleges, including both government and private institutions, were selected as the sample for the study using a convenient sampling method.

To achieve the objectives of the study, advanced statistical tools such as correlation analysis are used to identify the relationship between work autonomy and job satisfaction. Regression analysis is employed to measure the extent to which work autonomy influences job satisfaction, and Analysis of Variance (ANOVA) is applied to determine whether there are significant differences in job satisfaction across different groups based on the level of autonomy. The data collected are systematically analyzed and interpreted to draw meaningful conclusions regarding the impact of work autonomy on job satisfaction among college teachers.

8. LIMITATIONS OF THE STUDY

- The study is restricted to college teachers in Kanyakumari District, which limits the general applicability of the findings.
- The sample size of 125 respondents may not fully represent the views of all college teachers in the district.
- Only work autonomy is considered as the primary factor influencing job satisfaction, while other influencing factors are not deeply analyzed.

9. ANALYSIS AND INTERPRETATION OF THE STUDY

9.1 AGE-WISE DISTRIBUTION

Table 1

Age Group	Frequency	Percentage
Below 30 years	28	22.4%
30 – 40 years	46	36.8%
40 – 50 years	32	25.6%
Above 50 years	19	15.2%
Total	125	100%

The above table indicates that the majority of respondents (36.8%) fall within the age group of 30–40 years, followed by 25.6% in the 40–50 years category. Younger respondents below 30 years account

for 22.4%, while only 15.2% are above 50 years. This shows that the sample is largely composed of mid-career professionals who are likely to possess both experience and adaptability. Such a group is more inclined to value autonomy in their work and evaluate their job satisfaction based on professional independence and growth opportunities.

9.2 GENDER-WISE DISTRIBUTION

Table 2

Gender	Frequency	Percentage
Male	58	46.4%
Female	67	53.6%
Total	125	100%

The table reveals that female respondents (53.6%) slightly outnumber male respondents (46.4%). This balanced distribution ensures that the study captures perspectives from both genders without bias. It also reflects the increasing participation of women in the teaching profession. The presence of both male and female respondents provides a comprehensive understanding of how work autonomy influences job satisfaction across genders.

9.3 MONTHLY INCOME DISTRIBUTION

Table 3

Monthly Income (₹)	Frequency	Percentage
Below 25,000	22	17.6%
25,000 – 50,000	48	38.4%
50,000 – 75,000	34	27.2%
Above 75,000	21	16.8%
Total	125	100%

The majority of respondents (38.4%) earn between ₹25,000–₹50,000, followed by 27.2% in the ₹50,000–₹75,000 range. A smaller proportion falls under the higher and lower income categories. This indicates that most teachers belong to a moderate income group, which may influence their expectations regarding job satisfaction. Teachers in this income range may place greater importance on non-monetary factors such as autonomy and work flexibility.

9.4 TYPE OF INSTITUTION VS WORK AUTONOMY - CHI-SQUARE

Table 4

Type of Institution	Low	Moderate	High	Total
Government	14	16	10	40
Aided	11	18	11	40
Self-Financing	18	22	5	45
Total	43	56	26	125

Chi-Square = 9.372 | df = 4 | p = 0.025

The chi-square test shows a significant association between type of institution and level of work autonomy ($p < 0.05$). Teachers in aided institutions experience relatively higher autonomy, while those in self-financing institutions report lower autonomy levels. Government institutions show

moderate autonomy. This indicates that institutional structure and management practices significantly influence the level of autonomy provided to teachers.

9.5 WORK AUTONOMY & JOB SATISFACTION - CORRELATION

Table 5

Variables	Instr. Freedom	Decision Participation	Scheduling Flexibility	Job Satisfaction
Instructional Freedom	1	0.62	0.58	0.71
Decision Participation	0.62	1	0.65	0.74
Scheduling Flexibility	0.58	0.65	1	0.69
Job Satisfaction	0.71	0.74	0.69	1

The correlation analysis reveals a strong positive relationship between work autonomy dimensions and job satisfaction. Decision participation shows the highest correlation, indicating that involvement in decision-making significantly enhances satisfaction. Instructional freedom and scheduling flexibility also show strong positive relationships. This suggests that greater autonomy leads to higher job satisfaction among teachers.

9.6 REGRESSION ANALYSIS

Table 6

Variables	Beta	t-value	p-value
Instructional Freedom	0.32	3.85	0.000
Decision Participation	0.41	4.62	0.000
Scheduling Flexibility	0.27	3.21	0.002
R² = 0.68			

The regression results indicate that all dimensions of work autonomy significantly influence job satisfaction ($p < 0.05$). Decision participation has the strongest impact, followed by instructional freedom and scheduling flexibility. The R^2 value of 0.68 shows that 68% of the variation in job satisfaction is explained by autonomy variables. This confirms that work autonomy is a major factor affecting job satisfaction.

9.7 AUTONOMY VS JOB SATISFACTION - ANOVA

Table 7

Source	SS	df	MS	F	Sig
Between Groups	48.72	2	24.36	9.18	0.000
Within Groups	323.45	122	2.65		
Total	372.17	124			

The ANOVA results show a significant difference in job satisfaction based on levels of work autonomy ($p < 0.05$). Teachers with higher autonomy experience greater job satisfaction compared to

those with lower autonomy. This clearly indicates that autonomy plays a crucial role in enhancing satisfaction levels.

9.8 EXPERIENCE VS JOB SATISFACTION – ANOVA

Table 8

Experience	Mean	SD
Below 5 yrs	3.42	0.58
5–10 yrs	3.68	0.62
10–15 yrs	3.85	0.55
Above 15 yrs	4.02	0.60

F = 4.12 | p = 0.008

The results indicate a significant difference in job satisfaction across experience levels ($p < 0.05$). Teachers with more experience report higher satisfaction levels. This suggests that experienced teachers are more comfortable with their roles and better able to utilize autonomy, leading to increased satisfaction.

10.FINDINGS

- The majority of respondents belong to the mid-career age group (30–40 years), indicating that most teachers possess adequate experience and actively seek professional independence in their roles.
- There is a significant association between type of institution and level of work autonomy, with aided institutions providing relatively higher autonomy compared to self-financing colleges.
- A strong positive relationship exists between work autonomy dimensions—especially decision participation—and job satisfaction among college teachers.
- Regression analysis confirms that work autonomy significantly influences job satisfaction, with decision participation emerging as the most influential factor.
- Significant differences in job satisfaction are observed across levels of autonomy and teaching experience, indicating that higher autonomy and greater experience lead to increased satisfaction.

11.SUGGESTIONS

- College management should provide greater opportunities for teachers to participate in academic and administrative decision-making processes to enhance their sense of involvement and satisfaction.
- Institutions, especially self-financing colleges, should adopt flexible policies that allow teachers more freedom in teaching methods and work scheduling.
- Special attention should be given to early-career teachers by providing mentoring and guidance to help them effectively utilize autonomy and improve satisfaction levels.

12.CONCLUSION

The present study clearly establishes that work autonomy plays a vital role in determining job satisfaction among college teachers in Kanyakumari District. The findings reveal that autonomy in terms of decision-making, instructional practices, and work flexibility significantly enhances teachers' satisfaction levels. The study also highlights that institutional factors and teaching experience contribute to variations in autonomy and satisfaction. Teachers working in supportive environments with higher levels of independence tend to exhibit greater commitment and motivation. Therefore, it is essential for educational institutions to design policies that promote autonomy and create a conducive work environment.

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GREEN ENTREPRENEURSHIP AND ECO-INNOVATIVE SUPPLY CHAINS: PIONEERING SUSTAINABLE BUSINESS MODELS

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ABSTRACT *The escalating climate crisis and resource depletion demand a fundamental shift from incremental "green" improvements to systemic business model transformation. Moving toward a resource-efficient, low-carbon future requires more than just a software update for industry; it demands a total overhaul of venture logic and supply chain architecture. In this study, we analyze how green entrepreneurs are fundamentally re-engineering supply chains to become eco-innovative—closing loops, stripping away waste, and finally breaking the link between revenue and raw material consumption. By examining four distinct ventures (Fairphone, Too Good To Go, LanzaTech, and Worn Again Technologies), we map out three specific business model archetypes: circular product-as-a-service, industrial symbiosis for waste-to-value, and zero-inventory digital platforms. Our findings suggest that the most successful eco-innovators view supply chains not as a series of costs to be managed, but as dynamic ecosystems fueled by reverse logistics and radical traceability. We conclude by addressing the inherent friction between scaling a business and maintaining deep circularity, offering a roadmap for both scholars and practitioners.*

Keywords: *Circular Economy, Green Entrepreneurship, Supply Chain Innovation, Regenerative Business, Sustainable Operations.*

1. INTRODUCTION

Our global economic engine is stuck in a "take-make-waste" loop. While this linear path has built immense modern wealth, it has done so by treating planetary boundaries as suggestions rather than hard limits. A new wave of entrepreneurs is now rising to challenge this, viewing environmental decay as a market failure waiting for a solution. These "green entrepreneurs" don't just tack sustainability onto an existing model; they bake ecological health into the very foundation of their businesses. However, a "green" product is only as good as the system that delivers it. Without an eco-innovative supply chain (EISC), a sustainable idea can quickly lose its impact through murky sourcing or high-carbon logistics. True innovation here isn't just about using less fuel; it's about rethinking material flows to be regenerative by design. This paper digs into the specific models these entrepreneurs are using to bridge the gap between start-up agility and operational sustainability.

2. STATEMENT OF THE PROBLEM

- **The "Green" Gap:** Many founders focus entirely on making a great eco-friendly product but completely ignore the messy logistics behind it. Because they aren't fixing their supply chains, they still end up hurting the environment through poor sourcing and wasted materials.
- **The "Big Company" Bias:** Most research on circular supply chains focuses on giant corporations with huge budgets. This leaves the "little guys"—smaller, cash-strapped start-ups—without any real, practical advice on how to build these systems from scratch.

- **Scaling Without a Map:** Even the best green ideas hit a wall if there isn't a solid plan to link daily operations to sustainability goals. Without this connection, promising ventures struggle to grow or make a real, measurable dent in the environmental crisis.

3. RESEARCH OBJECTIVES

- **To show where green startups and smart supply chains meet,** making it clear how they are different from basic corporate "green" programs or old, wasteful ways of doing business.
- **To identify and classify** the predominant sustainable business models that green entrepreneurs deploy when designing or redesigning supply chains for circularity, waste reduction and regenerative impact.
- **To look closely at real success stories**—like Fairphone and Too Good To Go—so we can pull out simple, workable rules that other companies can follow to be just as successful.

4. REVIEW OF LITERATURE

4.1. THE RISE OF GREEN ENTREPRENEURSHIP

Over the last twenty years, "green" or sustainable entrepreneurship has carved out its own unique space in business research. The core idea, as defined by **Dean and McMullen (2007)**, is simple but powerful: founders aren't just looking for profit; they're hunting for market gaps that, when filled, actually slow down environmental decay. While a standard entrepreneur might ignore "externalities" like pollution, the green entrepreneur sees ecological damage as a market failure that needs a fix.

Schaltegger and Wagner (2011) take this a step further. They distinguish between "eco-preneurs"—who build a company's entire identity around the planet—and big, established firms that just tack on a sustainability department as an afterthought.

This "flexible" logic works well because the rules for green tech are always shifting (**York & Venkataraman, 2010**). Of course, it's not all smooth sailing. **Shepherd and Patzelt (2011)** pointed out that these ventures face a "green wall": higher costs upfront, longer wait times for a return on investment, and the exhausting job of convincing customers why "green" is worth the extra cent.

The real gap in the research? Most studies talk about the "why" or the "who," but they ignore the "how"—specifically the **supply chain (Gast et al., 2017)**. You can have a perfect eco-product, but if the logistics behind it are messy, the environmental footprint is still a disaster.

4.2. ECO-INNOVATION: BEYOND THE "GREEN" LABEL

Eco-innovation is more than just a buzzword; it's about changing how things are made or moved to lower environmental risk (**Rennings, 2000**). According to Rennings, this happens in three ways: through the product itself, the process of making it, or how the company is organized. In the world of supply chains, this looks like cleaner sourcing, low-carbon shipping, and "waste valorization"—finding the value in what everyone else throws away (**Dubey et al., 2017**).

This leads us to **Circular Supply Chain Management (CSCM)**. The goal here isn't just to "do less bad" but to actively close the loop. **Geissdoerfer et al. (2017)** describe this as the "slow, close, and narrow" approach to resources. It requires **reverse logistics**—the complex art of taking products back, checking them, and turning them into something new (**Govindan & Soleimani, 2017**).

5. RESEARCH METHODOLOGY

To explore these concepts, we utilized a qualitative, multi-case research design. We looked for companies that met three specific bars: they identified as green-first, they had tangibly redesigned their

supply chain, and their data was open for scrutiny. We landed on four key players: Fairphone (electronics), Too Good To Go (food), LanzaTech (carbon), and Worn Again Technologies (textiles). By layering these cases against one another, we identified recurring themes and friction points.

6. KEY FINDINGS: THE THREE ARCHETYPES

Archetype 1: The Material-as-a-Service Model

Examples: Fairphone, Worn Again.

Here, the company keeps ownership of the materials. You aren't just buying a phone; you're essentially "renting" the minerals inside it. This forces the company to design for repair and eventual recovery. **The tension?** It costs a lot of money upfront to hold onto all that inventory. **The fix?** Modular design that makes repairs cheap and fast.

Archetype 2: The Industrial Symbiosis Model

Example: LanzaTech.

This model turns "waste" into a feed-stock. By co-locating facilities—putting a fermentation plant right next to a steel mill—entrepreneurs can capture carbon off-gases before they hit the atmosphere. **The tension?** You are completely dependent on your "waste" partner. **The fix?** Long-term, symbiotic contracts that benefit both parties' bottom lines.

Archetype 3: The Zero-Inventory Platform

Example: Too Good To Go.

This is a digital solution to a physical problem. By connecting surplus supply (like leftover bread) with immediate demand, the entrepreneur eliminates waste without ever touching the product. **The tension?** Scaling while maintaining quality control. **The fix?** Using machine learning to predict demand spikes before they happen.

Discussion: Navigating the Friction

Green entrepreneurs aren't just fighting for market share; they're fighting against "business as usual." We found that "scaling up" is often the enemy of "circularity." When a business goes global, the carbon cost of shipping things back for recycling often outweighs the benefit.

7. CONCLUSION

Green entrepreneurship and eco-smart supply chains are no longer just niche interests; they represent a total rewrite of the business playbook for a world running low on raw materials. The three models we've explored—circular service models, trash-to-treasure industrial systems, and lean, on-demand platforms—prove that a company can grow without constantly digging up the Earth. However, this isn't a "set it and forget it" strategy. Success depends on a deliberate plan from day one, focusing on everything from tracking material origins to working with competitors on shared logistics.

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A STUDY ON SUSTAINABLE MARKETING: SOCIAL MEDIA ADVERTISING FOR GREEN BRANDS

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ABSTRACT *The study aims to analyse the Sustainable marketing has gained significant importance in recent years as consumers become more environmentally conscious. Social media advertising has emerged as a powerful tool for promoting green brands and influencing consumer behaviour. This study examines the role of social media in enhancing awareness of eco-friendly products and sustainable practices. It analyses how digital advertisements impact consumer attitudes and purchase intentions toward green brands. The research also explores key factors such as trust, transparency, and authenticity that determine the effectiveness of green advertising. Additionally, it identifies challenges such as greenwashing, high costs, and lack of consumer trust faced by green brands. The study is based on primary data collected through a structured questionnaire. The findings indicate that social media significantly influences consumer awareness and decision-making. However, a gap exists between awareness and actual purchasing behaviour. The study concludes that ethical and transparent social media strategies are essential for promoting sustainable marketing.*

Keywords: Sustainable Marketing, Social Media Advertising, Green Brands, Consumer Behaviour, Eco-Friendly Products, Digital Marketing, Consumer Awareness, Purchase Intention, Green Advertising, Sustainability

1. INTRODUCTION

In recent years, growing environmental concerns and increased awareness of climate change have significantly influenced consumer behavior and business practices. Sustainability has emerged as a key priority for organizations seeking to align their operations with environmental and social responsibility. In this context, sustainable marketing has gained prominence as a strategic approach that promotes eco-friendly products and practices while addressing the needs of environmentally conscious consumers.

Sustainable marketing through social media not only helps in increasing brand visibility but also fosters transparency and trust among consumers. By leveraging visually appealing content, storytelling, and influencer collaborations, green brands can create meaningful connections with their target audience. However, challenges such as greenwashing, consumer skepticism, and the need for authenticity also play a crucial role in shaping the effectiveness of these marketing strategies.

2. REVIEW OF LITERATURE

2.1 GREEN ADVERTISING ON SOCIAL MEDIA

A study by Ktisti, Hatzithomas, and Boutsouki (2022) examined the evolution of green advertising within social media platforms through a systematic literature review of 81 research articles. The findings highlight that social media has become a primary communication channel for green marketing due to its wide reach and interactive nature. The study also emphasizes key issues such as greenwashing, consumer skepticism, and generational differences in response to sustainable advertising. It concludes that while social media enhances engagement, credibility and transparency are crucial for effectiveness.

2.2 CONSUMER ADOPTION OF GREEN MARKETING

A systematic review published in the Journal of Cleaner Production (2022) analyzed 98 studies to understand factors influencing green marketing adoption. The research identifies that consumer

behavior is driven by environmental concern, perceived value, and social influence. The study applies the Theory of Planned Behavior to explain how attitudes and intentions lead to sustainable consumption. It also highlights that digital platforms, including social media, act as mediators in shaping eco-friendly purchase decisions.

2.3 GREEN MARKETING AND CONSUMER PURCHASE INTENTIONS

Adinugroho et al. (2023) conducted a literature review focusing on sustainable branding and consumer purchase behavior. The study identifies five major components of green marketing—eco-labeling, green advertising, sustainable innovation, environmental image, and corporate practices. It concludes that green trust, perceived value, and brand credibility significantly influence consumer intentions. Social media advertising plays a key role in building these psychological factors through storytelling and engagement.

2.4 SOCIAL MEDIA GREEN MARKETING AND CONSUMER BEHAVIOR

A recent study (2025) explored the impact of social media green marketing on Gen Z consumers. The research found that social media campaigns significantly shape brand perception and promote sustainable consumption behavior. Visual content, influencer marketing, and interactive campaigns were identified as effective strategies for engaging young audiences. The study also notes that authenticity and transparency are critical in avoiding skepticism and enhancing trust in green brands.

3. OBJECTIVES OF STUDY

- To examine the role of social media advertising in promoting sustainable marketing for green brands.
- To analyze the impact of social media advertisements on consumer awareness of eco-friendly products and practices.
- To evaluate how social media influences consumer attitudes and purchase intentions toward green brands.
- To identify the key factors (such as trust, transparency, and authenticity) that affect the effectiveness of green advertising on social media.
- To assess the challenges faced by green brands in implementing sustainable marketing strategies on social media platforms.

4. RESEARCH METHODOLOGY

Research methodology refers to the systematic processes, techniques, and procedures used to conduct research and gather data. It encompasses both theoretical and practical approaches to problem-solving

4.1 RESEARCH DESIGN

The researcher adopted descriptive research design to enhance data reliability and minimize bias by selecting and analysing various parameters for efficient data collection and analysis.

4.2 DESCRIPTIVE RESEARCH DESIGN

The present study adopts a descriptive research design to examine responsible consumer behaviour in the digital age, with a focus on ethics, awareness, and sustainable choices

4.3 SAMPLE DESIGN

A convenience sampling method is used to select respondents due to ease of access and time constraints. The sample consists of individuals who have prior experience with online purchasing and digital interactions.

4.4 SAMPLING METHOD

The sample size for the present study consists of 125 respondents who actively engage in digital platforms such as e-commerce websites and social media. The respondents were selected using a convenience sampling technique, considering accessibility and willingness to participate in the survey.

4.5 DATA COLLECTION METHODS

Primary Data - Such as questionnaires, is original and collected by researchers for specific purposes. Secondary Data - This research uses secondary sources, including a magazine, to gather information that is already available in the market.

5. STATISTICAL TOOLS AND ANALYSIS

5.1 CHI-SQUARE TEST

Null Hypothesis (H_0): There is no significant association between social media advertising and purchase intention.

Alternative Hypothesis (H_1): There is a significant association between social media advertising and purchase intention.

INTERPRETATION - The table shows that respondents with higher exposure to social media advertising tend to have higher purchase intention toward green brands. Conversely, those with low exposure show lower purchase intention.

INFERENCE - The Chi-square test confirms that there is a significant association between social media advertising and consumer purchase intention toward green products. This indicates that effective social media advertising plays a crucial role in promoting green brands and influencing consumer behaviour.

5.2 KRUSKAL-WALLIS TEST

The Kruskal–Wallis test is used to determine whether there is a significant difference in consumer purchase intention toward green brands across different levels of social media advertising exposure..

Null Hypothesis (H_0): There is no significant difference in purchase intention across different levels of social media advertising exposure.

Alternative Hypothesis (H_1): There is a significant difference in purchase intention across different levels of social media advertising exposure.

Test Statistic

Kruskal–Wallis H value = 14.32

Degrees of Freedom (df) = 2

p-value < 0.05

INTERPRETATION - The mean rank values indicate that respondents with high exposure to social media advertising have the highest purchase intention toward green brands, followed by medium and low exposure groups. This shows a clear upward trend.

INFERENCE - The Kruskal–Wallis test results reveal that social media advertising exposure significantly influences consumer purchase intention toward green brands. Increased exposure to green advertisements enhances awareness, builds trust, and positively shapes consumer attitudes.

Thus, effective and ethical social media marketing strategies can play a crucial role in promoting sustainable consumption and strengthening green brand positioning

6. FINDINGS, SUGGESTIONS AND CONCLUSIONS

6.1 FINDINGS

76% of respondents agreed that social media advertising plays a significant role in promoting sustainable marketing for green brands, while 24% felt its impact is limited.

71% of respondents stated that social media advertisements have increased their awareness of eco-friendly products and sustainable practices, whereas 29% reported minimal influence.

68% of consumers indicated that social media positively influences their attitudes toward green brands and encourages purchase intentions, while 32% remain neutral or unaffected.

74% of respondents identified trust, transparency, and authenticity as the most important factors influencing the effectiveness of green advertising on social media. The remaining 26% considered factors like price and brand popularity more important.

62% of respondents believe that green brands face challenges such as lack of credibility, greenwashing, and high product cost in social media marketing, while 38% feel these challenges are manageable.

6.2 SUGGESTIONS

- Green brands should focus on providing clear, honest, and verifiable information about their products to build trust. Avoiding greenwashing and ensuring transparency will improve consumer confidence and the effectiveness of social media campaigns.
- Social media platforms should be used to educate consumers about eco-friendly products, sustainable practices, and environmental impact. Informative content such as videos, infographics, and campaigns can significantly improve awareness and responsible behaviour.
- Collaborating with credible and eco-conscious influencers can help promote green brands effectively. Influencers should communicate genuine experiences to enhance authenticity and positively influence consumer attitudes and purchase intention
- Green brands should highlight certifications, eco-labels, and sustainability reports to strengthen trust. Consistent messaging and ethical practices will improve brand reputation in digital platforms.

6.3 CONCLUSION

The study concludes that social media advertising plays a significant role in promoting sustainable marketing for green brands. It effectively enhances consumer awareness regarding eco-friendly products and sustainable practices. The findings indicate that social media platforms strongly influence consumer attitudes and purchase intentions toward green brands. Factors such as trust, transparency, and authenticity are crucial in determining the success of green advertising. Consumers are more likely to engage with brands that provide honest and credible information. However, challenges such as greenwashing, high product costs, and lack of consumer trust still exist. Despite these barriers, social media remains a powerful tool for encouraging sustainable consumption. Green brands must adopt ethical and transparent communication strategies to strengthen consumer confidence. Increasing awareness and improving accessibility can further enhance sustainable purchasing behaviour. Overall, effective use of social media can significantly contribute to the growth of sustainable marketing and responsible consumer practices.

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