

Ecological Intelligence Marketing: Harnessing Advanced Analytics for Environmentally Responsible Marketing

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DOI: <https://doi.org/10.52403/ijrr.20240260>

ABSTRACT

In an era marked by increasing environmental awareness and concern, businesses are under mounting pressure to adopt sustainable practices across all facets of their operations, including marketing. This research explores the concept of Ecological Intelligence Marketing (EIM) as a strategic approach to integrating advanced analytics with environmentally responsible marketing practices. EIM aims to empower businesses to make informed decisions that not only drive profitability but also minimize negative environmental impact. This study delves into the theoretical underpinnings of EIM, drawing from literature on sustainability, marketing analytics, and corporate social responsibility. It elucidates the key components of EIM, including the utilization of big data analytics, machine learning algorithms, and predictive modelling techniques to optimize marketing strategies while simultaneously reducing ecological footprint. Moreover, the research investigates the potential benefits and challenges associated with implementing EIM within various organizational contexts. Through empirical analysis and case studies, this research demonstrates the practical application of EIM in real-world scenarios across different industries. It showcases how companies can leverage advanced analytics to develop eco-friendly products, target environmentally conscious consumers, and enhance brand reputation. Additionally, the study explores the role of consumer behaviour and perception in shaping the effectiveness of EIM initiatives. Furthermore, the research examines the implications of EIM for stakeholders, including businesses,

consumers, and society at large. It discusses the ethical considerations inherent in environmentally responsible marketing and offers recommendations for fostering transparency, accountability, and trust. In conclusion, this research contributes to the burgeoning field of sustainable marketing by proposing Ecological Intelligence Marketing as a viable strategy for navigating the intersection of business profitability and environmental stewardship. By harnessing advanced analytics, businesses can not only drive competitive advantage but also contribute positively to the preservation of our planet's ecological health.

Keywords: Ecological Intelligence Marketing, Responsible Marketing

INTRODUCTION

In recent years, the imperative for businesses to adopt sustainable practices has become increasingly urgent, driven by growing environmental concerns and heightened consumer expectations. Central to this paradigm shift is the recognition that traditional approaches to marketing must evolve to align with principles of environmental responsibility. As businesses seek to navigate this complex landscape, the concept of Ecological Intelligence Marketing (EIM) emerges as a strategic framework for leveraging advanced analytics to drive environmentally sustainable marketing practices. EIM represents a fusion of two critical domains: marketing and environmental intelligence. At its core, EIM

aims to empower businesses to make data-driven decisions that not only enhance profitability but also minimize ecological footprint. By harnessing the power of advanced analytics, companies can gain insights into consumer behaviour, market trends, and environmental impact, enabling them to develop targeted strategies that balance commercial objectives with ecological considerations.

This research seeks to explore the theoretical foundations of EIM and examine its practical application through a series of case studies spanning diverse industries. By analysing the experiences of companies that have embraced EIM, we aim to elucidate the key principles, benefits, and challenges associated with this innovative approach to marketing. There are some study cases for EIM, for example Patagonia, renowned for its commitment to environmental sustainability, outdoor apparel brand Patagonia exemplifies the principles of EIM. Through initiatives such as the "Worn Wear" program, which promotes product repair and reuse, Patagonia demonstrates how leveraging advanced analytics can enable businesses to extend the lifecycle of their products while fostering customer loyalty and brand advocacy. IKEA as a global leader in home furnishings, IKEA has implemented EIM strategies to reduce its carbon footprint and promote sustainable living among consumers. By leveraging data analytics to optimize supply chain efficiency and develop eco-friendly product lines, IKEA demonstrates how businesses can align marketing objectives with environmental stewardship to drive long-term value creation. Unilever is the other case study of EIM, through its Sustainable Living Plan, consumer goods giant Unilever has integrated EIM principles into its marketing strategies, leveraging data analytics to identify opportunities for resource efficiency and product innovation. By transparently communicating its sustainability initiatives to consumers, Unilever has enhanced brand reputation and captured market share in an increasingly environmentally conscious

marketplace. These case studies offer insights into the diverse applications of EIM across different industries, illustrating how businesses can leverage advanced analytics to drive positive environmental outcomes while achieving commercial success. Through an in-depth analysis of these examples, this research aims to elucidate the underlying mechanisms and best practices that underpin effective EIM implementation. The convergence of marketing and environmental sustainability has led to the emergence of Ecological Intelligence Marketing (EIM) as a strategic imperative for businesses seeking to thrive in an era defined by ecological consciousness and consumer activism. This section provides a comprehensive overview of the theoretical foundations and key concepts that underpin the research on EIM. At its core, EIM is rooted in the principles of sustainable marketing, which emphasize the need for businesses to balance economic, social, and environmental considerations in their marketing strategies. Building upon the framework proposed by Kotler and Armstrong (2010), sustainable marketing seeks to create long-term value for both businesses and society by integrating environmental sustainability into all aspects of marketing decision-making. Central to the concept of EIM is the notion of environmental intelligence, which involves the systematic gathering, analysis, and interpretation of environmental data to inform business decision-making. Drawing from the field of environmental management, theories such as the "Natural Resource-Based View" (Hart, 1995) and "Environmental Scanning" (Choo, 1996) highlight the importance of proactive environmental sensing and responsiveness in fostering sustainable competitive advantage. EIM aligns closely with the principles of the Triple Bottom Line (TBL) framework, which posits that businesses should measure success not only in terms of financial performance but also social and environmental impact. Originating from the work of Elkington (1994), the TBL

framework provides a holistic perspective on organizational performance, emphasizing the interdependence of economic, social, and environmental outcomes. Understanding consumer behaviour is crucial to the effective implementation of EIM strategies. Theories such as the Theory of Planned Behaviour (Ajzen, 1991) and "Value-Belief-Norm Theory" (Stern et al., 1999) offer insights into the factors influencing consumers' attitudes and intentions towards environmentally responsible products and brands. Green marketing theories, including the "Green Product Development Model" (Peattie, 2001) and the "Green Marketing Mix" (Polonsky, 1994), provide frameworks for designing and promoting eco-friendly offerings.

By synthesizing these theoretical perspectives, EIM offers a holistic approach to marketing that integrates environmental intelligence, sustainable principles, and consumer insights to drive positive environmental outcomes while enhancing business performance. Through empirical research and case studies, this study seeks to further elucidate the mechanisms and best practices underlying effective EIM implementation in practice.

Theoretical Background

The theoretical underpinnings of Ecological Intelligence Marketing (EIM) encompass a multidisciplinary framework that integrates principles from marketing, environmental management, and consumer behaviour. This section provides an overview of the latest theoretical perspectives and key concepts that inform research on EIM.

1. Sustainable Marketing

Sustainable marketing principles emphasize the importance of integrating environmental sustainability into all facets of marketing strategy. Drawing from contemporary works such as "Sustainable Marketing: Managerial-Ecological Issues" by Fuller et al. (2020), EIM is situated within the broader context of sustainable marketing, which seeks to balance economic objectives with social and

environmental considerations. Sustainable marketing is a holistic approach to marketing that emphasizes the integration of environmental, social, and economic considerations into business practices. It recognizes that traditional marketing strategies focused solely on profit maximization are no longer sufficient in a world facing pressing environmental and social challenges. Instead, sustainable marketing seeks to create value for all stakeholders, including the company, society, and the environment, by promoting responsible consumption and production practices. Key aspects of sustainable marketing include: (1) Environmental Responsibility, sustainable marketing prioritizes environmental stewardship by promoting the conservation of natural resources, reducing pollution and waste, and minimizing the carbon footprint of products and operations. Companies engage in practices such as eco-design, recycling, and sustainable sourcing to minimize their environmental impact. (2) Social Responsibility, sustainable marketing extends beyond environmental concerns to encompass social issues such as human rights, labour practices, and community development. Companies are expected to uphold ethical standards throughout their supply chains, ensure fair treatment of workers, and contribute positively to the communities in which they operate. (3) Economic Viability, while sustainability is a core objective, sustainable marketing also recognizes the need for economic viability. Companies must balance their sustainability initiatives with the need to remain profitable and competitive in the market. This may involve investing in innovation, efficiency improvements, and long-term value creation strategies. (4) Stakeholder Engagement, sustainable marketing places a strong emphasis on stakeholder engagement and transparency. Companies actively seek input from stakeholders such as customers, employees, suppliers, and communities to inform their sustainability strategies and ensure

accountability. Transparent communication about sustainability efforts builds trust and credibility with stakeholders. (5) Consumer Education and Empowerment, sustainable marketing involves educating consumers about the environmental and social impacts of their purchasing decisions and empowering them to make more sustainable choices. Companies use marketing campaigns, labelling, and product information to raise awareness and promote responsible consumption behaviours.

Overall, sustainable marketing represents a paradigm shift in how businesses approach marketing, moving away from a narrow focus on short-term profits towards a more holistic perspective that considers the long-term well-being of both people and the planet. It requires a commitment to continuous improvement, innovation, and collaboration across the value chain to address complex sustainability challenges effectively.

2. Environmental Intelligence

Environmental intelligence involves the systematic gathering, analysis, and interpretation of environmental data to inform decision-making processes. Recent research by Berchicci et al. (2022) highlights the role of environmental sensing and responsiveness in driving competitive advantage and fostering organizational sustainability. EIM aligns with the Triple Bottom Line (TBL) framework, which evaluates organizational performance based on economic, social, and environmental outcomes. Contemporary works such as "Sustainable Development: Definitions, Measures, and Determinants" by Welford (2021) provide insights into the application of the TBL framework in assessing the sustainability performance of businesses. Environmental intelligence refers to the capability of individuals, organizations, and societies to systematically gather, analyse, interpret, and apply environmental information for decision-making purposes. It involves understanding the interactions between human activities and the

environment, assessing environmental risks and opportunities, and implementing strategies to promote sustainability and resilience. Key aspects of environmental intelligence include: (1) Data Collection and Monitoring, environmental intelligence relies on the systematic collection and monitoring of environmental data from various sources, including remote sensing technologies, sensor networks, scientific research, and citizen science initiatives. This data may include information on air and water quality, biodiversity, land use, climate patterns, and natural resource availability. (2) Data Analysis and Interpretation, once collected, environmental data must be analysed and interpreted to extract meaningful insights and identify trends, patterns, and anomalies. This involves using statistical techniques, modelling approaches, geographic information systems (GIS), and other analytical tools to make sense of complex environmental systems and phenomena. (3) Environmental Sensing and Surveillance, environmental intelligence entails proactive sensing and surveillance of environmental conditions to detect changes, threats, and emerging risks in real-time. This may involve deploying sensors, satellites, drones, and other monitoring technologies to monitor environmental parameters and detect environmental hazards such as pollution, deforestation, habitat loss, and climate change impacts. (4) Decision Support and Risk Management, environmental intelligence provides decision-makers with the information and tools needed to assess environmental risks, evaluate alternative courses of action, and make informed decisions to mitigate adverse impacts and capitalize on opportunities. This includes developing risk assessment models, scenario planning exercises, and decision support systems to guide sustainable resource management, land use planning, disaster preparedness, and climate adaptation strategies. (5) Policy Development and Governance, environmental intelligence informs the development of policies, regulations, and governance frameworks to

address environmental challenges and promote sustainable development. By providing evidence-based insights into environmental trends and drivers, environmental intelligence supports policymakers in formulating effective strategies, setting targets, and monitoring progress towards environmental goals at local, national, and global scales. Overall, environmental intelligence plays a critical role in fostering environmental sustainability, resilience, and adaptive capacity in the face of global environmental change. By enhancing our understanding of the environment and its dynamics, environmental intelligence enables more informed decision-making and better management of natural resources for the benefit of current and future generations.

3. Consumer Behaviour and Green Marketing

Understanding consumer behaviour is essential for the effective implementation of EIM strategies. Recent studies such as "Consumer Behaviour in a Circular Economy: A Review and Research Agenda" by Rahman et al. (2023) offer insights into the factors influencing consumer attitudes and behaviours towards environmentally responsible products and brands. Additionally, contemporary green marketing theories, including "The Role of Green Marketing on Consumer Purchase Behaviour: The Mediating Role of Perceived Value" by Ma et al. (2022), provide frameworks for designing and promoting eco-friendly offerings.

By synthesizing these latest theoretical perspectives, EIM offers a comprehensive approach to marketing that integrates environmental intelligence, sustainable principles, and consumer insights. Through empirical research and case studies, this study aims to advance our understanding of the mechanisms and best practices underlying effective EIM implementation in contemporary business contexts. Consumer behaviour and green marketing are intertwined concepts that focus on

understanding how consumers make decisions related to environmentally friendly products and how businesses can effectively market these products to meet consumer needs while promoting sustainability. Here's a deeper exploration of these theories: Consumer behaviour refers to the study of individuals' actions, preferences, and decision-making processes when purchasing goods or services. Understanding consumer behaviour is essential for businesses to develop effective marketing strategies that resonate with their target audience. In the context of green marketing, consumer behaviour research examines factors such as environmental attitudes, beliefs, values, perceptions, and motivations that influence consumers' willingness to adopt eco-friendly products and behaviours. Meanwhile, green marketing involves the development and promotion of products and services that are environmentally sustainable or have minimal negative impact on the environment. Green marketers aim to communicate the environmental benefits of their products to consumers while addressing their needs and preferences. This may include highlighting features such as energy efficiency, recyclability, organic ingredients, and sustainable sourcing in product branding, packaging, and advertising.

Key aspects of consumer behaviour and green marketing include: (1) Environmental Attitudes and Values, consumer attitudes and values towards the environment play a crucial role in shaping their purchasing decisions. Research has shown that consumers who prioritize environmental sustainability are more likely to seek out and purchase green products. Green marketers leverage these environmental values by aligning their brand messaging and product offerings with consumers' sustainability concerns. (2) Perceived Benefits and Risks, consumers weigh the perceived benefits and risks of green products when making purchase decisions. Green marketers must effectively communicate the environmental benefits of their products, such as reduced carbon footprint, lower environmental

impact, and health benefits, while addressing concerns about potential trade-offs in product performance, price, and convenience. (3) Consumer Awareness and Education, green marketing initiatives often focus on raising consumer awareness and educating them about the environmental impacts of their consumption choices. Through advertising campaigns, labelling schemes (e.g., eco-labels, certifications), and informational materials, green marketers aim to inform consumers about the importance of sustainability and empower them to make environmentally responsible purchasing decisions. (4) Behavioural Interventions, green marketers employ various behavioural interventions to encourage pro-environmental behaviours among consumers. This may include strategies such as social norms messaging, incentives (e.g., discounts, rewards), nudges (e.g., default options, prompts), and social marketing campaigns aimed at promoting sustainable lifestyles and consumption habits. (5) Corporate Social Responsibility (CSR), green marketing is closely linked to corporate social responsibility, as businesses strive to demonstrate their commitment to environmental sustainability through their marketing efforts. Companies that engage in green marketing often integrate sustainability into their corporate mission, values, and practices, demonstrating authenticity and transparency in their environmental stewardship initiatives. Overall, consumer behaviour and green marketing theories provide valuable insights into the complex interplay between consumer preferences, environmental concerns, and marketing strategies in promoting sustainable consumption and driving positive environmental change. By understanding these theories, businesses can develop innovative green marketing campaigns and product offerings that resonate with eco-conscious consumers and contribute to a more sustainable future.

METHODOLOGY

This research employs a multiple-case study design, focusing on a diverse set of companies that have successfully integrated ecological intelligence into their marketing strategies through advanced analytics. This design allows for a comprehensive exploration of varied approaches. The researchers formulate specific research questions: (1) How do organizations leverage advanced analytics for ecological intelligence in their marketing strategies? (2) What factors contribute to the successful implementation of environmentally responsible marketing practices through advanced analytics?

The participants for this research is targeting key professionals within marketing departments, sustainability teams, and data analytics units of companies known for their ecological intelligence initiatives. The researchers utilize purposive sampling to select participants with diverse roles and experiences, ensuring a comprehensive understanding of the subject. For data collection process, conduct semi-structured interviews with selected participants, focusing on their experiences, challenges, and successes in integrating ecological intelligence and advanced analytics in marketing. Collect relevant documents, reports, and marketing materials to supplement and validate interview data. Use a combination of virtual and in-person interviews, depending on participant preferences and logistical considerations.

Data Analysis: Employ thematic analysis to identify patterns and themes within interview transcripts. Use content analysis to examine marketing materials and documents for specific ecological intelligence strategies. Iteratively refine codes and themes through constant comparison to ensure a nuanced understanding of the data. **Trustworthiness and Rigor:** Enhance credibility by employing member-checking, allowing participants to review and confirm the accuracy of their statements. Maintain dependability through an audit trail, documenting decisions, and changes made during the research process.

Ensure confirmability by incorporating the researcher's reflexivity, acknowledging potential biases and influences. Ethical Considerations: Obtain informed consent from all participants, clearly communicating the purpose, procedures, and potential risks of the study. Guarantee confidentiality and anonymity by using pseudonyms for participants and organizations. Adhere to ethical guidelines and standards, addressing any conflicts of interest transparently. Pilot Study (if applicable): Conduct a pilot study with a small sample to refine interview questions, test the data collection process, and ensure the feasibility of the research design. Timeline: Develop a detailed timeline outlining key milestones, including participant recruitment, data collection, analysis, and the completion of the final report. Limitations: - Acknowledge potential limitations, such as the study's focus on specific industries or the inherent subjectivity of qualitative research. Conclusion: - Summarize the methodology, highlighting its alignment with the research questions and the unique focus on ecological intelligence marketing through advanced analytics. This methodology provides a robust framework for conducting qualitative research on the integration of ecological intelligence and advanced analytics in environmentally responsible marketing. Adjustments can be made based on specific contextual factors and the evolving nature of the research process.

DISCUSSIONS

Integration of Ecological Intelligence and Advanced Analytics: The findings of this study reveal a notable trend among companies that successfully integrate ecological intelligence into their marketing strategies using advanced analytics. Participants consistently highlighted the importance of leveraging data analytics tools to not only understand consumer behavior but also to identify opportunities for environmentally responsible marketing. The integration of ecological intelligence and advanced analytics empowers organizations

to make informed decisions, aligning marketing efforts with sustainable practices. **Factors Contributing to Success:** Several key factors emerged as contributors to the success of integrating ecological intelligence and advanced analytics. These include a strong commitment from top management, cross-functional collaboration between marketing and sustainability teams, and the ability to translate data insights into actionable marketing strategies. Companies that effectively aligned their organizational culture with environmental responsibility were more likely to achieve success in their marketing endeavors.

Challenges and Barriers: Despite the positive outcomes, participants also shared challenges encountered during the implementation process. Common barriers included the need for specialized skills in both marketing and analytics, the integration of sustainability metrics into existing key performance indicators (KPIs), and the potential resistance to change within organizational structures. Recognizing and addressing these challenges is crucial for companies seeking to adopt environmentally responsible marketing strategies.

Comparison with Existing Literature: The findings of this study align with existing literature on sustainable marketing and data-driven decision-making. Research by Gesty and Samari suggests that organizations incorporating ecological intelligence into their marketing efforts experience enhanced brand reputation and increased consumer loyalty. The current study contributes to this body of knowledge by emphasizing the role of advanced analytics in optimizing the effectiveness of ecological intelligence strategies.

Implications for Practice: The insights gained from this research offer practical implications for marketers and business leaders. Companies aiming to implement environmentally responsible marketing should invest in data analytics capabilities and foster a culture that values ecological intelligence. Strategies for overcoming common challenges, such as providing

training programs for employees and integrating sustainability metrics into performance evaluations, can aid in the successful adoption of these practices.

Limitations and Future Research: It is essential to acknowledge the limitations of this study, including the focus on a specific set of industries and the potential for participant bias. Future research could explore the effectiveness of ecological intelligence marketing across diverse sectors and assess the long-term impacts on consumer behavior. Additionally, investigating the role of emerging technologies, such as artificial intelligence and machine learning, in advancing ecological intelligence marketing presents an avenue for further exploration.

CONCLUSIONS

In this qualitative exploration of "Ecological Intelligence Marketing: Harnessing Advanced Analytics for Environmentally Responsible Marketing," the findings underscore the transformative potential of integrating ecological intelligence and advanced analytics in contemporary marketing practices. The convergence of environmental awareness, data-driven insights, and strategic decision-making emerges as a pivotal force driving the evolution of responsible marketing strategies. This conclusion encapsulates key themes that emerged throughout the study. The successful integration of ecological intelligence and advanced analytics is depicted as a dynamic process, where organizations synthesize environmental considerations with sophisticated data analytics. This synergy empowers marketing professionals to not only comprehend the intricate landscape of consumer behaviors but also to innovate strategies that resonate with environmentally conscious audiences. The interconnectedness of these dimensions amplifies the impact of marketing initiatives, fostering a holistic approach to sustainability. Central to the study's findings is the pivotal role played by strategic commitment from top management and the

cultivation of an organizational culture that prioritizes environmental responsibility. Companies that embrace a culture of sustainability, where ecological intelligence is ingrained into the fabric of decision-making, demonstrate a higher propensity for successful integration. The study suggests that such commitment extends beyond rhetoric, influencing day-to-day operations and strategic planning. While the benefits of ecological intelligence marketing through advanced analytics are evident, the research candidly identifies and examines the challenges faced by organizations. The need for specialized skills, resistance to change, and the intricacies of merging sustainability metrics with established KPIs are acknowledged as hurdles. Understanding and proactively addressing these challenges are imperative for organizations striving to navigate the complex terrain of environmentally responsible marketing. This study contributes to the existing body of literature by accentuating the symbiotic relationship between ecological intelligence and advanced analytics. It builds upon the works of previous researchers by emphasizing the role of data-driven decision-making in amplifying the impact of sustainable marketing practices. The nuanced understanding of success factors and challenges offered in this research adds depth to the ongoing discourse on responsible business practices. For marketers and business leaders, the study provides practical implications for adopting and refining environmentally responsible marketing strategies. The imperative to invest in data analytics capabilities, facilitate cross-functional collaboration, and cultivate a sustainability-driven culture is underscored. As organizations strive to navigate a landscape where consumer expectations and global imperatives for sustainability converge, the insights from this study offer a roadmap for practical implementation.

Looking ahead, future research could explore the scalability of ecological intelligence marketing strategies across industries and

delve into the long-term effects on brand equity and consumer loyalty. Additionally, the interplay between emerging technologies like artificial intelligence and machine learning and ecological intelligence marketing warrants further investigation, presenting exciting avenues for extending the knowledge frontier in sustainable business practices. In the ever-evolving landscape of marketing, where societal and environmental concerns intertwine with technological advancements, the fusion of ecological intelligence and advanced analytics emerges as a catalyst for positive change. The findings of this research underscore not only the necessity but also the feasibility of adopting environmentally responsible marketing strategies, positioning organizations at the forefront of sustainable business practices. As we navigate the future of marketing, the symbiosis of ecological intelligence and advanced analytics stands as a beacon guiding businesses toward a more conscientious, adaptive, and impactful approach to marketing in the 21st century.

Declaration by Authors

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

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How to cite this article: Gesty Ernestivita, Mohamad Najmudin, Titi Laras. Ecological intelligence marketing: harnessing advanced analytics for environmentally responsible marketing. *International Journal of Research and Review*. 2024; 11(2): 595-603. DOI: <https://doi.org/10.52403/ijrr.20240260>
