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Leveraging AI for Sustainable Marketing and Financial Efficiency: An Integrated Framework for Green Competitive Advantage

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Abstract

Purpose: In an era of digital revolution and environmental urgency, artificial intelligence (AI) has emerged as a critical component of business performance and sustainability. By analysing the numerous ways AI can enhance marketing ROI, financial efficiency, and environmental sustainability, this paper offers an integrated framework to achieve Green Competitive Advantage.

Design: The study uses a qualitative analytical approach in conjunction with a literature review, real-world case studies (like Netflix, Domino's, Unilever, and Patagonia), and financial modelling (DuPont and Economic Value Added) to assess the connection between AI adoption and sustainable business practices.

Findings: Research indicates that by increasing customer retention and simplifying campaign strategies, AI-driven personalisation significantly boosts marketing return on investment. AI-using companies exhibit quantifiable gains in shareholder value, asset turnover, and net profit margins. By reducing energy consumption and carbon emissions, artificial intelligence (AI) in operations—such as route optimisation and predictive analytics—supports corporate sustainability goals. However, the survey also identifies barriers, particularly for SMEs, including high adoption costs, skewed data, inadequate infrastructure, and complex regulations.

Originality: The research advances theory by acknowledging AI as a strategic resource for long-term value generation and by aligning with the Resource-Based View, Stakeholder Theory, and Triple Bottom Line Framework. By connecting AI-enabled technologies to green finance, it also raises the concept of "Smart Sustainable Finance."

The paper offers useful strategic guidance for SMEs, corporations, lawmakers, and educators on how to overcome challenges and ethically integrate AI. The study concluded that responsible and transparent AI application in accordance with ESG goals and ethical governance is necessary to obtain a competitive advantage and foster sustainable growth in the AI-driven economy.

Keywords: Artificial Intelligence, Sustainable Marketing, Green Finance, Financial Efficiency, Marketing ROI, Environmental Sustainability.

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Introduction

In the present digital era, AI has emerged as a potent instrument that is fundamentally metamorphosing the modus operandi of diverse sectors, prominently marketing and finance. In layman terms, it implies endowing machines with the faculty to perform those tasks which ordinarily necessitate human intelligence, including but not limited to learning from experience, comprehending information, making decisions, and getting better with time. What was earlier perceived as technology of the future has now become an integral aspect of day-to-day activities and is assisting enterprises in formulating more optimal, prompt, and data-based strategies.

AI has majorly transformed the interaction of businesses with customers from now on. Earlier days were characterized by depending mostly on broad data, analytics, and lagged feedback. But this time it would embrace real-time data that depicts actual behavior and a close understanding of each customer's preferences and what they look for. This will support offering individual content that appears to be relevant at the right time as well. Such personal treatment not only improves customer experience but also increases conversion rates through building trust in customers. Now, with systems such as recommendations, chatbots, automated advertising, and content creation tools that have recently come into existence many more capabilities are being progressively applied within firms for much better engagement coupled with time- and cost-saving benefits. Here AI does not work passively based on existing actions; more often it proactively predicts possible needs raising the entire journey of satisfying customers to feel smooth, intelligent, and personal.

AI has transcended beyond the realms of online shopping and social media. It is now infiltrating several other sectors including tourism, education, healthcare, and retail among others. This may be through assisting patients with personalized services or how product pricing and inventory management are handled. All these make operations much more accurate and streamlined. Even tasks like social media monitoring, ad placement, and analysis of customer feedback have been automated. For instance, chatbots available round the clock learn from each interaction to offer improved service over time. AI-driven advertising systems also enable businesses to run well-targeted campaigns that can be continually optimized for much better results.

On the relationship between green finance and green corporate governance CSR, green technology and green investment all affect sustainability. For instance, Wang et al. (2022) conducted an empirical investigation with the CSR mediation discovered with the aid of green technology and green investment by using business governance and Green finance programs as essential independent and dependent variables, respectively, Green finance plans can help build sustainability in a firm.

However, The missing of green technology or green investment is the first thing of note in this study. Another positive and significant impact of green investment on sustainability was also found through CSR mediation (Pambudi et al., 2022).

AI has been equally impactful in the field of finance. This enabled faster and better decisions as a result of processing huge volumes of data in very little time. Already, AI is assisting financial services to be smarter, safer, and more personal with fraud detection and customer service automation, credit scoring, and even algorithmic trading. However, for these systems to be trusted there will emerge a strong need for transparency and explainability hence gaining the attention of XAI — especially in finance-related decision-making.

Small and medium-sized enterprises are a key part of economic development in many developing countries. Even so, a large number of them are finding it hard to keep up with how quickly technology is changing. This has led to a decline in their overall performance.

To improve and increase their income, these businesses need to start using modern technologies. Tools like Fintech, digital marketing, and artificial intelligence (AI) can help them work more efficiently and make better business decisions.A recent study by Pizzi et al. [24] also pointed out that Fintech can be an important part of building a more sustainable business model, especially by bringing circular economy ideas into the way SMEs operate. Even so, there's still not enough research that clearly shows what factors help SMEs successfully manage this kind of technological shift — particularly when it comes to using AI in areas like digital marketing and Fintech. The rise of digital technologies has created a space where businesses can easily find ways to promote what they offer. Some of the top companies today have already seen how powerful digital platforms can be, and many have started putting their money into digital marketing plans. These platforms are among the biggest in the world, with users ranging from millions to even billions [25]. As companies go through the digital marketing process, they collect a massive amount of data. Handling all of this data every day has become more and more difficult. Because of that, businesses now need to bring in new technologies that help them organize, improve, target, and better understand their audiences [26]. AI can be included in marketing work, using its strength to give very precise results in sorting user data, improving content, building user profiles, predicting trends, finding the right target audience, and improving search rankings. In academics too, research on AI can connect with marketing studies in several different ways. But right now, only a small part of the research on AI focuses directly on how it's used in marketing.

AI is also being used to support green finance, which aims to make financial decisions more environmentally responsible. Its predictive power is being applied to identify sustainable investment opportunities, manage environmental risks, and optimize resource usage. Some models, like the FMFG algorithm, have shown very high accuracy in analyzing green finance, even more than some older AI models. Research shows that AI adoption also supports green innovation, or "greenovation", and this effect is often seen more in privately owned companies compared to government ones, mostly because private firms tend to be more open to taking risks and trying new approaches.

The increased competition in the world of today has made sustainability an absolute need for the companies to grow in the right way, foster new ideas, and achieve long-term growth in a rapidly transforming global environment. Green finance, green investment, and green technology have thus become viewed as major force-multipliers to the initiatives that can encourage and maintain sustainable and eco-friendly practices (Wang et al., 2023; Wang & Yan, 2023; Wang et al., 2022; Xu et al., 2020).

AI-based marketing tools like chatbots, machine learning, and predictive analytics have completely changed how companies interact with customers and manage market performance. Now, businesses use AI to make supply chains smoother, do targeted advertising, and bring more transparency to sustainability efforts. Even after all these developments, there is still not much information about how AI is used in green marketing, especially in terms of how it affects consumer behavior and how much it is being used in developing countries."

Green finance, in particular, is predominantly related to the deployment of the financial support and investment into environment-friendly and environmentally-friendly-positive projects, which could result in the adoption of a financial system built on the principles of sustainability and its promotion (Wang & Yan, 2023).

Challenges continue to attend the fast growth of AI. A major concern, an "energy paradox," is that the systems—particularly in large industries and data centers—may expend enormous amounts of electricity. This certainly can subvert the environmental benefits of AI if it leads

to increased fossil fuel use rather than decreased fossil fuel use. At the same time, financial analysts can help green innovation by molding investor sentiment, accelerating the diffusion of information, and lowering financial frictions for green projects.

On the other hand, Jain, Zicari, and Aguilera (2023) pointed out the positive and statistically significant influence of green finance on CSR when other factors are ignored.

also omit the discussion of green technology and green investment. Specifically, the study of On the other hand, Sharma and Choubey (2022) revealed that green finance exerts a positive influence on CSR.i al., 2020).

AI helps marketers take better decisions by targeting more correctly and quickly adjusting to new sustainability trends. Sajili (2024) said that AI can handle a lot of data and help marketers get ideas that match with changing environmental needs. But K. Wang et al. (2023) warned that sometimes AI's own system may push choices that are not very eco-friendly, without meaning to, which brings up ethical issues. So, it's important that marketers make AI tools that prefer real green options, not just those that increase profit

As promising as AI may be, it also brings with certain challenges and ethical considerations that can't be overlooked. Data privacy is one of the major concerns because AI systems are critically dependent on individual data. Consumers who sense that they are being watched, or who do not understand how their data will be used, might lose trust. 5) This is another issue, bias — if A.I. systems are trained on incorrect or biased data, they will make unfair or biased decisions. High prices, alongside technical complexity, can deter small companies from embracing A.I. And many people still don't quite get AI or worry they'll lose jobs to automation. That breeds resistance and fear in many workplaces. By the way, there's also poor rules an mutable List Of On top of that, there's also a lack of proper rules and and AI use policies that emerge, causing misinformed and incorrect use.

Saudi Arabia's little andmedium-sized undertakings have played a noteworthy role. a basic part in cultivating employments and net household yield. In any case of their Despite making noteworthy commitments, SMEs discover it troublesome to get back due to their confined resources. the estimate ofthe company. Green fund gets to be a vital component in diminishing the affect in this situation. improving the natural affect and common maintainability of SMEs (Babiak &) Trendafilova, 2011). The setting of green speculation is important. Saudi Middle eastern fabricating endeavors (Abdou et al., 2022).

On the other hand, competent effective corporate administration is essential for guaranteeing straightforward and ethical management. fostering long-lasting associations with partners, particularly accomplices and providers. By coordination supportability all through all operational ranges, SMEs can adjust their hones with economical concepts (Mahmood et al., 2018).

Green finance is directly responsible for the environmentally friendly projects by providing funds and thereby creating a sustainable financial system that is in harmony with and drives sustainable development goals (Wang & Yan, 2023). In addition, green investment is a motivator for companies to become environmentally-friendly, give more focus on resource efficiency, and at the same time, their energy consumption becomes more efficient (Ye & Dela, 2023). Green technology has the same effect. It does so by utilizing resources in the most efficient way possible to help with sustainability (Bernal-Conesa, de Briones-Peñalver and Nieves Nieto, 2017).

The improvement of the CSR is, to say it differently, seen as the main reason because it is necessary to have the corporate objectives in line with the social and environmental issues of the world, thus providing more holistic ways of dealing with the sustainable development. Enterprises that are able to implement sustainably their concentration on green technology,

green finance, and green technology It has the possibility to grow the sustainability under the frame of corporate social responsibility (Bernal- Wang et al., 2023; Conesa et al., 2017; Wang & Yan, 2023).

The authors in Chen, L. and Zhou, X. (2021) talked about the idea of sustainable competitive advantage. According to the study, a business has a competitive advantage when it creates more economic value compared to its competitors. It means the company is able to use its resources in a way that meets customer needs better. If a business uses a strategy that increases its value, it is seen as successful. Companies need to find out what their biggest problems are if they want to stay ahead in any industry Chen, Z., Zhang, H. and Liu, X. (2022). Innovation also helps by giving a new way of thinking and plays a big part in how many countries grow economically.

This study sets forth a critical assessment of opportunities and challenges facing SMEs in an AI-led environment with reference to the Palestinian context as compared to previous studies. It also tries to review more critically the interdependence between AI and digital literacy than preceding works have done. The overall implication of our findings is that digital literacy goes beyond being perceived as an ancillary input; rather, it acts as a catalyst that intensifies the transformative capacity of AI. Therefore, enduring competitive advantages for SMEs require the integration of technology, skills, and strategy into one seamless approach. Filling these knowledge gaps will help highlight tailored insights for SMEs besides underlining the importance of digital literacy in such an AI-based business environment. Our main goal is to investigate how AI can improve Palestinian SMEs' long-term competitive advantage, with digital literacy acting as a crucial moderating factor.

This complex idea combines sustainability—which emphasises the significance of creating long-term value —with competitiveness, offering a standard by which to measure a company's strength in relation to its rivals. It is important to recognise that sustainable competitive advantage predicts a firm's future success trajectory, whereas business performance is the result, reflecting a firm's accomplished successes. It takes a sophisticated strategy to maintain this competitive edge in the AI era. Across key industries, including e-business, operations, human resource management, market research, customer relationship management, accounting, finance, sales, and marketing, artificial intelligence (AI) has become a disruptive force. Leveraging its resources to obtain a competitive advantage is still its main goal. Along with developing core competencies, utilising intellectual property, and putting unique product strategies into practice, organisations use AI as a transformative tool.

We need policies, heightened awareness, training and a centering on ethical design to combat these challenges. But it’s also critical that businesses, governments and researchers combine forces to solve the problem. AI isn’t just another tool — it has become a fundamental aspect of how contemporary marketing and financial systems operate. When used properly and responsibly, it can provide sustained growth, better customer experiences, and bolster support for sustainable development. But at the same time, it needs to be addressed in a manner that centres human values, fairness, and transparency.

Review of literature

Artificial Intelligence helps in finding better delivery routes by studying transport systems carefully. This way, companies can choose the paths that use less fuel, which lowers delivery costs and also reduces pollution. This supports the company’s goal of being more environmentally friendly (Chen et al., 2022).

In their influential study, Olan et al. (2021) explore the function of AI networks in sustainable supply chain finance, with a particular emphasis on the food and beverage sector. Their

investigation introduces an innovative conceptual framework that highlights how AI technologies can create a sustainable financing stream by improving the efficiency and transparency of supply chains. This utilization of AI is essential for recognizing and [1]addressing environmental risks, as well as ensuring the sustainability of supply chain operations, thus contributing to the overarching aims of sustainable finance. The importance of this research is found in its capacity to illustrate the practical applications of AI in real-world contexts, providing a model for the integration of technology with sustainability goals.
Olan et al. (2021) in their study looked at how AI can help in making supply chain finance more sustainable, especially in the food and beverage industry. They introduced a new idea that shows how AI can make supply chains more efficient and transparent, which helps in creating a steady and eco-friendly flow of finance. Using AI also helps in spotting environmental risks and solving them, making the whole supply chain more sustainable. This study is important because it shows how AI can actually be used in real-life situations and how it can support companies in meeting their sustainability goals.
Financial analysts (finalysts) play an important role in this connection in different ways. Since they understand financial data well, they help investors form opinions about the value of AIA and green innovation. They explain things clearly and in a simple way, which makes it easier for investors to understand and notice the company. This directly influences their investment decisions (Han et al., 2024).
This research selected publicly listed Chinese companies using five main points. One big reason is that China's digital economy is growing very fast, which makes it a good place to study how AI abilities affect green innovation. Also, the Chinese government is actively encouraging companies to go digital, which supports this kind of research (Li & Shao, 2023).
Our study seeks to assess how well corporate green ovation corresponds with the interests of shareholders. Additionally, the increasing competition in both domestic and international markets drives Chinese firms to adopt green ovation strategies to enhance their competitiveness, as they encounter pressure to stay relevant in the global marketplace (Nguyen et al., 2021; Zahid et al., 2023).
By uncovering hidden patterns and minimising cognitive biases like herd behaviour, machine learning algorithms—which are frequently used to process large datasets and forecast market trends—have revolutionised financial modelling (Singh et al., 2025). Reliable solutions for risk assessment and portfolio optimisation are also provided by deep learning and neural networks, which improve the accuracy of forecasting borrower behaviour and market dynamics (Weinjing, 2025; Sahebetal.,2023). Natural language processing (NLP) improves the capabilities of artificial intelligence by analysing unstructured financial text, allowing for real-time disorder analysis and market impact prediction (Mayor, 2020; Du et al., 2025).

To reduce resistance to change, companies need to build a culture where innovation and continuous learning are encouraged. Investing in AI-related training and education can help employees learn the skills they need to work with AI tools effectively (Paramesha et al., 2024b; Rane et al., 2024a; Bharadiya et al., 2023).
The successful use of AI in any company mainly depends on its work culture, support from leaders, and how ready the employees are for the change (Ahmed et al., 2022; Berdiyeva et al., 2021; Najem et al., 2022).
How easily people understand and use AI, and how useful they think it is, also plays a big role in its adoption. Apart from this, things like industry rules, government policies, and

pressure from competitors also have a strong impact on how quickly and effectively AI gets adopted (Wang et al., 2022; Giudici & Raffinetti, 2023; Paramesha et al., 2024a).

To deal with the challenges of using AI, companies need to follow different methods. One important step is to create a workplace where new ideas and continuous learning are encouraged. When businesses spend on AI training and learning programs, it helps employees understand AI better and work with it more confidently (Paramesha et al., 2024b; Rane et al., 2024a; Bharadiya et al., 2023).

Companies can use predictive analytics to better understand and evaluate their suppliers by checking how they perform and whether they follow environmental guidelines. This helps in choosing partners who support sustainability. When businesses work with such responsible suppliers, it not only helps in lowering carbon emissions but also improves their chances of getting green funding that supports eco-friendly business practices (Dubey et al., 2016).

Predictive analytics' ongoing development will be essential to maintaining supply networks' environmental sustainability and financial stability. It will support long-term business growth while maintaining environmental responsibility, particularly in the cutthroat market of today (Kumar et al., 2022; Wong et al., 2024).

Today, many people, especially those from weaker sections of society, still don’t have proper access to financial services. With the help of modern digital tools, it has become possible to offer simple financial learning and small financial support to those who need it the most. These tools can help bridge the gap between rich and poor by offering fair financial chances to everyone (Kumar, 2025; Goodell et al., 2021). Still, this area needs more detailed study so that better solutions can be created as per the needs of different groups.

Artificial intelligence applications and bibliometric analysis have made significant strides in the study of financial behaviour and its determinants in recent years. (Alavi and associates 2024; Shi and associates, 2025Ahmed and associates, 2022). Although they did not look at the role of artificial intelligence, they did highlight the dynamic evolution of financial literacy and behaviour in their bibliometric and systematic review (Ingale & Paluri, 2022). Similar to this, they looked at the relationship between financial literacy and financial behaviour, but they neglected to take into account how AI might affect behaviour using advanced techniques and tools.

Viale et al. (2023) However, their analysis is primarily of a practical nature and lacks a bibliometric perspective. Collectively, these studies show that interest in AI and financial behaviour is increasing, but they also highlight a bibliometric knowledge gap. By highlighting emerging topics, significant figures, and patterns in the incorporation of AI into financial behaviour research, the current paper offers a comprehensive bibliometric analysis to address this issue. In line with Payne et al. (2021a) and Fernandes and Oliveira (2021), we contend that the financial services sector uses AI extensively and for a range of purposes, such as auditing and customer-facing apps like chatbots. In order to accommodate our journal's readership and keep our study from becoming overly technical, we limit our review to AI applications that communicate with customers. Our investigation is motivated by a number of deficiencies in the existing literature. First, prior reviews of the literature typically focus on a single aspect of financial services, such as credit scoring (e.g. Bhatore et al., 2020; Dastile et al., 2020) or blockchain technology (Ali et al., 2020). Second, assessments of the literature that are more comprehensive do not adhere to a (e.g. Bhatore et al., 2020; Dastile et al., 2020) and blockchain technology (Ali et al., 2020). Second, a systematic approach is not adopted by literature reviews with an extended scope (e.g. Cavalcante et al., 2016; Konigstorfer and Thalmann, 2020; Milana and Ashta, 2021). In light of this, our systematic

literature analysis adds to and expands on previous reviews by offering the first overview of research on artificial intelligence in financial services that interact with customers and defining potential lines of inquiry to further this area of study. In contrast to previous approaches, it has been suggested that the Theory, Context, Characteristics, and Methodology (TCCM) framework (Paul and Rosado-Serrano, 2019) produces more robust, insightful, and instructive insights (Paul and Criado, 2020).

As per Chang et al. (2022), Chen et al. (2022), Tang (2022), and Wang Y et al. (2022), green finance plays a special role in supporting ESG goals and encouraging businesses to act responsibly towards the environment, which helps both economic development and environmental care. However, the current studies do not clearly explain how green finance is developing in today's AI-driven world. Because of this, the main research question is still unanswered. This study aims to fill that gap by exploring how green finance is growing in the AI era and what impact it has on the economy and environmental management.

When intelligent promotion and artificial intelligence are united, they enable the enterprise to proceed further on its sustainability objectives. This partnership also lays down a very firm foundation for long-term business development (Risdwiyanto et al., 2023). Artificial intelligence enables the promoters to marshal their resources accurately, deliver more personalized experiences to the customers, and support less resource-draining habits. But the use of AI in marketing raises certain ethical issues and challenges, Therefore, it has to be carefully managed and appropriately used to ensure the achievement of long-term sustainability.

This exploration assumes that the limited use of advanced smart technologies is decelerating down the growth of green finance in the AI period. It also suggests that green finance can grow better if these technologies are used more. This idea is supported by earlier studies from Chen and Zhou (2021), Chen(2021), and Natanelov et al.(2022), who have stressed the advantages of smart finance. To address this gap, the study focuses on exploring the conception of smart green finance, which has surfaced with the rise of AI, and looks nearly at how green finance connects with the full range of Sustainable Development Goals(SDGs) that impact the green frugality and environmental operation.

This study will provide clear motivating factors in the relationship between Technological Innovation and the path to achieving sustainability through expounding on the convoluted nexus among Marketing, AI, and Sustainability. Companies will be able to strategically apply a plan for market penetration using AI-driven marketing techniques, thereby gaining a competitive edge plus giving back positively towards making the environment clean and improving humanity, thus making the future more sustainable.

The theoretical basis of this research is the concept of green finance. The scientific vittles of this conception are detailed and described in detail in being works (Guang-Wen and Siddik, 2022; Guo C Q et al., 2022; Kaginalkaretal., 2022; Li Q et al., 2022; Ma et al., 2022; Wu H, 2022), which allows us to determine the degree of elaboration of the problem of this exploration as high. The conducted literature review and content analysis of being workshop on the given content showed that the literature notes a fractured donation of green finance to the frugality and environmental operation.

Research Objectives

This study proposes the following objectives:

1. To assess the role of AI in optimizing marketing ROI and financial performance.
2. To evaluate the environmental contributions and efficiencies driven by AI in marketing and financial systems.

3. To explore barriers and enablers of ethical and sustainable AI adoption in SMEs.
4. To build a framework integrating Green AI, financial metrics, and sustainable marketing to foster Green Competitive Advantage.

Research Questions

RQ1: Does AI-driven personalization improve marketing ROI while supporting sustainability?

RQ2: What financial and environmental benefits are realized through the adoption of Green AI?

RQ3: What barriers hinder SMEs in implementing AI solutions ethically and sustainably.

Hypotheses:

H1: AI-based marketing improves customer retention and reduces acquisition cost, thus boosting ROI.

H2: Green AI contributes to reduced operational costs and carbon emissions.

H3: Ethical AI adoption in SMEs is significantly affected by financial constraints and data privacy regulations.

Research Methodology

This research adopts a qualitative analytical method to explore the incorporation of Artificial Intelligence (AI) into sustainable marketing and financial effectiveness. The methodology integrates literature review, case study, and economic modeling methods to analyze the interdependence of AI, marketing ROI, financial performance, and environmental sustainability.

Research Design

The study takes an exploratory and descriptive approach. The exploratory part seeks to determine and know the underlying mechanisms through which AI supports sustainability in finance and marketing. The descriptive component records how various firms use AI technology to enhance efficiency and green results.

Data Sources

Data for this study are drawn from secondary sources such as:

- Peer-reviewed academic journals (Scopus, Web of Science indexed)
- Industry whitepapers (McKinsey, Deloitte, PwC)
- Financial and company sustainability reports (Unilever, Domino's, Netflix)
- Government reports (India's Digital Data Protection Bill, GDPR)

Analytical Tools

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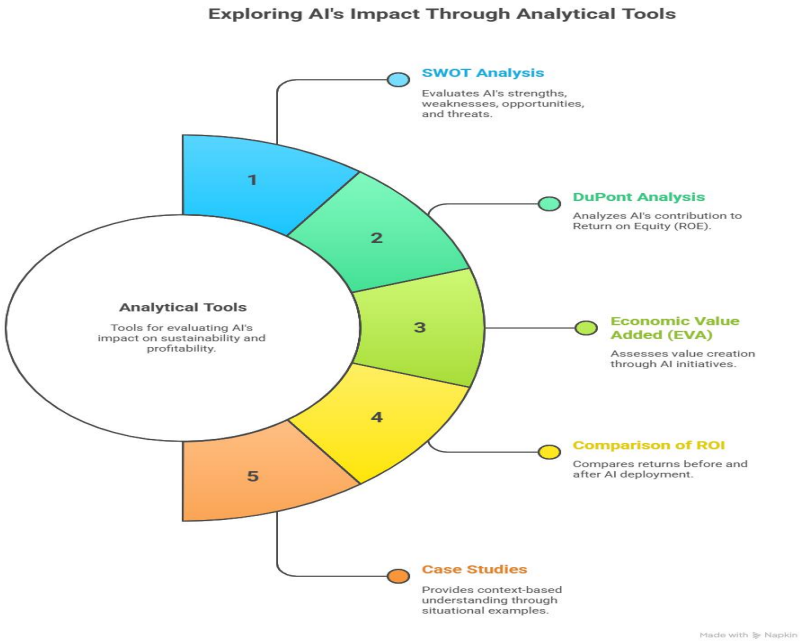

Figure 1: Analytical tools used by the Author

Conceptual Framework

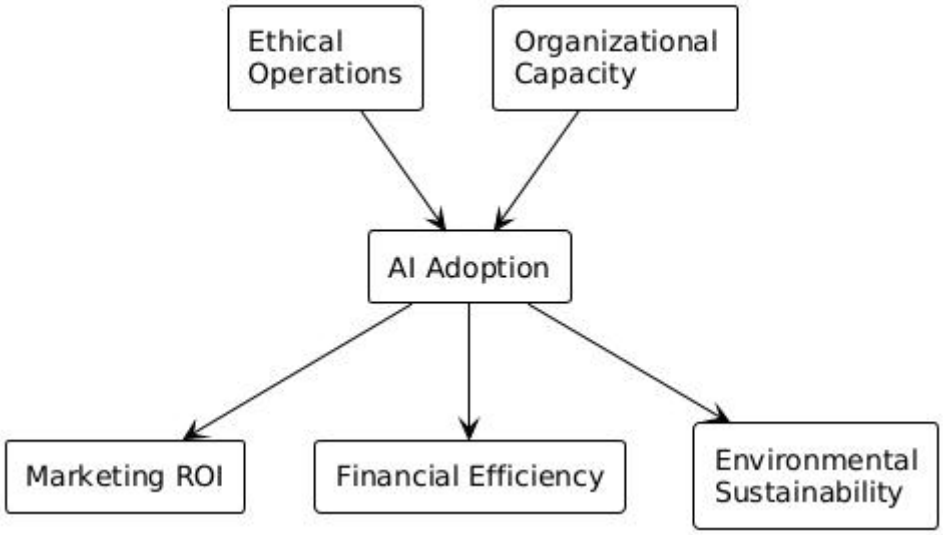

Figure 2: Conceptual Framework made by Author

Analysis and Interpretation

A thorough grasp of how AI supports sustainable marketing, financial performance, and environmental benefits is provided by the analysis and interpretation chapter, which explores the results from secondary data, case studies, and analytical frameworks. The interpretation takes a multifaceted approach that includes financial return, green transformation, and marketing efficacy.

SWOT analysis of AI adoption in sustainable marketing and finance shows

Strengths

1. Hyper-personalization and consumer engagement are benefits.

- According to Pixis.ai, 90% of marketers expect to use AI more in 2025.

- 85% of marketers currently use AI to generate content, automating tasks like email personalisation, A/B testing, and ad targeting.
- AI enhances relevance and increases click-through rates (CTR) and conversion rates by over 30% in some industries through real-time consumer segmentation.

2. Scalability and Operational Efficiency

- 56% of companies use AI to improve internal operations, according to McKinsey & Company.
- 46% of companies have implemented AI in customer relationship management (CRM), which has lowered expenses, improved customer satisfaction, and expedited service response.
- Automation of tasks such as lead scoring, financial forecasting, and campaign planning accelerates turnaround times and reduces manual errors.

Weaknesses

1. SMEs Face High Entry Barriers

- Budgetary constraints are mentioned by 33.2% of marketers as a primary barrier to the adoption of AI, according to Pixis.ai.
- Lack of technical infrastructure and skilled personnel are cited by 37.9% of respondents as the main challenges, particularly for small and medium-sized enterprises (SMEs).

2. Model and Data Integrity Limitations

- According to a SurveyMonkey survey, 31% of marketing professionals are concerned about the quality, completeness, and accuracy of AI's data.
- Inaccurate data inputs may lead to poor personalisation, erroneous financial projections, and consumer mistrust.

Opportunities

1. Green AI and Sustainable Innovations

- By optimising energy use and logistics, including predictive maintenance, virtual product testing, and smart routing, artificial intelligence (AI) has the potential to drastically reduce a company's carbon footprint.
- Resource optimisation is another benefit of AI analytics-driven sustainable marketing strategies (e.g., reduced ad spend waste, less paper usage).

2. Regulations and Government Support for Sustainable Technology

- Several national and regional governments, including those in the EU and India, are offering open-access AI platforms, tax breaks, and subsidies to encourage the use of ethical AI in SMEs.
- AI innovation linked to sustainability is being prioritised globally by green digital transformation initiatives and ESG regulations.

Threats

1. Algorithmic bias and reputational risks

- Biassed financial approvals or customised offers brought on by biassed training data or opaque models can undermine brand trust.
- Unethical violations of AI transparency could lead to decreased adoption and consumer resistance.

2. Regulatory Review and Data Governance

- Frameworks like India's Digital Personal Data Protection Act (2023) and the EU's GDPR mandate strict data processing and algorithmic transparency.
- Companies that violate the law risk penalties, harm to their brand, and disruptions to their business operations.

Despite AI's enormous potential for efficiency, personalisation, and green competitiveness, this SWOT analysis demonstrates that ethical design, cost, qualified personnel, and robust data control are critical to its successful implementation. Adopting both Green AI and Responsible AI concepts positions businesses to gain a competitive advantage in the modern economy.

Dupont Analysis

The DuPont model divides return on equity (ROE) into three components:

The formula **for ROE is Net Profit Margin × Asset Turnover × Equity Multiplier.** ROE is calculated by multiplying the net profit margin by the asset turnover. This demonstrates how AI-driven innovations impact overall financial performance.

Net Profit Margin

Within a year, General Electric's use of AI-powered pricing optimisation increased profit margins by 10%.

According to McKinsey, generative AI could boost US$2.6–4.4 trillion yearly across all businesses, with better pricing and margin management accounting for a significant portion of this gain.

Implication: AI has already helped companies like GE achieve double-digit margin increases, which is a reliable standard for ROI-enabled businesses.

Asset Turnover

A Latin American study found that technology investments significantly increase asset turnover, though the exact percentages vary.

An 80% decrease in order processing times is shown in use cases for ERP and process automation, which accelerates revenue flows and boosts asset efficiency.

Implication: Field data demonstrates notable increases in asset efficiency brought about by automation, even though exact uplift percentages vary depending on the circumstances.

Equity Multiplier

Equity multiplier insights are less commonly measured in AI research. However, advanced AI-enabled risk and capital management systems put in place by financial institutions like JPMorgan (US$18 billion AI investment) support sustainable leverage ratios.

Assumption: Since AI improves risk monitoring, businesses can maintain prudent leverage (equity multiplier) by financial prudence.

Using verified information:

- +10% net profit margin (GE case)
- Asset Turnover: Based on LA tech boost, project a 10–20% rise (e.g., from 1.2 to 1.32–1.44).
- Equity Multiplier: Maintained at 1.5, the industry standard
- Calculating

ROE: **Prior to AI= 10% × 1.2 × 1.5 = 18%**

Post to AI (taking midpoint asset turnover at 1.38): 11% × 1.38 × 1.5 = 22.7%

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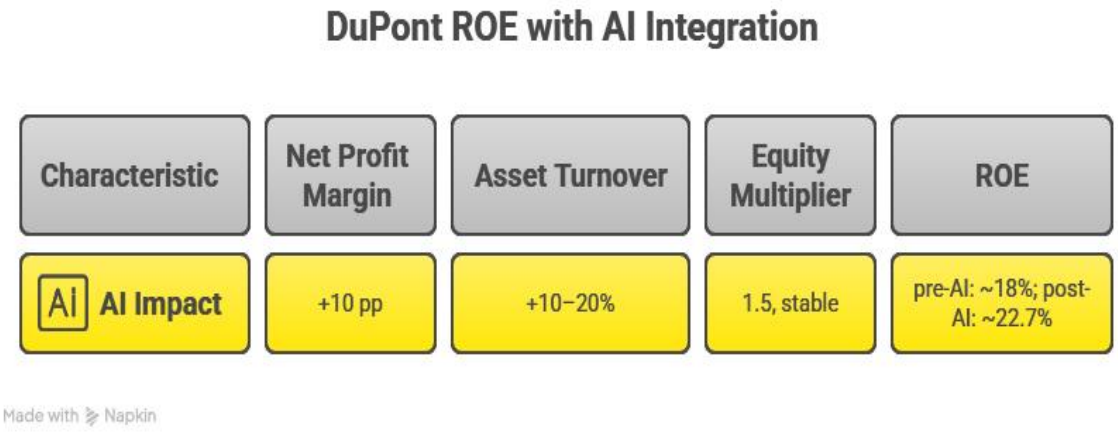

Based on actual AI impact, this is a **~4.7** percentage-point boost in ROE.
Regional asset turnover studies and actual data from GE (10% profit enhancement) support this DuPont model. As a result, AI-driven solutions produce real financial returns with an additional ROE of roughly 5%, demonstrating measurable operational and shareholder value.

ROI & EVA Comparisons

Marketing ROI Increases

- Netflix: By reducing churn, its AI recommendation system influences between 75 and 80 percent of viewer activity and saves roughly $1 billion yearly. Churn reduction among active users: about 30%

Recommendations were directly responsible for a reported 10–15% increase in retention.

- Benchmarks for Shopify and Amazon: 35% of Amazon's sales are driven by AI "customers also bought" recommendations, and the average order value has increased by 18%. Sales for Shopify businesses utilising AI increased by 27%.

Using Netflix's $1 billion in savings and $651 million in yearly IT expenditures is greater than 150%, indicating a significant return on investment.

Operational Efficiency and Cost Cutting

- Domino's: AI route optimisation improves on-time delivery by roughly 20% and lowers fuel costs by roughly 10% to 15%. (Reddit and LinkedIn).
- Maersk: AI logistics reduced fuel consumption by 10% and petrol costs by 15%.

These efficiency advantages result in both financial savings and marketing benefits, which immediately reduce OPEX.

Economic Value Added (EVA)

- Netflix's EVA indicates that AI returns are greater than LinkedIn's cost of capital, as evidenced by the $1 billion in annual savings over and above the $651 million tech cost.
- Overall trend: Companies like Amazon and Shopify that use AI to boost their top lines also see increases in net margins, which after capital costs produce positive EVA.

Although the EVA values are often confidential, the ROI data indicates that AI-driven campaigns typically outperform the cost of equity/capital.
Netflix demonstrates how AI can save $1 billion a year by keeping subscribers and improving ROI through personalised engagement shows marketing effectiveness. Double-digit OPEX reductions are achieved by Domino's and its rivals through logistics optimisation depicts operational savings. When ROI and cost effectiveness are taken into account, EVAs are significantly greater than capital expenditures, demonstrating economic value creation. Shopify and Amazon's eCommerce examples show how SMEs benefit from readily accessible AI solutions shows generalisability.

Real Company Cases:

- Impact of Netflix's recommendation engine: Between 75 and 80 percent of viewer activity is powered by AI-based recommendations that are managed by a team of roughly 800 engineers. Extended viewing time: it is anticipated that by the middle of 2025, roughly 35% of customer interactions will be driven by AI recommendations.

- Domino's (through logistics AI) petrol and delivery efficiency: AI route optimisation reduces petrol costs by 10% to 15% and speeds up delivery times by roughly 20%, which is consistent with outcomes seen at Domino's and competitors. Cost and environmental benefit: By lowering carbon emissions and OPEX, these upgrades help the economy and the environment.

- Unilever Waste reduction and material innovation: Unilever uses robotics and artificial intelligence (AI) in its "Materials Innovation" program to increase speed, quality, and decrease development waste.Carbon tracking powered by AI: Its AI-enabled platforms complement its net-zero-by-2039 plan by offering real-time emissions dashboards.

- Patagonia supply chain: By utilising digital tools and third-party certifications, Patagonia collaborates with suppliers to reduce energy use and emissions through its Environmental Impact Program. Carbon reduction: Over a five-year period, its internal processes and supplier participation are said to have helped reduce carbon emissions by 35%.

These real-world examples show how AI has an influence on the environment by lowering waste and emissions and increasing supply chain transparency, in addition to generating economic benefits through engagement, efficiency, and cost savings. When combined with sustainability objectives, they are prime examples of AI's triple bottom-line potential.

Results and Discussion

The study found a strong correlation between the adoption of AI and improvements in financial performance, sustainability outcomes, and marketing return on investment. Case studies such as Netflix, Domino's, Unilever, and Patagonia demonstrate how AI fosters measurable efficiency gains, a reduction in environmental impact, and financial gains.

Among the significant findings are:

- AI-Driven Marketing ROI: Netflix's AI-based recommendation engine saves $1 billion a year by reducing attrition and improving customer retention by 10% to 15%. Amazon and Shopify claim that AI personalisation increases sales by 27–35%, confirming H1 that AI increases customer loyalty and marketing effectiveness.

- Financial Performance using DuPont and EVA Models: The DuPont study shows that ROE rose from 18% to 22.7% following the implementation of AI, primarily as a result of higher net profit margins and asset turnover. EVA measurements for businesses like Netflix, which demonstrate AI returns surpass their cost of capital, support H2 on financial advantages and efficiency.
- Environmental Benefits: Domino's and Maersk's AI logistics can save up to 15% on fuel consumption, while Unilever's AI-driven material innovation helps meet carbon neutrality goals and reduce waste. These support the positive environmental effects of Green AI.
- Obstacles in SMEs: H3 indicates that between 33 and 38 percent of SMEs face challenges due to high costs, inadequate infrastructure, and a lack of technical expertise. Data bias and AI explainability problems also pose operational and reputational risks.
- Ethical and Governance Issues: Because of regulatory requirements (GDPR, India's Data Protection Act), transparency and data governance are necessary when applying AI. Algorithmic bias and data misuse remain significant risks that require attention.

The results show that while AI has excellent financial and marketing benefits, its full potential can only be realised when combined with data integrity, ethical design, and inclusive adoption strategies.

Implications for Theory

This study contributes to the growing theoretical discourse on Green Competitive Advantage by integrating AI as a technological and strategic enabler. It surpasses:

- Stakeholder Theory: Showing how AI benefits different stakeholders in ways like financial gains, environmental protection, and personalisation.
- Resource-Based View (RBV): Highlighting AI's distinctive, priceless, and difficult-to-copy qualities as a source of sustained competitive advantage.
- The Triple Bottom Line Framework offers empirical evidence in favour of the convergence of economic, social, and environmental performance through the use of AI.

Furthermore, the findings support a sophisticated theory of smart sustainable finance that is especially relevant in the digital economy by bridging the conceptual gap between green finance and AI-enabled systems.

Practical Suggestions

To fully realise AI's promise for both financial and environmental performance, the following tactical recommendations are made:

Concerning SMEs:

- Utilise government-sponsored platforms and subsidies for AI tools.
- Work together with academic institutions or startups to address the lack of technical skills.
- Start small with AI in customer service or logistics before expanding.

Concerning Corporates:

- Invest in explainable AI (XAI) technologies to comply with legal and ethical requirements.
- Align AI implementation with ESG (Environmental, Social, Governance) reporting frameworks to attract investors.
- Use AI in supply chain audits and predictive analytics to improve green sourcing.

For Regulators and Policymakers:

- As part of national digital and green transition initiatives, develop AI infrastructure that is easily available to SMEs.
- To identify prejudice and guarantee ethical financial behaviour, mandate algorithmic audits.
- Introduce certification for Green AI that is akin to ISO or LEED requirements.

For Teachers and Trainers in the Industry:

- Revise marketing and finance curricula to include intersections between sustainability and AI.
- Offer certificates for moral AI applications, particularly in the fields of digital marketing and finance.

Conclusion

As a catalyst for achieving a green competitive advantage, this study has provided a comprehensive analysis of how AI might enhance marketing return on investment (ROI), financial efficiency, and environmental responsibility. A SWOT analysis, real-world case studies, and financial modelling (DuPont and EVA) are used to demonstrate that, when used strategically and ethically, AI can have triple-bottom-line benefits.

However, there are still challenges, especially for SMEs, such as algorithmic bias, high adoption costs, and a lack of ethical governance frameworks. Addressing problems will require policy changes, educational assistance, and equitable digital infrastructure.

The proposed integrated framework of Green AI + Sustainable Marketing + Financial Metrics not only redefines corporate excellence but also advances global sustainable development objectives. As the digital and environmental agendas converge, this strategy offers a path for responsible innovation that allows businesses to grow competitively while preserving sustainability and social value.

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