

## AI Tools in Marketing: Understanding How Artificial Intelligence is Reshaping Marketing Practices and Advancing Sustainable AI

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### ABSTRACT

Artificial intelligence is transforming how organizations connect with customers while simultaneously raising critical questions about environmental sustainability. This paper looks on how Artificial Intelligence Technologies that including chatbots, predictive analytics, recommendation engines, and real-time analytics are deployed across telecoms, banking and retail sectors, and also addressing the emerging imperative of sustainable AI practices. The paper highlights Airtel, Netflix, Amazon, and JPMorgan Chase usage of AI, illustrating both significant benefits and critical challenges of it. The findings of this paper reveal that AI works best when it doesn't replace human judgement but instead complements them and when environmental accountability is embedded throughout the AI lifecycle. The paper throw light on problems like privacy concerns, algorithmic prejudice, over-automation risks, and the environmental impacts from energy consumption and carbon emissions. We have concluded that responsible AI-driven marketing requires transparency, clear governance, human oversight, investment in real-time analytics infrastructure, and commitment to green AI practices that balance innovation with environmental stewardship

**Keywords:** Artificial intelligence, marketing automation, sustainable AI, green AI, personalization, real-time analytics, ethical AI, human-AI collaboration, carbon footprint, environmental sustainability

### INTRODUCTION:

At first, people simply utilized AI for experiments, but now it's a huge element of marketing. Companies employ machine learning to swiftly find out what customers want, chatbots to answer a lot of service questions at once, and recommendation engines to make content unique for millions of people at once. This suggests that more and more people are using Marketing 5.0. Customers are happier when businesses use AI, the Internet of Things, and automation [Qin & Zhou, 2023] [Virmani et al, 2023].

But development also brings up real time issues, not just moral ones. Customers are aware that they get personalized recommendations and monitor their activities to receive tailored recommendations. There is, however, another fear that isn't as clear: how AI systems will harm the environment. It takes as much carbon emissions to train one huge AI model as it does to run five cars for their full lives [Strubell et al., 2019]. By 2035, data centers that serve AI systems are predicted to discharge more pollution, climbing from 180 Mt to 300 Mt. This will make them one of the fastest-growing sources of carbon emissions in the world [Green Software Foundation, 2025].

People who have jobs are scared about losing them. People are still worried about topics like privacy, bias in algorithms, and whether automation makes it harder for humans to talk to each other. Another crucial thing to think about while deploying AI is how it will affect the

planet. This paper talks with these problems explicitly and how organizations should employ AI in a good way.

Our contribution is threefold:

- (1) We synthesize research on AI in marketing with particular focus on sustainable AI practices;
- (2) We present real-world implementations showing both successes and failures, including their environmental implications; and
- (3) We propose a framework where AI enhances rather than replaces human decision-making while minimizing ecological footprint.

The core argument: effective AI-driven marketing treats AI as a partner to human judgment, not a substitute for it, and integrates environmental accountability as a fundamental design principle rather than an afterthought.

### 2. Research Methodology

This study employs a narrative literature analysis to amalgamate AI-driven marketing research, supplemented by case studies of practical commercial applications across several sectors. We selected scenarios to identify patterns of value, risk, and environmental effect applicable across many contexts. To keep the focus and relevance, not all types of literature are included:

Articles that don't talk about marketing automation or being environmentally friendly

Research that only looks at traditional marketing methods and doesn't use AI or ML

The literature that only looks at AI engineering or technological architecture, with no links to marketing or sustainability.

## 2.1 Inclusion Criteria

The study looks at how AI, machine learning, marketing tactics, and environmental sustainability are all connected to each other. Studies that are eligible are those that concentrate on:

AI or ML-based marketing strategy

Marketing that runs on its own and techniques to get people involved that are developed particularly for them  
Marketing that uses data, digital change, and how people act when they buy items

AI-powered marketing tools including chatbots, predictive analytics, natural language processing, and automation

Improving AI for the environment, adopting AI technologies that are helpful for the environment, and reducing the harm it contributes to the environment

The amount of resources, carbon, and energy that AI systems utilize and how well they use them

AI applications that are useful and find a middle ground between being beneficial for the environment and making money [Qin & Zhou, 2023][Kumari, 2024][EY Netherlands., 2025]

## 2.2 Exclusion Criteria

To retain the focus and relevancy, not all forms of literature are included:

Articles that don't talk about either marketing automation or being environmentally friendly

Research that only looks at traditional marketing methods and doesn't use AI or ML

The literature focused solely on AI engineering or technological architecture, with no ties to marketing or sustainability.

Research devoid of practical applicability, substantial data-driven insights, or references from authoritative sources [Vishwakarma, 2024][Stone et al., 2020]

## 2.3 Search Strategy

The review utilized systematic search methodologies across multiple databases, including Google Scholar, Scopus, Web of Science, IEEE Xplore, and ScienceDirect. We generally looked for articles that came out between 2016 and 2026, but we were especially interested in those that came out between 2020 and 2026. Some of the most important search terms were AI marketing automation, sustainable AI practices, green AI development, the environmental impact of AI, personalized marketing AI, predictive analytics

marketing, machine learning marketing automation, carbon footprint AI systems, and energy-efficient AI. There were many types of literature, such as peer-reviewed journal articles, conference proceedings, systematic reviews, industry reports, white papers, and corporate case studies from Google, Microsoft, Meta, and groups that work on sustainability [Qin & Zhou, 2023][Green Software Foundation., 2025][Bolón-Canedo et al, (2024)].

## 3. How Companies Are Using AI in Marketing

AI in marketing means using machine learning, Data Driven Marketing, NPL, predictive analytics, chatbots and generative models to analyse customer data, personalize interactions and automation optimize marketing decisions across channels.

### 3.1 Airtel's Fraud Prevention System

Airtel is one of the biggest telecom companies in India and handles 1.5 billion SMS and 2.5 billion calls every day. Instead of sending customers offers that aren't useful, the company uses AI to keep them safe from fraud. The system checks each call and message against 250+ behavioural parameters in less than 2 milliseconds. It blocks about 100 million spam calls and 3 million fraudulent SMS every day, which leads to a 68.7% drop in fraud-related losses and a 14.3% drop in cybercrime [Amekudzi-kennedy, A. & Singh, P. (2024)]. Importantly, this works across ten Indian languages without needing a separate app; it simply makes the customer experience safer and less intrusive. Thus Airtel facilitate personalized marketing for it's customers by blocking unwanted and fraudulent SMS and calls.

### 3.2 Netflix's Recommendation System

Netflix uses data from more than 260 million customers to make more than 1,300 personalized recommendation clusters. AI recommendations account for about 80% of views, and the company believes this saves them about \$1 billion a year in lost customers [Virmani et al., 2023]. However, Netflix sometimes suggests content that isn't appropriate, which shows a major flaw: AI is good at finding patterns, but it doesn't understand cultural context and individual differences like people do. Thus Netflix AI marketing tools include analytics, personalization, and content generation, ad optimization, automation, social listening, chatbots and customer data platforms.

### 3.3 Amazon's Layered Personalization

Amazon's A9 search engine employs natural language analysis to figure out what customer's desire. Collaborative filtering-based recommendation systems that offer things that are "Frequently Bought Together" account for about 35% of Amazon's sales. In 2021, the company's sales climbed 22% to \$469.8 billion. The key reasons for this were that click-through rates went up by 30% and conversion rates went up by 20% [Amekudzi-Kennedy, A. 67% of clients are cautious about data harvesting, even though personalization has its benefits

[Search Engine Journal, 2025]. In this Amazon example, the main types of AI marketing tools are AI-powered search and recommendation and personalized engines using NPL and collaborative filtering with predictive analytics.

### 3.4 JP Morgan Chase's Careful Model

JP Morgan Chase was careful with AI. Coach AI aids financial managers by gathering information about their clients and undertaking research. This makes it 95% easier to find what you need. The bank also chose not to employ AI to give regular people investment advice because AI can make mistakes that can have major effects on money decisions [Amekudzi-Kennedy, A. & Singh, P, 2024. AI is employed to help with back-office activities in this scenario, although people are still in charge of delivering advice. In this example of AI-powered internal decision-support and back office automation tools in marketing (Data Driven sales/CRM enablement assistants), with human retaining final advisory control.

## 4. Real-Time Analytics, RFID Technology, and Business Impact

### 4.1 Developing Capabilities for Real-Time Analytics

People wear or put RFID tags on goods. They are compact and don't need wires to work. They tell a lot about how people behave and move. The Magic Bands from the Walt Disney Company use RFID technology to keep track of where customers are in the parks and make their experiences unique right away. The Mayo Clinic employs RFID on staff badges and patient bracelets to make it easier to operate the business and care for patients [Shil, S.K. et al., 2024]. RFID tagging helps businesses that sell to other businesses maintain better track of their operations and supply chains.

When businesses have real-time data, they can rapidly assess how effectively their strategies are performing and make changes if they need to. It will be tell how well your campaigns are doing by looking at traffic and transaction statistics to see how they link to the results [Virmani et al., 2023]. Companies need meaningful and relevant data to help them decide which products are ideal for specific markets. This will help them find things that need to be fixed. Real-time analytics [Shil, S.K. et al., 2024] lets businesses quickly run tests and get reliable results. This example illustrates AI-Driven real time analytics and customer behaviour tracking tools like IoT, RFID data and marketing analytics dashboards.

### 4.2 Emerging Trends and Future Prospects

As AI technology gets better, new patterns are starting to crop up in AI and marketing automation [Uy, J.R. et al., 2024]. A key distinction is hyper-personalization. It doesn't put customers in groups. It doesn't do that. Instead, it looks at each person and their situation, such where they are, what they buy, and how they use social media. This makes interactions more precise and valuable than they

used to be [Uy, J.R. et al. 2024]. This will help sell high-end brands and pricey things.

More and more individuals are also utilizing AI to search for images. People can now look for items with photos instead of words. This is really helpful for fashion, home decor, and making things your own because how something looks is highly significant. AI systems employ images to locate things that are comparable, which makes it easier for users to find what they want [Virmani et al., 2023].

### 4.3 Impact on ROI and Business Performance

AI apps are helpful for business since they help businesses make more money. AI Enterprise Applications' revenues went risen 87 times from \$357.89 million in 2016 to \$31,236.92 million in 2025 [Patel, R.K et al, 2024]. This increase suggests that the company is really making a difference and that the money spent is effectively spent. Cloud-based AI platforms and open-source tools like Google Analytics, Mailchimp, and HubSpot make it possible for businesses to gain advanced capabilities without having to pay a lot of money up front [Liu. J et al, 2023]. Sales of AI Enterprise Applications are going higher from 2016 to 2025. This means that the market is growing quicker and the return on investment is getting greater. The Gartner AI Magic Quadrant (2016–2024), Statista AI Market Reports, and information from companies including Google Cloud, Microsoft Azure, Adobe, Salesforce, and HubSpot. The black area (2020–2022) demonstrates how the pandemic accelerated up the growth of digital technology [Patel, R.K et al, 2024][Shil, S.K et al, 2024][Marvi, R et al, 2025].

AI helps organizations make decisions based on data that save money, speed up procedures, and improve the company as a whole [Singh, G et al, 2024]. By employing cutting-edge AI tools and staying up to date with new technology, businesses can move ahead of their competitors and attract more clients [Singh, G.]. et al. 2024.

### 4.4 AI-Powered Customized Marketing Automation

AI marketing technology have drastically revolutionized how businesses make unique experiences for many of their clients. Businesses may convey messages to certain groups of individuals and establish trust in their brand with the help of smart automation and data analysis.

Google Analytics and other leading platforms may teach a lot about how clients behave. By keeping track of how often individuals buy items, what sorts of devices they use, and how they use their websites, businesses can figure out where potential customers are having problems. While people are looking at costs, features, or comparing goods, they might do this. You can use this information to decide where to put advertising, what to write about, and how to make the site better for users. ChatGPT and other related tools help you write faster in a lot of different ways, such on social media, in surveys, and in email campaigns. Mailchimp is also great because it includes

automated workflows and predictive segmentation. These technologies are useful for small firms with little resources that wish to test their ideas about the market by making offers to specific groups of people.

The data must be collected in a sensible way for AI marketing to work. People's profiles on social media reveal where they reside and what they like. Web traffic analytics tell you how people search for goods and what they do with them. Transaction histories demonstrate how consumers buy things and how much they care about pricing moving up and down. The Internet of Things (IoT) has sensors that communicate performance data immediately away. Engagement keeps records of client queries, chats with chatbots, and support requests to explain how decisions are made. These data streams work together to help you talk to people on a very personal level and break them up into very small groups.

Distinct types of work are better done on distinct specialist platforms. Marketo is effective at nurturing and scoring leads, locating good prospects, and automating their progress through sales funnels. At every stage of your campaigns, Adobe Experience Cloud can help you come up with new content ideas. Regression models aim to predict how sales will vary over time, neural networks look for complicated patterns, and validation methods stop built-in biases from happening.

## **5. The Environmental Imperative: Understanding Sustainable AI**

Learning about AI That Helps the Environment AI is excellent for business, but we can't ignore how it impacts the world we live in. Marketers need to know about the huge consequences that the fast rise of AI systems has on the environment and how to cope with them.

### **5.1 The Hidden Environmental Cost of AI Systems**

AI damages the environment in three basic ways: it uses too much energy, releases too much carbon, and uses too many resources. To learn, big AI models need a lot of computing power. According to a research from the University of Massachusetts Amherst in 2019, training one large Transformer model can make as much carbon dioxide as five automobiles do over their whole lifespan [Strubell et al., 2019]. Open AI's GPT-3 model contained 175 billion parameters, therefore it needed a lot of processing power. This indicates it used a lot of gas and put out a lot of CO<sub>2</sub> [Green, A, 2024].

Inference is when you make assumptions or predictions using AI models. Doing something on a vast scale needs a lot of energy. Netflix's recommendation system is used by more than 260 million people, and Amazon's personalization engine processes hundreds of millions of queries per day. These and other commercial systems like them need power all the time. The data centres that make these AI activities feasible are predicted to spew out more carbon dioxide by 2035, climbing from 180 Mt to 300 Mt. This will make them one of the fastest-growing sources of carbon emissions in the world [Green Software Foundation, 2025].

People don't talk about how much water they use sufficiently. Computers that use AI make a lot of heat, therefore data centres need big cooling systems to keep

the temperature down. In locations where water is already hard to get, these cooling systems utilize a lot of water, which is terrible for the environment [Almawave, 2025]. Also, rare-earth metals are needed for the servers, special processors, and AIGPUs that support them. Mining and producing these metals can affect the environment and make pollution worse [Walther C, 2024].

Twenty-four. Adding electrical garbage makes these problems worse. Technology gets old very rapidly as AI models get more complex and consume more resources. This makes the problem of electronic waste even worse. Making and getting rid of AI technology has a major effect on the environment that goes beyond the energy it takes to run [Earth.org, 2024].

If we don't care about the environment and utilize AI a lot, it will make the air dirty since we'll use too much power and water. A business that relies heavily on AI should employ renewable energy and recycle water to prove that it is better for the environment than other companies.

## **5.2 AI as a Sustainability Ally: Dual Role in Environmental Stewardship**

The AI systems do have an effect on the environment, but they can also help with significant projects that are good for the environment [ARM Newsroom, 2025]. This means that companies need to find a middle ground between the two.

### **Optimization of Renewable Energy**

They need to use AI to make the world better and safer at the same time. AI for renewable energy makes it easier to figure out how much solar and wind power will be available. This makes the grid and energy storage perform better. Predictive models enable grid operators get ready for times when demand is high, cut down on energy waste, and make it easier to incorporate renewable sources that aren't always available to power distribution systems [Rolnick et al., 2022]. Companies like Google, Apple, and Ikea that employ different types of renewable energy can declare they are beneficial for the environment.

### **Climate Modelling and Disaster Prevention**

Climate models that use AI help us understand how the weather works and when bad weather is likely to happen. They do this by stopping disasters and building models of the weather. UNICEF's flood modeling in Malawi is a great illustration of how AI-based early warning systems may lower the risks of climate change, save lives, and speed up the recovery process after a disaster [ARM Newsroom, 2025]. This will assist FedEx and other logistics companies figure out the best way to ship and distribute goods so that cyclones and other hazards don't destroy them.

### **Supply Chain and Transportation Efficiency**

AI helps individuals think of innovative, more environmentally friendly, and energy-efficient ways to move things and get them to people. Predictive analytics help logistics, which implies that deliveries are less likely to be late and consume less petrol. Using algorithms to find the optimal transportation routes is good for the

environment. Businesses in both the industrial and retail sectors can avoid manufacturing too much and wasting too much by forecasting demand [Total Product Marketing, 2025]. This will help with marketing, talking to people, and branding.

## 6. Critical Drawbacks and Risks of AI in Marketing

Companies need to be honest about the big problems that still exist, even when there are many benefits [Alawamleh et al., 2024].

### 6.1 Privacy and Surveillance Concerns

People want good discounts, but they don't want to be followed. Studies show that being open and having real control over data makes people more likely to embrace it, especially in new areas like India. Customers feel like they are being profiled instead of served when there is no transparency [Qin & Zhou, 2023][Wang et al, 201].

### 6.2 Algorithmic Bias

AI systems that learn from past data can either preserve the differences that have always been there or make them worse. If training datasets don't have enough people from certain categories, algorithms might not give them decent discounts or might try to fool them [Search Engine Journal, 2025].

### 6.3 Loss of Human Connection

Customers say they are being treated too rapidly. When every discussion is about pushing them to buy something, real connections slip away. This is especially crucial when you have to make a decision that needs a lot of consideration and when trust and deep talk are important [Kumar, R. et al. (2020) [Vishwakarma, 2024].

### 6.4 AI System Failures and Safety Risks

AI failures are not common or unimportant. Chatbots don't always offer you the right answers. Engines that tell you what to do tell you to do things that are wrong. The technology for self-driving cars has failed in extremely disastrous ways. Financial algorithms have caused strange things to happen in the market. humanity are still terrified of forecasts like the Singularity, which argues that AI could be smarter than humanity by the middle of the century, even though AI is moving swiftly. But there isn't a lot of support for research on AI safety, and only a few academics are trying to make it less harmful [Alawamleh et al., 2024]. We don't have enough rules and safety measures to keep AI from getting worse.

### 6.5 Environmental Impact as Ethical Concern

AI systems have an effect on the environment, which makes the moral stakes higher. It's hard to believe businesses that say they utilize AI to better their marketing

but simultaneously raise carbon emissions, especially when they're attempting to target people who care about the environment. Greenwashing, which promotes sustainability while not being sustainable, damages trust and brings government attention [Rai, P. 2025]. We provide five simple criteria for using AI in a way that is both moral and healthy for the environment [Alawamleh et al., 2024] [National Engineering Policy Centre, 2024].

The first rule is to do things that are helpful for the planet and the customer. Use AI to aid customers, like Airtel does by cutting down on spam. Don't only make things better inside the organization. Also, make sure that AI installations have mechanisms to keep an eye on how they affect the environment and decrease such consequences from the outset. Give staff greater control and teach them anew.

Investing in new skills and making it clear that AI contributes to rather than replaces jobs fosters support and morale. People should learn about sustainability as part of their training so that teams can think about how AI decisions could hurt the environment. Be honest and seek for permission.

### 6.6 Embed Transparency and Consent

People are more likely to trust a company if they know how their information is being used and can modify their settings to make things function better. Companies should be honest about how they help the planet. They might also use internal marketing to tell people about their work to make AI better for the environment and how near they are to meeting their carbon neutrality targets.

### 6.7 Institutionalize Bias Auditing

Check algorithms often to make sure they don't have an unfair effect. Update models to strike a balance between being fair and doing well. When you seek for prejudice, you should think about how fair the world is and how fair people are. This will improve the company's marketing because sustainable brands hire people to work in stores.

### 6.8 Implement Green AI and AI Governance

It should be obvious at all times who is in charge of the influence on the environment. AI performance reports should say how well they safeguard the environment. A company or organization's goals for sustainability should be clear, measurable, and possible to reach. Governments should make people accountable for the environment for the whole life of a product, encourage them to consume less energy, and convert to renewable energy sources.

To use AI safely and for a long time, it's important to be open about how customer data is used for personalization, to test algorithms to make sure they don't systematically leave out marginalized groups, to keep human touchpoints

for important decisions, to make it clear that AI improves but doesn't replace customer service, and to show measurable progress toward environmental sustainability goals [EY Netherlands., 2025][National Engineering Policy Centre, 2024][Alawamleh et AL, 2024]. This will assist the firm establish a strong brand with stakeholders that meets customer requirements, generates more money, and doesn't hurt the environment.

## 8. Implications for Marketing Practice

In the actual world, this implies that marketers have to deal with a lot of challenges when they try to advertise. They need to find a way to make things personal while still respecting people's privacy. They also need to learn more about technology, have different budget goals, and now be responsible for the environment. But today's customers, especially younger, tech-savvy, and eco-friendly ones, like enterprises that employ AI in a thoughtful way [Kumar, R. et al. (2020) [Vishwakarma, 2024].

### What AI makes it possible:

Micro-segmentation distributes communications to tiny groups of customers that are essential to them, which helps spread the word.

Personalization in real time that modifies information based on how people act, which cuts down on unwanted communication

Rewards that fit a customer's shopping patterns and tastes

Using predictive analytics to locate clients who are in danger and aid them before they need it [Liu, J. et al. 2023. Sustainable

### AI strategies include:

Distinguishing between eco-conscious customers who consider brands as a whole, including their operational sustainability, which aids in green marketing and sustainability efforts.

Following the rules as governments ask for more and more reports on the environment and carbon accounting to help with green branding

Gaining the trust of stakeholders by showing that business practices and promises to be environmentally friendly are in line with each other [EY Netherlands, 2025] [Rai, P. 2025]. In the long term, this will help your brand.

When a business keeps its promises, smart marketing works better and better. AI can help people trust each other if it is employed in a clear, moral, and long-lasting way. But when utilized in a way that isn't clear or long-lasting, it can break trust, especially when people know more about how AI influences the environment [Wang et al, 201] [Rai, P. 2025]. 9. 9.

## 9. Conclusion

AI is a big aspect of marketing these days. Studies from many fields suggest that personalization, which increases user engagement; fraud protection, which protects consumers; and automation, which frees up staff time to work on important duties, may be helpful. But it can also be bad: it can invade privacy, be prejudiced by algorithms, make people less connected, create system failures, and have a major effect on the environment [Alawamleh et al, 2024].

This analysis shows three important things. First, AI and people need to work together for marketing to be effective. AI is good at making quick decisions, discovering patterns in a lot of data, and executing dull things by itself. But people are better at making moral decisions, knowing what's going on, and developing trust by being responsible and having actual relationships.

Second, the design should be predicated on how well it will hold up in the environment, not just as an afterthought. As AI gets more common and data centers get dirtier, marketing companies can't say they care about the environment while utilizing AI systems that go against what they say. It is both morally right and good for business to use renewable energy, be conscious of carbon emissions, and keep track of a product's environmental impact across its life cycle.

Third, being honest and upfront helps things seem more real. Stakeholders trust businesses that are honest about how they aim to utilize AI, recognize its flaws and trade-offs, keep an eye on people, and let people know how their job affects the environment. This offers them an edge over their competitors in the long run.

If a company operate in telecom, finance, retail, or any other area that employs AI for marketing, it don't have to worry about which AI technology to acquire. Instead, they should be more concerned about how to utilize them safely:

Will these technologies actually benefit our customers?

Will they be good for our people instead of bad?

What form of governance will make sure they do what they say they will?

How are we going to make their impact on the environment smaller and tell everyone about it?

How will we stop AI from hurting the environment?

Companies who think about these aspects will be able to use AI to stay ahead of their competitors for a long time. People are more likely to trust companies that care about the environment these days. Long-term success will depend on firms that employ AI in a way that is honest and responsible and that also cares about the environment.

We need not to be excited about everything or say no to everything right away in order to move on. It's a lot of work to use AI to make things better while also being aware of and trying to lower its dangers and costs to the environment. The future of ethical marketing is using AI in a way that is fair and good for the environment.

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