Sustainable marketing in the age of artificial intelligence (ai): Opportunities, challenges, and ethical implications: An empirical study

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Abstract
Artificial Intelligence is growing rapidly and transforming how companies plan and execute their marketing strategies. "It uses smart tools like machine learning and other modern technologies, to make marketing tasks easier and more effective." The present research work explores the concept of using Artificial Intelligence in marketing, as well as its benefits for today's marketing world, and provides tips for effective use, outlining the best practices for responsible use. AI tends to help marketers guess what their customers may need and, plays an important role in making customer experience smoother. "Artificial Intelligence is changing nearly every part of how businesses work- from day-to-day tasks to financial as well as sales operations." But, despite so many challenges, the biggest effect of AI is seen in marketing, where it has added a lot of value. Even though there are some of the challenges discussed in this study that need to be fixed, "still the future of Artificial Intelligence in marketing looks very promising." Bringing Artificial Intelligence (AI) into sustainable marketing practices has become a key tool for businesses trying to handle numerous challenges of today's fast-changing market. 201 respondents from the marketing sector were surveyed to determine the factors that show sustainable marketing in the age of AI in terms of opportunities, challenges and ethical implications and also know the impact of AI on sustainable marketing and conclude a significant impact of AI on sustainable marketing.

Keywords: Artificial Intelligence, Modern technologies, Machine learning, Sustainable marketing, Businesses.

Introduction
Artificial Intelligence is becoming more important in marketing as "smart tools and new technologies like ChatGPT are offering them tremendous opportunities." By 2030, marketing powered by AI is, supposed to contribute around 45% to the world's economy. "AI is a type of computer science which helps machines to understand and copy how people talk and act." With the help of given data, "AI has made smart machines that can think, answer, as well as do tasks just like humans." Artificial Intelligence is able to handle complex and expert-level tasks like working with robots, understanding speech and images, as well as reading and writing like humans, solving problems, and many more. "AI can study, understand, and decide things. Thus, works on current user information to guess market trends and understand how people might act. Therefore, it will lead to improved products by using data, offering customized services, and shaping what customers want. AI in marketing uses smart computer tools and technologies along with customer and brand feedback to give a clear understanding, of customers' behaviour and market changes. "Smart tools like language understanding, learning from data, and checking customer feelings help in considering better choices. This

way, businesses can stay ahead of others and be ready for changing market needs." In today's AI-driven world, smart marketing means using technology to plan better, reach the right people, and be kind to the environment. Helps to cut down waste, use resources wisely, and give customers a better experience without harming nature. Shortly, it will be a key part of every business operation across all over the world. New changes in AI-based automation show big shifts in how AI is growing and being used. According to Haleem et.al. (2022), "Artificial Intelligence is an exciting and modern tool that supports a business's exciting content plan." From chatbots and handling social media to running big marketing plans, AI is helping how marketers work in numerous ways. Marketers are now using AI to study the market, prepare summaries about how the industry is doing, as well as encourage ideas that can be used later. During the earlier days, marketers used surveys, age groups, and guesswork from past results to understand what people want. But, in recent years, "AI has completely changed how they do it." Artificial Intelligence is changing the way businesses connect with people as, it leads to making marketing smarter, based on data, and more in tune with what each customer wants. Davenport et.al. (2020), stated AI tools and technologies are helping marketers, make quicker and smarter choices. Platforms like Adobe Sensei and Google Marketing tools help them work better by bringing together data checking, running ads, and guessing future trends all in one place. Through this research work, we will also get to know how businesses are able to learn more about their consumers of the market by looking at social media, feedback and support chats. This helps them send the right messages which connect better with people and tend to build stronger customer trust. Kumar & Suthar. (2024), mentioned one major challenge or more issue with the increasing use of AI in marketing is keeping personal data safe. According to Inavolu. (2024), Advanced AI tools and technologies all depend on large amounts of customer information to offer personalized experiences, but despite so many opportunities, there's a rising worry about this data being gathered, handled, and possibly misused. Many organizations are also collecting whatever, they find online to improve their systems. However, in many situations, they are using people's pictures and written content without asking for their permission. Therefore, it is very crucial to balance the opportunities that AI can do with the possible challenges, that might cause people and society to make sure the sustainability of AI in marketing.

Literature review
"Artificial Intelligence (AI) has become an important subject in almost every area today." Fields like engineering, science, teaching, health care, businesses, accounts, banking, advertising, economics, the share market, marketing, and law in all aspects are just some of the examples where AI is being used and studied widely. Kshetri et.al. (2024), asserted that during recent years, as generative AI is becoming useful, marketing teams are now using it to quickly make highly personalized ads, pull out useful information from customer's data, as well as improve their current marketing plans. Huang & Rust. (2021), findings stated AI in marketing means the usage of computer systems to plan, run, and improve how a company or an organization promote its products. Businesses use tools like machine learning to study data, speed up their routine work, give useful advice, and even help to create custom marketing that encourages to match the brand's style. Jain & Aggarwal. (2020), mentioned Artificial Intelligence is a very useful tool for marketers for those, who want to grab attention and keep their customers for a longer period. The technology spots similar habits as well as features among the best customers which eventually, helps an organization to find and reach people who are likely to be interested in what businesses sell. AI tools bring together smart computer tools and information from the customer and their brand interactions to provide marketing

teams with a clear and detailed understanding of how consumers of the market behave and what's happening in the market. Smart AI tools and technologies like language understanding, machine learning, and emotion analysis help businesses make better decisions, stay ahead of others, and handle changes in the market more easily. Artificial Intelligence can thus, eventually improve eco-friendly marketing methods by helping companies understand useful information, make work smoother, and give customers of the market more personal experiences as long as it is used in a fair and more responsible way. AI has become such a big part of our daily lives that it's hard to think of a world without it. During recent years, businesses have started using AI more in their organizational decisions by over 270% according to Gartner. A report by Fortune Business Insights (2020) says, that the global AI market is, therefore, expected to hit $267 billion by the year 2027 which is nearly ten times more than its value in 2019, which was around $27.23 billion. Many well-known products we use today work with the help of AI. Even if the company isn't a tech company, it likely uses AI tools for tasks like customer support and running day-to-day operations. According to Campbell et.al. (2020), Marketers are always ready to initiate and try new tools, so they now use AI to track how consumers interact with their brand and to better understand what people want. Popular platforms like- Facebook, Google, Quora, Reddit, Instagram, and Snapchat collect a huge amount of user data. This information helps in easily grouping or dividing users based on their interests, habits or behaviour. Using the data we already have details about the perfect customers or clients tools can eventually find and show marketing teams a list of possible buyers who are most likely to become real customers. Sales teams will be better prepared to offer the right help to customers- and just at the right moment. Marketing teams are able to save time by avoiding the need to search through many lead sources by hand. Most old ways of finding leads are tiring and don't work very well. Using AI tools will help us find leads which lets us focus on more useful work that helps the company grow and earn more. Consumers of the market in today's scenario expect a lot and that's okay because, with the help of AI, marketers are still able to give them a good part of it. Using AI and Machine Learning, we can provide each visitor with a more meaningful and personalized experience. Patel & Trivedi. (2020), mentioned AI and Machine Learning work together to deliver relevant messages and deals that help turn potential consumers of the market into buyers. According to Everstring, around 72% of marketers are drawn towards AI in marketing mostly, because it helps them create more personalized experiences. All businesses understand that customer tastes are always shifting, and consumers are often interested in the newest thing. So, to hold the interest of potential buyers, it is very important to keep updating and improving the knowledge about what they want. According to Ngai & Wu. (2022), Small retailers like using AI and Machine Learning because, it helps them to group customers and suggest products by studying and understanding the consumer's purchasing habits. Being aware of what the competitors are doing is always important to an organization. "Competitors can either teach them something useful or give them an idea to improve their businesses." Marketers are able to get many ideas that support finding out which keywords their competitors are using with their ongoing efforts. Yadav. (2017), asserted marketing teams can check every page of their website, social media accounts, and online content by hand. When OpenAI launched ChatGPT in the year 2022, it opened up many new ways to use AI. One major use case is for creating content, AI can help marketing teams save time and costs by making things like blog posts, ad messages, written content, emails, video subtitles, website text and many more. Despite so many opportunities, still there are many marketers who find it hard, to deal with the large amount of data they get while planning a campaign. AI can help support them by studying customer's data and guessing future trends. Looks at massive

amounts of information in just a few seconds using smart and quick learning tools. AI tools help an organization to work smartly and quickly by grouping their customers based on different features, likes and actions which improves to reach the right people and make their marketing plans work better. Nowadays, AI-based tools are able to create content that can talk to customers in simple, human-like language. They can help at any point in the customer's journey, solve issues faster, and make customers happier. AI spots patterns in how customers act and guess which products could do well. Marketing teams of businesses are able to set better prices and rank sales leads more effectively. Companies are able to use such information to improvise their marketing plans, keep their customers from leaving, and enter new markets where there's demand. Bringing AI into the workplace can shift how employees do their jobs. Setting up training sessions and clear plans for handling changes can make the move to using AI smoother. Wongmonta. (2021), stated marketing teams can use the tech better and understand which tasks still need a human touch. The use of Artificial Intelligence was once, seen as something from science fiction, but today, it has become a real and active of our daily lives. "Netflix uses smart AI tools and machine learning to suggest, shows and movies based on what the viewer likes and has watched." Global health brand Glanbia Performance Nutrition wanted to use data to better understand how their product, Optimum Nutrition (ON) Gold Standard 100% Whey, was doing in important markets compared to other companies. Old-fashioned ways like collecting reviews by hand, checking public opinion and comparing with other brands used to consume a lot of time and gave un-even results in different markets. Therefore, to overcome such problems, they created a unique score called "Product Edge" to check how well their product was, doing in the market using customer feedback. Such systems used AI tools to gather and combine up-to-date data from five major countries. "Nike uses Artificial Intelligence tools to bring more feeling and connection to their different online ads and promotions." Nike creates its advertisement content in a way that connects deeply with people and tells interesting stories thus, such stories help the brand get the most value from the money spent on advertising. Famous brand Coca-Cola has expanded their use of AI in marketing by launching its creative platform which uses AI and is made for customers to use. Coca-Cola has stepped up its AI-based marketing by involving its global customers in the creative journey. Even with such progress in AI, people still worry about ethics when they think about how their data is being used. AI-based marketing depends heavily on large sets of customer information. This brings up worries about how safely the data is being stored or, if it might be misused. Hermann. (2022), acknowledged people working in marketing should create honest as well as, fair guidelines for how they build and use AI-based marketing plans. Many customers of the market don't fully understand how; AI works and eventually end up trusting it and the companies behind it without knowing much. Keeping data safe is a moral issue for big companies using AI, since such systems often, deal with private information which makes them easy targets for hackers and online threats. The moral worries about the usage of AI in marketing aren't just about misusing data or fooling customers. Customers are also concerned that AI might continue unfair treatment or show bias toward certain groups. Umamaheswari. (2024), analyzed "Artificial Intelligence is a big game changer for marketers because it makes it easier to customize, improve and automate many important marketing tasks." AI can provide immense ideas and marketing work faster, but it also brings serious risks like misleading people, treating some groups unfairly as well as reducing human control over decisions. To handle such moral concerns, companies must focus on being open and responsible when using AI in their marketing activities for sustainability.

OBJECTIVE
1.   To determine the factors that show how AI helps in sustainable marketing in terms of opportunities, challenges and ethical implications.
2.   To know the impact of AI on sustainable marketing

Methodology
The present study has adopted a "mixed-methods empirical research design" where both quantitative and qualitative approaches has been mixed to determine the factors that show sustainable marketing in the age of AI in terms of opportunities, challenges and ethical implications and also to know the impact of AI on sustainable marketing. Study survey was conducted among marketing professionals through a structured questionnaire particularly designed for this study. "Convenient sampling method" is used to collect the data. Quantitative data was analysed using SPSS through "Factor Analysis" following "Multiple Regression Analysis" while qualitative data was analysed to extract deeper insights into ethical concerns, AI bias, and sustainability integration. Ethical concerns are strictly followed by including informed consent, anonymity, and confidentiality.

Findings
In the total population of the study survey, the males contribute 54.7% and the rest 45.3% are female. 36.3% are below 32 years of age, 40.8% are between 32 to 42 years and the rest 22.9% are above 42 years. 41.3% have been working for less than 5 years, 34.8% have been in the marketing sector for 5-8 years and the rest 23.9% have been working for more than 8 years in the marketing sector.

"Table 1 General Details of Respondents"

"Variables"	"Respondents"	"Percentage"
Gender		
Male	110	54.7
Female	91	45.3
Total	**201**	**100**
Age		
Below 32	73	36.3
32-42	82	40.8
Above 42	46	22.9
Total	**201**	**100**
Work experience (yrs)		
Less than 5	83	41.3
5-8	70	34.8
More than 8	48	23.9
Total	**201**	**100**

"Exploratory Factor Analysis"

"Table 2 KMO and Bartlett's Test"

"Kaiser-Meyer-Olkin Measure of Sampling Adequacy"		.841
"Bartlett's Test of Sphericity"	"Approx. Chi-Square"	2397.481
	"df"	66

	"Sig."	.000

The KMO value in Table 2 is 0.841 and the "Barlett's Test of Sphericity" is significant.

"Table 3 Reliability Statistics"

"Cronbach's Alpha"	"N of Items"
.911	12

The overall reliability is 0.911 for the 3 constructs comprising twelve items.

"Table 4 Total Variance Explained"

"Component"	"Initial Eigen values"			"Rotation Sums of Squared Loadings"		
	"Total"	"% of Variance"	"Cumulative %"	"Total"	"% of Variance"	"Cumulative %"
1	6.118	50.984	50.984	3.453	28.776	28.776
2	2.271	18.923	69.907	3.368	28.068	56.844
3	1.735	14.457	84.363	3.302	27.519	84.363
4	.410	3.418	87.781			
5	.306	2.553	90.334			
6	.291	2.427	92.762			
7	.233	1.943	94.705			
8	.213	1.776	96.480			
9	.156	1.298	97.778			
10	.103	.858	98.636			
11	.093	.771	99.408			
12	.071	.592	100.000			

In a "principal component analysis", 12 variables were grouped into 3 factors, explaining the variance as follows: 28.776%, 28.068%, and 27.519%, respectively. Together, these factors account for a total variance of 84.363%.
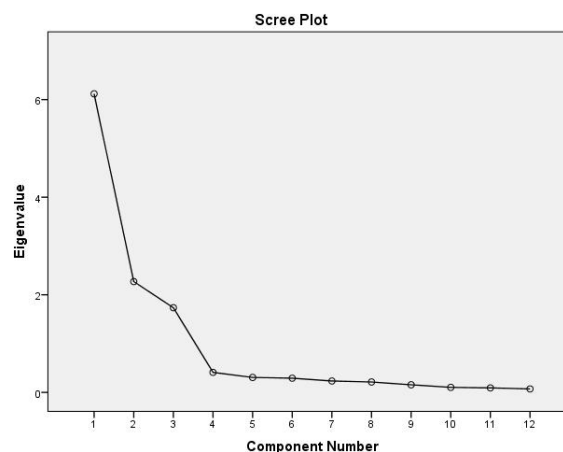
"Scree Plot"

The graph above shows the Eigenvalues derived from the "Total Variance Explained" table, indicating an elbow point at 3 components

"Table 5 Rotated Component Matrix"

"S. No."	"Statements"	"Factor Loading"	"Factor Reliability"
	Personalized Engagement		**.944**
1	Advanced AI tools and technologies offer personalized customer experiences	.920	
2	Marketing teams use AI tools to make highly personalized ads	.893	
3	AI enables hyper-personalized content and product recommendations	.890	
4	AI tends to help marketers make customer experience smoother	.884	
	Data Privacy Concerns		**.934**
5	The increasing use of AI in marketing makes it tough to keep personal data safe	.900	
6	Lack of Consumer Awareness tends to reduce their informed consent	.872	
7	AI-driven tools collect excess data which not necessary for marketing purposes	.866	
8	Mishandling data privacy takes away consumer trust	.855	
	Environmental concern		**.929**
9	Sustainable marketing helps to be kind to the environment	.902	
10	Allow companies to cut down on waste	.893	
11	AI-driven tools help to use resources wisely	.879	
12	Help to give customers a better experience without harming nature	.816	

Factor "Personalized Engagement" includes variables like Advanced AI tools and technologies offering personalized customer experiences, Marketing teams using AI tools to make highly personalized ads, AI enabling hyper-personalized content and product recommendations, and AI tends to help marketers in making customer experience smoother. Factor "Data Privacy Concerns" consist of the Increasing use of AI in marketing makes it tough to keep personal data safe, Lack of Consumer Awareness tends to reduce informed consent, AI-driven tools collect excess data which not necessary for marketing purposes, and Mishandling data privacy takes away consumer trust. Factor "Environmental concern" includes variables like Sustainable marketing helps to be kind to the environment, allows companies to cut down waste, AI-driven tools help to use resources wisely and help to give customers a better experience without harming nature.

Table 6 "Model Summary"

"Model"	"R"	"R Square"	"Adjusted R Square"	"Std. Error of the Estimate"
1	.893ᵃ	.797	.794	.42175
Predictors: (Constant), Personalized Engagement, Data Privacy Concerns, and Environmental concern				

The R-squared value is 0.797, indicating that the model explains approximately 79% of the variation.

"Table 7 ANOVA"

"Model"		"Sum of Squares"	"df"	"Mean Square"	"F"	"Sig."
1	Regression	137.953	3	45.984	258.519	.000[b]
	Residual	35.042	197	.178		
	Total	172.995	200			
a. Dependent Variable: Overall impact of AI on sustainable marketing						
b. Predictors: (Constant), Personalized Engagement, Data Privacy Concerns, and Environmental concern						

The significance value of .000 indicates a significant relationship between Personalized Engagement, Data Privacy Concerns, and Environmental Concern and Sustainable Marketing.

"Table 8 Coefficients"

"Model"	"Unstandardized Coefficients"		"Standardized Coefficients"	"t"	"Sig."
	"B"	"Std. Error"	"Beta"		
(Constant)	3.995	.030		134.295	.000
Personalized Engagement	.074	.030	.079	2.472	.014
Data Privacy Concerns	.126	.030	.135	4.210	.000
Environmental concern	.818	.030	.879	27.418	.000
a. Dependent Variable: Overall impact of AI on sustainable marketing					

The table above shows that all the factors of Personalized Engagement, Data Privacy Concerns, and Environmental concerns show the significant impact of AI on sustainability marketing. The highest impact is shown by Environmental concern showing a beta value of .879 followed by Data Privacy Concerns (.135), and Personalized Engagement with a beta value of .079.

Conclusion

Artificial Intelligence ideas, tools and technologies are helping businesses grow and succeed by helping marketing teams find new ways to advertise, create products, and connect with customers. AI can help increase interaction with current and potential customers to find new buyers and also study their data to give detailed ideas for planning future marketing steps. Therefore, to get the real benefits and correct business ideas, AI should be honest, safe, dependable, open to all, and clear. AI tools must be integrated with care and taught using different kinds of data to avoid unfairness. According to Ryan & Stahl. (2020), New rules for data safety, content rights, and control are also being made to make sure both people and AI creators are treated fairly, and that moral and social concerns are kept in mind. "To make sure AI is used in the right way and keep people's rights and privacy safe, businesses need to set clear rules and instructions." Besides telling people when AI is being used, organizations should also give ways for customers to share their thoughts if, something feels wrong or, if the AI makes mistakes. "This will eventually help businesses give a service that people can

trust and find useful." Companies that train their marketing heads in AI tools will have a strong advantage over others in the market.

The study aims to determine the factors that show how AI helps in sustainable marketing in terms of opportunities, challenges and ethical implications and found that Personalized Engagement, Data Privacy Concerns, and Environmental concerns are the factors that show the effect of AI in sustainable marketing. The study concludes a significant impact of AI on sustainable marketing.

Managerial implication

The findings of this study offer substantial managerial implications for organizations that aims to mix sustainable marketing practices with AI technologies. It is important for the managers to recognise and understand AI as a tool of efficiency and a strategic enabler that helps to achieve sustainability goals in long-term. Businesses must use AI to have data-driven insights and design tailored, eco-conscious movements that lined up with values and environmental priorities of consumers. Leaders are suggested to be attentive regarding ethical concerns in terms of "privacy, algorithmic bias, and transparency" which in turn are responsible for brand credibility. Clear guidelines and governance framework must be developed by the managers to practice responsible AI use in their marketing department. Innovations may be nurtured through cross functional collaborations amid IT, marketing, and sustainability teams while ensuring the accountability as well. Implementation of training programs that focus on ethical AI practices is essential to equip staff with important capabilities. Additionally, mixing of sustainability with AI-enhanced marketing improves organization's operational performance, brand reputation, customer loyalty, and competitive advantage market place.

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