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The Impacts of Big Data Analytics and Artificial Intelligence on Marketing Strategies

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ABSTRACT

The marketing sector has seen a significant transformation, particularly due to the emergence of data-driven decision-making and the dominance of digital platforms. This transition signifies a deviation from traditional marketing strategies, which formerly depended on more direct contact methods and conventional market research techniques. As digital technologies have grown, they have changed how we can track and change customers' buying habits and given us new ways to connect with them. Digital platforms and enhanced data provide marketers new consumer insights, making marketing more challenging. A detailed literature review and practical assessment analyse the real and prospective benefits of big data analytics and artificial intelligence on marketing decision-making. According to the paper, AI and big data analytics may assist companies understand customer and industry developments. They might then modify their marketing for each user. Big data analytics and AI improve target market positioning, simplify marketing, and educate consumers, affecting marketing strategy. The research suggests creating a data analysis team, streamlining data gathering and combination, using adaptable analytical tools, and customising marketing efforts. Some issues remain with this research. Data reliability and group size matter. The steps are unclear. For more solid and unambiguous results, future study should examine the impact of marketing using AI and big data analytics, maybe on a particular sector. This research may assist firms greatly enhance their marketing.

INTRODUCTION

There has been a great changes in the ever-evolving field of marketing, particularly with the as attention is given to digitization, data-driven and making decisions (Hamamah et al., 2024). This action marks a departure from conventional marketing strategies, which mostly relied on face-to-face interaction and standard market research. Digital technology has changed consumer behaviour research and client contact. Digital platforms and advanced analytics have given marketers new customer preference insights, enabling a new age of intelligent marketing (Odeibat, 2024). This allows personalised marketing tactics. AI breakthroughs are also transforming the marketing landscape, giving firms new opportunity to improve user experiences and optimise strategy. AI transforms the environment and helps individuals in ways that other technologies cannot. It reduces risks and expenses and allows you to find innovative solutions to challenging issues. The increasing usage of AI applications and systems is having an impact on many enterprises (Okorie et al., 2024). This may increase customer experiences, connections, and participation while generating new business (Hossain, 2024). This "information age," started in the mid-1900s. The shift from conventional businesses to an information economy was enormous.

The digital material and computer use of this era set it apart. Under this revolutionary approach, artificial intelligence alters marketing. This technological breakthrough is transforming how businesses value and engage with their target clients (Odeibat, 2024). AI's ability to collect and analyse huge quantities of data is changing client interactions, with forecasts indicating that personalised and predictive marketing will become the standard (Okorie et al., 2024).

AI-enabled marketing may predict customer preferences and provide tailored experiences (Pasupuleti, 2024). To fully grasp the promise of this powerful digital weapon, marketers must adapt and develop as AI sets a new benchmark for customer happiness and conduct.

AI has gained much interest in management and marketing research, but its implications in other domains are unclear. AI scaling and usage have increased and decreased appeal. The marketing potential and talents of this technology have been called into doubt since its commercial introduction. According to Pausupuleti (2024), AI and data collecting help to strengthen AI systems.

These systems handle text, images, audio, even fictitious numbers. One might study and arrange digital platform learning resources. Computer-generated artificial data is useful for artificial intelligence, data analytics, and natural language processing (Odeibat, 2024). AI may have an impact on sales, customer service, organisation, business, and behaviour. This is something that many businesses can accomplish.

Consider what will happen in transportation when self-driving automobiles driven by artificial intelligence become commonplace, they will change human behaviour and economic institutions. Data availability and analytics determine how effectively marketing AI performs. This paper looks at how artificial intelligence and big data analytics affect marketing strategy and how to utilise them to guide decisions.

Big data analytics

With the growth of e-commerce, mobile technologies, prediction algorithms, social networking, search engines, and other digital economy technologies, big data has opened up potential for the services sector (Ladeira et al., 2024). One of the hardest things to do in the data age is to manage large data analytics (Yaşar et al., 2024). Due to the large volume of data, services professionals must understand information management for decision-making (Bag et al., 2023). Recent research on big data analytics' implications in services have been abundant (Blanche et al., 2024). Due to data complexity, new technologies, and the desire for efficiency and effectiveness, the service industry has invested more in big data analytics using computers and machines that can reason, learn, and act like humans.

According to Ladeira et al. (2024), resources, skills, competitive pressure, and environmental changes all contribute to big data analytics. Dynamic Capabilities theory requires the firm's external environment to be dynamic and unpredictable (Wamba et al., 2020).

This concept is a major reason why firms utilise big data analytics: it encourages them to generate new ideas and develop new skills (Ladeira et al., 2024; Wamba et al., 2020). Services literature defines dynamicism as instability produced by consumers' unexpected behaviour or the firm's rapid adoption of new ideas and modifications. Because technology and wants change, ecosystems adapt. Globalisation affects service technology. Industry uses big data analytics to address requirements and stay ahead in a fast-changing industry (Bag et al., 2024). Environmental changes are affecting global service firms' big data analytics (Bag et al., 2023; Wamba, 2020).

Resources are human talents and knowledge, whereas capabilities are taught behaviours. Based on resources and abilities, big data analytics help organisations compete (Ladeira et al., 2024). Vincent (2024) says that a company needs to handle its tools and skills to do well in business and the economy. Al-Khaldy, Al-Obaydi, and Shari (2023) say that big data analytics need both management and technology. Knowledge cultures happen when people have the technical and management skills to mix hiring talented people with technical know-how. Management and technology boost big data analytics (Vincent, 2024).

Ladeira et al. (2024) say competitive pressure boosts competitiveness. It also affects innovation adoption. Zhang et al. (2020) define competitive pressure as an organization's perceived requirement to preserve its technical edge. This pressure stems from environmental factors that may influence big data analytics adoption (Yoo, 2024). Competitive pressure may effect consumers, suppliers, and rivals (Ladeira et al., 2024). When competition is fierce, businesses mimic one another (Zhang et al., 2020). Adoption of big data analytics is driven by competitive pressure in a data-driven organisation. Thus, competitive pressure may motivate big data analytics.

Artificial intelligence and marketing strategy to identify key trends and challenges

Artificial intelligence enhances return on investment and digital marketing strategies. Hendrayati et al. (2024) assert that AI-enhanced lead generation and enhancements in campaign efficacy are transforming digital marketing strategies. Concerns have been expressed about the ethical implications of AI on consumers engaged in social media marketing. Organisations use artificial intelligence (AI) to forecast customer buying patterns.

This may change how businesses use data forecasts to sustain operational systems. Multiple viewpoints exist to study the market and human conduct within it. In 2024, Odeibat intends to examine the ability of AI-driven systems to forecast customer demand for novel products.Tosi, Kokaj, and Roccetti (2024) assert that AI will anticipate customer preferences, develop pricing strategies, and determine the optimal timing for discounts.

Tosi, Kokaj, and Roccetti (2024) contend that pricing and promotion influence sales. Every marketing endeavour can benefit from the predictive capabilities of AI. Marketing use AI in several essential areas:

a. Preparation and planning: AI enhances STP (segmentation, targeting, and positioning), crucial for campaign strategy and implementation.

Artificial Intelligence assists enterprises in establishing long-term goals and addressing segmentation, targeting, and positioning challenges. Industries include banking, retail, tourism, art marketing, and finance may use algorithms for text mining and machine learning to discover lucrative customer niches (Pitt, Bal & Plangger, 2020). Optimisation of data, causal forests, and machine learning techniques may be used to enhance the precision of targeted client segments (Verma et al., 2021).

b. Product management: AI-driven marketing analytics systems can predict client preferences and satisfaction (Dekimpe, 2020). Topic modelling improves service design and innovation. Integrating customer preferences in product searches may aid marketers in understanding product recommendation systems and improving product management (Verma et al., 2021).

Deep learning makes exploring new places easy and provides tailored suggestions for must-see sites. Odeibat (2024) suggests that AI may help firms better serve consumers.

c. Pricing management: pricing needs several calculations and considerations. Demand fluctuation makes pricing choices harder since they need real-time price changes. AI addresses these issues. Odeibat (2024) references the multi-armed bandit technique for dynamic pricing optimisation. Bayesian inference-based machine learning approaches provide rapid price modifications to maintain competitiveness in dynamic pricing contexts like e-commerce. Optimal response pricing algorithms improve dynamic pricing by using supply network dynamics, competitive tactics, and consumer preferences (Dekimpe, 2020).

d. Place management: Make marketing mix goods accessible to increase client satisfaction. Managing relationships, logistics, inventory, storage, and transportation is a tedious but crucial aspect of product distribution. Distribution system control is a prominent application of artificial intelligence (AI) due to the use of cobots for packing, drones for delivery, and the IoT for order monitoring and restocking (Huang & Rust, 2021). Automation and standardisation of distribution procedures make things easier for suppliers and consumers.Optimal customer service is attained by human connection; nevertheless, AI enhances client engagement with emotionally responsive service robots (Priday, 2024). Productivity may be improved by the automation of the service process.

f. Oversight of advancement: Search Engine Optimisation, media scheduling, and administration of advertising campaigns are all strategies to augment the firm's success.

The digital revolution is transforming promotional strategies from physical to 'phygital', therefore integrating digital and physical components. Digital and social media are extensively used since consumers may choose the time, location, and topic of engagement. AI-driven customised messaging tailored to client interests and profiles may enhance engagement (Huang & Rust, 2021). Content analytics enhances communications, but emotional AI systems evaluate real-time customer preferences. AI-driven mobile solutions streamline client interaction throughout the user life cycle (Kunal et al., 2023).

Artificial intelligence improves e-commerce accuracy and conversion rates by forecasting customer behaviour and personalising the shopping experience (Puntoni et al., 2021). The influence of AI on consumer behaviour and buying habits has been explored.

Consumers exhibit reluctance towards AI owing to its many barriers to adoption.

These contrasting perspectives arise from the conviction that AI is incapable of comprehending human emotions or recognising individual differences (Verma et al., 2021).

Furthermore, consumers find AI systems emotionally frigid. AI adoption is lower in high-impact, identity-defining fields (Davenport et al., 2020).

Earlier research had shown that AI improves the connection between customer pleasure and loyalty; however, Chen et al. (2022) found that AI actually moderates the proposed connections in the opposite way. Given the challenges associated with implementing AI into home-sharing platforms, researchers are forced to reevaluate the purportedly positive impacts of AI within the sharing economy.

By allowing customers to make modest adjustments to the AI, you may raise their awareness of the benefits of customisation and help them overcome the neglect of uniqueness. The previous concerns may also be amenable to resolution using this approach.

It gets even more difficult when robots add AI. Consumers have uneasiness with increasingly lifelike robots due to the uncanny valley hypothesis (UVH). As to Odeibat (2024), first attempts to address this issue focused on appealing to consumers' empathy by portraying robots as capable of understanding their perspective and showing sympathy in times of pain. In particular, sociologists are curious in consumer acceptance and cultural preferences as they pertain to the possible societal integration of robots driven by artificial intelligence. Cultural differences in attitudes towards robots may be one of several factors studied to determine whether or not robots would replace human hairstylists or babysitters or elderly caretakers.Certain sociologists suggest that robots might improve persons' spiritual well-being (Davenport et al., 2020). Significant research queries emerge from the consequences of AI deployment. If AI can precisely forecast customer choices, it may diminish their sense of agency.

AI-driven micro-targeting marketing may increase product appeal by reducing search costs; but, it may also undermine customers' feeling of autonomy by influencing their evaluations and decisions.

Certain clients, upon recognising that AI systems can anticipate their preferences, may demonstrate their autonomy by intentionally choosing less popular choices (Davenport et al., 2020). Moreover, several individuals express concern that forming emotional bonds with AI-enabled robots might result in a disconnection from human relationships.

The media tends to inflate people's fears that robots with artificial intelligence capabilities would eventually become more appealing companions than humans. For instance, the Harmony robot from Realbotix is considered a potential contender because to its ability to exhibit emotions and adopt several personas. Such robots pose a threat to society because they may increase social isolation, decrease marriage rates, or further reduce birth rates—all of which are happening in countries like Japan where the birth rate is already falling. The intriguing research prospects presented by this finding are asserted by Davenport et al. (2020).

In a comprehensive 2021 study, Chintalapati and Pandey (2022) categorised marketing into many functional themes and sub-themes to illustrate how AI enhances outcomes and experiences across multiple sectors. Their analysis indicates that AI is enhancing and revolutionising marketing techniques. AI has revolutionised marketing, improving campaigns and resource allocation and enhancing ROI, according to Veleva and Tsvetanova (2020).

Dixit's 2022 research also showed how AI has expanded digital marketing, notably CRM. AI's predictive powers are changing how organisations manage consumer data and interactions, resulting in more focused and effective advertising. AI is enhancing digital marketing strategies via cloud computing, big data, and the Internet of Things (Odeibat, 2024).

Finally, the use of AI into digital marketing has resulted in a sea shift in the development, implementation, and evaluation of plans. Various marketing operations benefit from enhanced return on investment and efficiency (Wong, 2023). Digital marketing has significantly expanded due to AI, particularly in customer relationship management (CRM), where customised interactions and predictive analytics are prevalent.

These studies demonstrate that AI enhances digital marketing by prioritising clients, optimising data utilisation, and streamlining operations. Artificial intelligence has enabled virtual assistants and robots to assist clients by providing prompt and tailored responses. Odeibat (2024) asserts that robots might enhance client engagement and sales by personalising purchasing experiences.

Case study of companies that have successfully integrated big data analytics into their marketing strategies

As big data analytics has been a focal point of recent discourse, several organisations have long embraced the technology to enhance their marketing efforts. Among these corporations is Amazon, an online retail behemoth that has extensive data on its consumers, including names, addresses, payment information, and search history, all meticulously stored in its database. In addition to its use in advertising algorithms, Amazon utilises this information to enhance customer interactions, a facet often neglected by many big data users. When you next reach out to the Amazon help desk with an inquiry, do not be astonished if the representative had a majority of your relevant information readily available. This facilitates a swifter, more efficient customer service experience that eliminates the need to spell one's name many times.

Secondly, American Express Company utilises big data to evaluate and forecast customer activity. The organisation employs advanced prediction algorithms, analysing previous transactions and over 100 factors, instead of relying on conventional business intelligence retrospective reporting. This enables a more precise prediction of probable attrition and consumer fidelity. American Express has said that they can forecast 24% of accounts that would terminate within four months in the Australian market. Additional entities include BDO, Capital One, General Electric (GE), Miniclip, and Netflix. These examples indicate that firms, irrespective of the industry, may utilise big data analytics to enhance their overall performance. This research focusses on Narellan Pools, a small business that has expanded significantly thanks to the utilisation of big data analytics. Big data was utilised by Australian swimming pool maker Narellan Pools to get insights about their customers. There was a 54:1 revenue-to-expenditure ratio for the marketing plan. Walsh, 2017. Because of Australia's climate, swimming pools are necessary. Recently, elevated housing prices have resulted in deeply indebted Australian homebuyers having insufficient funds to install a pool. Additionally, elevated costs have prompted a transition from homes to flat living. The combination of this factor and an entrance of new rivals resulted in a revenue decrease of around 25% for Narellan Pools from 2007 to 2013 (Walsh, 2017).

The swimming pool industry resembles operating a funeral home, since most clients do not return for a subsequent engagement. With this, some marketing initiatives were simplify, yet relevant than others. Narellan concentrated on enhancing brand recognition via conventional channels such as television and print advertising, supplemented with little keyword buying in search media, ensuring that when consumers decided to purchase a pool. To create a digitally-driven marketing strategy, Narellan hired marketing services firm Affinity in 2013. With just AUD 495,000 allocated for media expenditures, the goal was to offset the decline in sales (Walsh, 2017). Affinity started its analysis with sales data. Affinity saw a significant and apparently inexplicable fluctuation in the conversion rate of client leads to sales, with some days achieving conversions up to 800% over the average, despite the expected increase in sales during warmer months (Walsh, 2017). The increase in conversion rates would last for around three to four days before returning to the mean.

It took Affinity five years to acquire seven terabytes of data containing over 100 million rows. Narellan compiled a comprehensive report based on its own data on website traffic, site visit duration, visit-to-enquiry ratios, advertising and promotional expenditures and strategies, as well as third-party data on consumer confidence, inflation, interest rates, building approvals, and online pool-related keywords. Walsh (2017) discovered that in-depth research increased consumer comprehension. The significant rise in conversion from interest to purchase of pools may be attributed to a specific climatic factor, despite temperature being a clear influence on interest and sales. Only when the local temperature exceeded the mean rolling monthly average for two or more days

did the number of purchases rise. Recent temperatures were more essential than high temperatures in converting client attention into sales. The conversion rate was high for four days, with temperatures above normal on the second day.

After determining "when," analysts decided "what." In-depth interviews revealed that buyers were more likely to buy after visualising a relaxing plunge in their own pool. Affinity's internet marketing strategy included keywords as well as social media banner and video advertisements (Walsh, 2017).

The current temperature and a 30-day rolling average dictated whether Narellan's 49 Australian locations activated or discontinued the internet campaign. The online campaign would run four days if the 30-day rolling average and previous-day projection were higher. Narellan advertisements may brighten certain locations but not others. The web campaign began using automated technology. The results were amazing. In 2015, revenues increased by 23%, while leads increased by 11%. Approximately 70% of the AUD 499,00 media expenditure was spent. Advertising returned $54 for every $1 spent (Walsh, 2017).

The era of internet marketing has been characterised by accounts of substantial expenditures by several individuals hired by major corporations. This narrative from the Antipodes illustrates that intelligent individuals in tiny enterprises may have significant influence with few resources. Astute study of the extensive data gathered nowadays might provide valuable information into consumers. Technological advancements enable organisations, regardless of size, to effectively use this information. Similar to the offline world, identifying the specific stage of the customer's purchasing journey to concentrate on and maintaining a singular focus on the target is as crucial now as it has always been. The technologies have evolved and marketing levers have diversified, however proficient analysis yielding insights that guide judicious marketing activities remains invaluable.

Key factors that contribute to the effectiveness of big data analytics and artificial intelligence in marketing decision-making

Several studies suggest that several variables affect big data analytics and AI usage. Egwuonwu et al. (2024) described these aspects as technical, organisational, and environmental.

a. Technological elements

Projected value: This BDA analysis shows the operational and strategic benefits of adopting new technologies like BDA (Egwuonwu et al., 2024). Because of its practicality, BDA discourse highlights both direct and indirect benefits, such as improved customer service, process reengineering, and increased collaboration, as well as reduced organisational operating costs, improved internal resource efficiency, and decreased error rates (Mikalef et al., 2019; Cao, Jones, and Shenge, 2014; Mikalef et al., 2019). Few studies have examined these utilitarian value formulations in contexts outside than Western BDA discourse, particularly in Nigeria. Firms would fully implement BDA to satisfy essential financial obligations, according to management's endorsement of this value, which concentrates the BDA adoption discourse on utilitarianism (Chen et al., 2015).

Technological competence: As stated in the discourse by Egwuonwu et al. (2024), the effective utilisation of contemporary technologies significantly augments innovation capability, as it is contingent upon the extent to which the innovation aligns with existing organisational values, historical experiences (path dependence), and the requirements of potential adopters.

It is reasonable to assert that using BDA discourse, as both a definitional and practical framework, will aid organisations in their pursuit of adopting BDA. The current research indicates that "the compatibility of an innovation may pertain to its alignment with (1) value systems (e.g., organisational culture), and (2) business practices" [Chen et al., 2015]. Egwuonwu et al. (2024) have shown that cognitive and operational compatibility is enhanced when organisations use BDA. Nonetheless, implementing such logics universally may pose contextual challenges, especially in scenarios for which they were not initially intended, even when BDA techniques are demonstrably aligned with corporate values, standard operating procedures, and market mechanisms.

b. Organisational elements

Top management support: Existing research demonstrates that top management support is essential for organisations to implement contemporary IT-based systems (e.g., BDA). The existing research identifies variable skills and data generation potential as critical success factors (Roemer et al., 2021). Senior managers in Nigeria's industrial and service industries may adopt Big Data Analytics (BDA) if they have positive IT system expectations, although this has not been verified. Western-influenced utilitarian rhetoric suggests that they are more likely to modify organisational norms, attitudes, and cultures, accept new technology, and build network-based benefits.

Current BDA research highlights organisational preparation as a key driver of a firm's capacity and willingness to accept technological change (Gangwar, 2018). This indicator shows the company's technical IT skills and willingness to invest in and manage new technologies (Yang et al., 2020).

The BDA scholarship asserts that an organization's preparedness is crucial for the adoption and execution of business development (Raguseo and Vitari, 2018). Asiaei and Rahim (2019) assert that organisational preparedness is crucial for adoption at the organisational level within the Marketing discipline.

c. Ecological determinants

Market competition: Although the aforementioned technical and organisational (TO) elements underscore the favourable impact on firm-level BDA adoption, competitive pressure emphasises the environmental danger presented by a company's competitors within the same market (Mikalet et al, 2016). This challenge may compel companies to adopt new technologies to secure a competitive edge (Muller, Fay, and vom Brocke, 2018). However, rival firms can employ more advanced business development strategies to

attract customers from competitors by integrating state-of-the-art, costly technological innovations (Yu, 2016). Competitive pressures may compel smaller enterprises to emulate the behaviours of market giants, especially during periods of instability. The apprehension of being seen as distinctive within the same industry may drive the adoption of newer technology, although at a financial expense. This acts as a catalyst (Muller, Fay and von Brocke, 2018) and may hinder new business and technology adoption in the same area.

Extrinsic assistance: Vendors or third parties give external aid to businesses to promote technological innovation and strategy execution (Biney, 2019).

It is critical to technical innovation and resource efficiency. Management's technical and inventive abilities, as well as BDA acceptance, are dependent on vendor support, which encourages learning from suppliers and open-source platforms (Clarker, 2015). According to Chen et al. (2015), outsourcing to external organisations and suppliers may assist firms, particularly startups that lack big data analytics competence.

The regulatory environment: Current BDA literature emphasises the need of a conducive regulatory framework in which the government encourages the entrepreneurial use of BD technology. The literature demonstrates an adequate infrastructure, legal framework, regulatory guidelines, and support to do this (Yu, 2016). For example, with governmental assistance, legal measures may be implemented to alleviate public concerns over information leakage and illicit data trade, hence addressing barriers to BD adoption (Egwuonwu et al, 2024).

Framework for integrating big data analytics and artificial intelligence into marketing strategy.

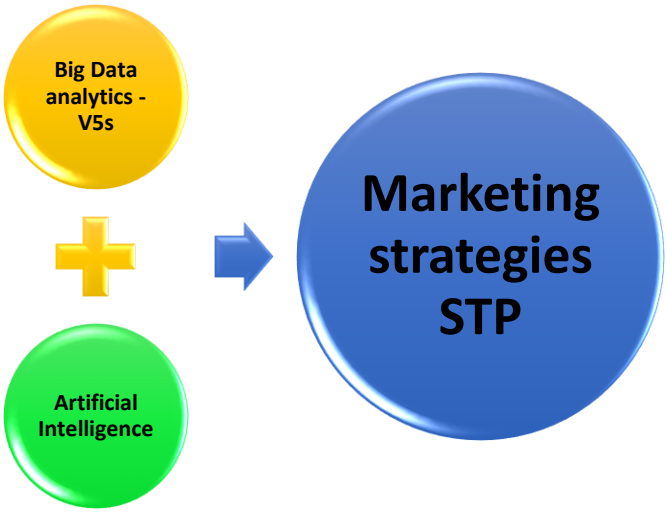

Figure 1: Conceptual framework for the study
Source: Writer's model

The model shows that using artificial intelligence and big data analytics (which include the 5Vs: Volume, Velocity, Variety, Veracity, and Value) can help with market segmentation, targeting, and positioning to increase sales volume. Artificial intelligence includes symbolic processing, data ingestion, learning capabilities, reasoning, non-algorithmic methods, and imperfect knowledge.Looking at "Big Data" has a big effect on business plans in many areas, including

Views from customers: Big data analysis helps businesses understand how customers buy things, what interests them, how active they are on social media, and other relevant data, which leads to more accurate consumer insights.

Ethical implications of big data analytics and artificial intelligence in marketing

Despite advances in AI and Big Data analytics, consumers still have ethical reservations about data handling. According to Puntoni et al. (2021), consumer AI interactions include four types: data capture, in which the consumer gives the AI personal information; classification, in which the consumer receives Big Data analytics and personalised predictions from the AI; delegation, in which the AI performs certain tasks in place of the consumer; and social, in which the consumer interacts with the AI. Therefore, there are many ways that customers may engage with AI and Big Data analytics throughout the day (Kumar et al., 2019). As technology and computer power increase, businesses need to adapt to new advancements. Customers and organisations get additional value when they adopt and modify them for everyday procedures and products (Armour and Sakp, 2020). Business decision-making may be aided by big data analytics and artificial intelligence (AI) tools including speech recognition, machine learning, and natural language processing (Sohn & Kwon, 2020). A Netflix-type content recommendation system that leverages big data for behavioural targeting, for example, gives users options they are likely to like without requiring them to go through all of the material to get what they want (Ameen, Tarhini, Reppel, & Anand, 2021). This feature allows users to learn about both their current selection and others they may find interesting. This capability would not be possible without these innovative techniques (André et al. 2018). According to earlier

study, a number of technologies have swiftly supplanted human decision-making by offering superior inputs (Duan, Edwards & Dwivedi, 2019). According to André et al. (2018), this discovery shows that customers may benefit from digital assistants' assessments, which match preferences with possibilities without cognitive and emotional weariness. However, studies suggest that consumers may like their choices; and when they believe they lack this capacity, it can result in negative emotions and repercussions that affect the quality of choice and customer happiness (Hermann, 2022).

As shown, there are differing opinions on the creation and use of AI, and both ethical potential and difficulties arise (Hermann, 2022). In order to better comprehend Big Data analytics and AI-enabled consumer experiences, previous research has emphasised the importance of perceived sacrifice and trust. According to certain research, there are significant compromises such the loss of control, privacy, and human connection, as well as time consumption and potential unpleasant emotions when trust is essential (Du & Xie, 2021).

AI and big data analytics have ethical issues beyond data collecting since they leverage information to affect online and offline conduct, subverting free will and conscious decision-making. If there is enough data and interaction, an algorithm may target a person and provide them the right inputs to change their conduct (Muller, 2020). Businesses employ behavioural biases, deceptions, and addictions to maximise profits. Advertising causes overconsumption and purchase addiction, in addition to its ethical difficulties. Computers uncover patterns that humans miss to assist marketers make judgements (Struhl, 2017).

Since the researcher decides, ethics are uncertain. Recognising moral awareness and difficulties and establishing their circumstances is necessary to make ethical judgements. Big data analytics and AI provide benefits that prevent technology misuse and underuse when applied properly. It helps organisations leverage on public values that may help define ethical behaviour. However, it helps organisations anticipate and maybe prevent costly mistakes due to unethical or immoral behaviour (Floridi et al., 2018). A group of academics say ethics' double advantage only works in a trustworthy and accountable environment. Technology is more likely to be adopted if its benefits exceed its drawbacks (Floridi et al., 2018). Customers believe their actions are motivated by them, not by their environment.

Advances in technology like artificial intelligence (AI) and big data analytics quickly allow AI to take on additional decision-making duties and take independent action. As a result, it raises concerns about human benefits and safety (Dignum, 2017). It increases the perceived danger, leading people to wonder whether such technologies should be produced and if certain robots should be performing what they do. People start to wonder whether computers will surpass people in intelligence (Muller, 2016).

Best practices for responsible use of AI and Big data analytics

Transparency of AI algorithms has become a critical ethical concern in the rapidly developing field of artificial intelligence (AI) (Bai and Fang, 2022). In their exploration of the relevance of transparent AI algorithms, Olatoye et al. (2024) highlight how crucial these algorithms are to fostering trust via transparent and accountable decision-making processes. The detection and reduction of biases in the decision-making process are made easier by transparent AI systems (Olatoye et al., 2024).

Thota and Arora (2024) recommended the following procedures:

• Consequences of Personal Data Collection for Privacy

This inquiry explores the moral dilemmas raised by the extensive gathering of personal information. How can we strike a balance between the need for data-driven insights and the protection of individual privacy in a world when people are producing enormous volumes of digital information? Consent, data ownership, and the possibility of invasive monitoring are among the issues it brings up.

Keeping Data Secure and Preventing Data Breach

This inquiry tackles the crucial problem of security and data breaches, which are becoming more frequent in the big data era. It examines the moral duty of governments and organisations to protect the private data they gather, taking into account both the possible damage to individuals and the wider ramifications for society.

• Taking Ethics into Account When Making Decisions (e.g., Hiring and Lending)

This query brings to light the moral conundrums that arise when data is used to make choices that affect people's lives, such assessing creditworthiness or employing individuals. It calls into question the possibility of discrimination based on data-driven insights as well as the fairness, bias, and openness of decision algorithms.

• Reducing Biases in Data Collection and Analysis

One of the most important ethical issues in data collecting and analysis is bias. Given that biassed data may reinforce and even worsen social inequities, this subject investigates ways to guarantee that data used in analytics is impartial and representative. In order to counteract prejudice, it also discusses the need of algorithmic openness and fairness-aware machine learning.

3 Crucial Steps to Guarantee Ethical Big Data Analytics

• Talk about the need of strict data privacy laws like the GDPR.

In the era of big data analytics, data protection laws such as the General Data Protection Regulation (GDPR) are crucial for protecting people's privacy and personal information. By establishing guidelines for data collection, storage, and processing, these rules make

sure that companies and organisations manage data in an ethical and open manner. By giving people control over their own data, including the right to access and the right to be forgotten, they also empower people.

• Describe the significance of safe data storage and encryption.

Secure data storage and encryption are essential for shielding information from unwanted access. Data is changed into a code via encryption, which only the right key can decode. Protecting data from breaches and cyberattacks is ensured by secure data storage. To stop data breaches and preserve the integrity and security of sensitive data, both steps are essential.

Examine the idea of algorithmic fairness and transparency.

In order to reduce biases and prejudice in data-driven decision-making, algorithms must be fair and transparent. Fair algorithms make sure that sensitive characteristics like gender, ethnicity, or other characteristics don't affect choices. Transparency enables people to know how choices are made and question them if needed by making the inner workings of algorithms transparent and accountable. This is especially important for criminal justice, financing, and employment applications.

According to Dewangan and Kumar (2024), the following procedures should be followed:

• Interoperability: It's critical to make sure that various technologies can interact and communicate with one another. To do this, standardising interfaces and protocols is crucial.

• Data Management: Robust data management techniques, including storage, processing, and analysis, are necessary to handle the massive volumes of data produced by IoT devices and AI systems.

• Cybersecurity: As connection grows, so do the hazards associated with cybersecurity. One of the top priorities is safeguarding systems and sensitive data against online attacks.

• AI Ethics: To guarantee just and moral AI-driven judgements, ethical issues pertaining to AI, such as bias mitigation and responsible AI deployment, must be addressed.

• Skilled staff: It might be difficult to create a staff that has the know-how to manage and maintain Industry 5.0 technology. Education and training are essential.

• Cost and ROI: Putting Industry 5.0 technology into practice might be costly. Businesses have to compare these expenses against anticipated returns on investment.

• Regulation and Compliance: It might be difficult to navigate the regulatory environment. It may be difficult to use Industry 5.0 technology while adhering to industry-specific laws.

• Sustainability: Sustainable development requires striking a balance between Industry 5.0's environmental effects and the energy use of connected devices.

30 recommended practices for the responsible use of AI are being proposed by the AMF (2023), which draws on ethical standards as well as legal and regulatory initiatives proposed in various countries. These guidelines are applicable to any AISs that a financial player has put in place, including ones that are still internally orientated. These procedures need to be modified in accordance with the features of the AIS in use, the business environment of the financial player, and the risk assessment for the use of an AIS, particularly with reference to its effect on customers. Some of these methods are connected to consumer protection and were designed to shield customers from financial players' unfair, abusive, or deceptive use of artificial intelligence. These procedures encourage the use of AI in a way that satisfies customers' legitimate expectations about autonomy and privacy.

1. Applying AI for the benefit of customers

AI should not hurt consumers either individually or collectively by, for instance, increasing economic and social inequality, systemising unwarranted discriminatory biases, or erecting obstacles to financial inclusion.

Because AISs may take advantage of unconscious processes, they can simulate and affect human behaviour via methods that might be difficult to identify. An AIS that unduly influences and informs consumers' decisions about products or services, the dissemination of false information on social media (such as deepfakes), or the dissemination of inflated claims about the value added by a financial player's use of AI in its operations are just a few examples of how AI should not be used to deceive or manipulate the public.

Finally, customers should be made aware that an AIS is an automated agent while it seems to be human.

2. Protecting customer privacy Any AIS intrusion into a customer's private life must be justified by the possible advantages to the customer and compliant with privacy and personal information protection laws and regulations.

Consumer permission requests for the collection and use of their data should be made in straightforward language and should be supported by an explanation of the AIS's goals and the need of data collection for the AIS to operate properly. Any gathering of customers' personal information, including information about them (such as information found in social media postings), should be covered by the permission. Decisions or results that an AIS provides about a customer may be considered personal information and need to be handled as such.

Only with the consumer's permission should an AIS that tracks their activities be implemented. Such monitoring need to be relevant and essential for using the given item or service. But no AIS should give the impression that a customer is being watched all the time.

Finally, certain AISs make it possible to draw conclusions about a person's traits, routines, or life experiences. For instance, one may assess a person's likelihood of becoming a parent or being a member of a certain ethnic group. The customer may feel that the inference violates their privacy in certain situations. Only traits, occurrences, or behaviours that are relevant to the nature of the financial product or service being sold and that the customer may reasonably anticipate should be inferred by AISs.

3. A rise in consumer independence

The implementation of an AIS shouldn't restrict a consumer's options or have an impact on their lifestyle or behaviour. Conversely, AISs need to be created and made accessible to customers in order to assist them in making choices that are more in line with their financial objectives and situation.

When financial players use an AIS to make automated choices, they should notify customers of this and have their prior approval. Customers who do not want to communicate with, be watched by, or have an automated decision made about them should be provided with choices that are clear and affordable.

4. Giving customers fair treatment

Financial players are able to provide financial goods and services that are suitable for the conditions of each set of customers, at a suitable price and with a suitable risk profile, by segmenting their customer base according to pertinent and socially acceptable criteria. For instance, segmentation is used to determine the risk covered by an insurance policy or to evaluate credit for mortgage loans. However, using data and models free from discriminating biases and quality problems is the only way to reap these advantages.

The quality of the data utilised is a fundamental determinant of AIS performance. Current data that is representative of the system's target population and free of biases from discriminatory behaviours, for instance, should be used to train an AIS.

Vulnerable consumer groups or groups that may be unduly disadvantaged (such as new immigrants, illiterate people, or people who are not familiar with digital technologies) should be identified in order to gather such data, and the impact of an AIS on these groups should be evaluated during the design phase. Additionally, steps should be taken to confirm that the AIS provides equitable results, and if two customers or groups of customers get different treatment, the difference should be justified based on suitable standards. Financial participants may think about including a sociologist or ethicist in these investigations to pinpoint the precise causes of prejudice and the best ways to address it.

5. Handling conflicts of interest in the best interests of customers

Throughout the course of the AIS's life cycle, conflicts of interest (such as the potential for an AIS to prioritise the interests of a financial actor above those of consumers) should be avoided or minimised.

Finding conflicts of interest should get special attention in AISs that are complicated, opaque, or have results that are difficult to explain.

6. Customers must be consulted before using AIS

Customers need to be considered involved in the design of an AIS. Consumer feedback should be solicited and taken into consideration by financial stakeholders when evaluating ethical risks before implementing an AIS that may have a significant influence on consumers. This is especially important in cases where an AIS could possibly result in feelings of privacy invasion or loss of autonomy. Consumers whose data is utilised by the AIS or who may be influenced by AIS decisions or results would be included in the consultations, albeit they would not be the only ones. Consultations should engage disadvantaged or minority consumer groups.

For AISs that potentially significantly affect consumers in general or a specific consumer group, participation mechanisms that allow for the frequent collection of consumer feedback throughout the AIS life cycle should also be put in place. Although there are many, such procedures as suggested by AFM (2023) are beyond the purview of this investigation. Data ethics and AI ethics are two ethical issues related to AI. Respectful and secure management of private and sensitive data is a component of data ethics. The ethical use of data for AI system training and the selection of safe, traceable, and explicable systems are the main focusses of AI ethics. Thorough testing of AI systems is necessary to prevent discrimination and guarantee impartial, consistent performance.

CONCLUSION AND RECOMMENDATIONS

This study examines the real impact and possible benefits of big data analytics and artificial intelligence on marketing choices via an extensive literature analysis and empirical investigation. According to the report, businesses may better understand customer requirements and market trends by combining big data analytics with artificial intelligence (AI). This allows them to create more individualised and precise marketing plans. The precision of target market positioning, the application of personalised marketing, and the enhancement of consumer understanding are the primary ways that big data analytics and artificial intelligence are influencing marketing strategy. A data analysis team should be established, data collection and integration should be strengthened, different analysis methodologies should be used flexibly, and customised marketing tactics should be put into practice, among other practical implications and recommendations that this research offers. Nevertheless, this research has many drawbacks as well, including problems with data dependability and sample size. It doesn't specify the process. Future studies may examine the impact

of using AI and big data analytics in marketing in more detail, focusing on a particular sector to provide a clearer and more substantiated conclusion. This research has significant applications for businesses looking to improve their marketing tactics.

REFERENCES

1. AFM (2023). Proprietary traders make large-scale use of machine learning in trading algorithms. March 3, 2023. Online: https://www.afm.nl/en/sector/actueel/2023/maart/her-machine-learning
2. Al-Khaldy, M., Al-Obaydi, B. & Shari, A. (2023). The Impact of Predictive Analytics and AI on Digital Marketing Strategy and ROI. 10.1007/978-3-031-42455-7_31.
3. Ameen, N., Tarhini, A., Reppel, A., & Anand, A. (2021). Customer experiences in the age of artificial intelligence. Computers in Human Behavior, 114, 106548. doi:10.1016/j.chb.2020.106548.
4. André, Q., Carmon, Z., Wertenbroch, K., Crum, A., Frank, D., Goldstein, W., Huber, J., van Boven, L., Weber, B., & Yang, H. (2018). Consumer Choice and Autonomy in the Age of Artificial Intelligence and Big Data. Customer Needs and Solutions, 5(1–2), 28–37. doi:10.1007/s40547-017-0085-8.
5. Armour, J., & Sako, M. (2020). AI-enabled business models in legal services: From traditional law firms to next-generation lawcompanies? Journal of Professions and Organization, 7(1), 27–46. doi:10.1093/jpo/joaa001
6. Arora, S. and Thota, S. R. (2024). Ethical Considerations and Privacy in AI-Driven Big Data Analytics. International Research Journal of Engineering and Technology (IRJET), 11 (05), pp774-788
7. Asiaei, A., & Ab. Rahim, N. Z. (2019). A multifaceted framework for adoption of cloud computing in Malaysian SMEs. Journal of Science and Technology Policy Management, 10(3), 708–750. https://doi.org/10.1108/jstpm-05-2018-0053
8. Bag, S., Dhamija, P., Singh, R. K., Rahman, M. S., & Sreedharan, V. R. (2023). Big data analytics and artificial intelligence technologies based collaborative platform empowering absorptive capacity in health care supply chain: An empirical study. Journal of Business Research, 154, 113315. https://doi.org/10.1016/j.jbusres.2022.113315
9. Belanche, D., Belk, R. W., Casaló, L. V., & Flavián, C. (2024). The dark side of artificial intelligence in services. The Service Industries Journal, 44(3-4), 149–172. https://doi.org/10.1080/02642069.2024.2305451
10. Biney, I. K. (2019). Unearthing entrepreneurial opportunities among youth vendors and hawkers: challenges and strategies. Journal of Innovation and Entrepreneurship, 8(1). https://doi.org/10.1186/s13731-018-0099-y
11. Cao, Q., Jones, D. R., & Sheng, H. (2014). Contained nomadic information environments: Technology, organization, and environment influences on adoption of hospital RFID patient tracking. Information &Amp; Management, 51(2), 225–239. https://doi.org/10.1016/j.im.2013.11.007
12. Chen, D. Q., Preston, D. S., & Swink, M. (2015). How the Use of Big Data Analytics Affects Value Creation in Supply Chain Management. Journal of Management Information Systems, 32(4), 4–39. https://doi.org/10.1080/07421222.2015.1138364
13. Chen, Y., Lee, J. Y., Sridhar, S., Mittal, V., McCallister, K., & Singal, A. G. (2020). Improving cancer outreach effectiveness through targeting and economic assessments: Insights from a randomized field experiment. Journal of Marketing, 84(3), 1-27. https://doi.org/10.1177/0022242920913025
14. Chen, Y., Prentice, C., Weaven, S., & Hisao, A. (2022). The influence of customer trust and artificial intelligence on customer engagement and loyalty–The case of the home-sharing industry. Frontiers in Psychology, 13, 912339. https://doi.org/10.3389/fpsyg.2022.912339
15. Chintalapati, S., & Pandey, S. K. (2022). Artificial intelligence in marketing: A systematic literaturereview. International Journal of Market Research, 64(1), 38–68. https://doi.org/10.1177/14707853211018428
16. Clarke, R. (2015). Big data, big risks. Information Systems Journal, 26(1), 77–90. https://doi.org/10.1111/isj.12088
17. Davenport, T., Guha, A., Grewal, D., & Bressgott, T. (2020). How artificial intelligence will change the future of marketing. Journal of the Academy of Marketing Science, 48, 24-42. doi:10.1007/s11747-019-00696-0.
18. Dekimpe, M. G. (2020). Retailing and retailing research in the age of big data analytics. International Journal of Research in Marketing, 37(1), 3-14. https://doi.org/10.1016/j.ijresmar.2019.09.001
19. Dewangan, S. and Kumar, S. (2024). AI and Big Data Analytics Revolutionizing Industry 5.0: Unlocking the Power of Smart Manufacturing and Beyond. https://orcid.org/0000-0002-6539-3357
20. Dignum, V. (2017). Responsible Autonomy. Proceedings of the Twenty-Sixth International Joint Conference on Artificial Intelligence. doi:10.24963/ijcai.2017/655
21. Du, S., & Xie, C. (2021). Paradoxes of artificial intelligence in consumer markets: Ethical challenges and opportunities. Journal of Business Research, 129, 961–974. doi:10.1016/j.jbusres.2020.08.024

22. Duan, Y., Edwards, J. S., & Dwivedi, Y. K. (2019). Artificial intelligence for decision making in the era of Big Data – evolution, challenges and research agenda. International Journal of Information Management, 48, 63–71. doi:10.1016/j.ijinfomgt.2019.01.021
23. Egwuonwu, A., Mendy, J., Smart-Oruh E., and Egwuonwu, A. (2024). "Drivers of Big Data Analytics' Adoption and Implications of Management Decision-Making on Big Data Adoption and Firms' Financial and Nonfinancial Performance: Evidence From Nigeria's Manufacturing and Service Industries," in IEEE Transactions on Engineering Management, vol. 71, pp. 11907-11922,, doi: 10.1109/TEM.2023.3321426.
24. Floridi, L., Cowls, J., Beltrametti, M., Chatila, R., Chazerand, P., Dignum, V., Luetge, C., Madelin, R., Pagallo, U., Rossi, F., Schafer, B., Valcke, P., & Vayena, E. (2018). AI4People—An Ethical Framework for a Good AI Society: Opportunities, Risks, Principles, and Recommendations. Minds and Machines, 28(4), 689–707. doi:10.1007/s11023-018-9482-5
25. Gangwar, H. (2018). Understanding the Determinants of Big Data Adoption in India. Information Resources Management Journal, 31(4), 1–22. https://doi.org/10.4018/irmj.2018100101
26. Hamamah, A., Al-Haimi, B., Tajuri, W.(2024). Navigating the Marketing Landscape: Artificial Intelligence and Big Data Role in Digital Marketing. *International Journal Of Academic Research In Business And Social Sciences,* 1 4 (10), PP 2285- 2299
27. Hendrayati, H., Achyarsyah, M., Marimon, F., Hartono, U. & Putit, L. (2024). The Impact of Artificial Intelligence on Digital Marketing: Leveraging Potential in a Competitive Business Landscape. *Emerging Science Journal*, 8, (6),pp2343-2359
28. Hermann, E. (2022). Leveraging Artificial Intelligence in Marketing for Social Good—An Ethical Perspective. Journal of Business Ethics, 179(1), 43–61. doi:10.1007/s10551-021-04843-y
29. Hossain, M. R. (2024). The integration of AI in small enterprises and its impact on productivity and innovation. International Journal For Multidisciplinary Research, 6(5). https://doi.org/10.36948/ijfmr.2024.v06i05.28649
30. Ji-fan Ren, S., Fosso Wamba, S., Akter, S., Dubey, R., & Childe, S. J. (2016). Modelling quality dynamics, business value and firm performance in a big data analytics environment. International Journal of Production Research, 55(17), 5011–5026. https://doi.org/10.1080/00207543.2016.1154209
31. Kumar, V., Rajan, B., Venkatesan, R., & Lecinski, J. (2019). Understanding the role of artificial intelligence in personalized engagement marketing. California Management Review, 61(4), 135–155. doi:10.1177/0008125619859317.
32. Ladeira, W. J., Santini, F. de O., Rasul, T., Cheah, I., Elhajjar, S., Yasin, N., & Akhtar, S. (2024). Big data analytics and the use of artificial intelligence in the services industry: a meta-analysis. *The Service Industries Journal*, *44*(15–16), 1117–1144. https://doi.org/10.1080/02642069.2024.2374990
33. Lei, Y., Jia, F., Lin, J., Xing, S., & Ding, S. X. (2016). An Intelligent Fault Diagnosis Method Using Unsupervised Feature Learning Towards Mechanical Big Data. IEEE Transactions on Industrial Electronics, 63(5), 3137–3147. https://doi.org/10.1109/tie.2016.2519325
34. Liu, Q., Wan, H. and Yu, H. (2023). Application and Influence of Big data Analysis in Marketing Strategy. *Frontiers in Business, Economics and Management*, Vol. 9, No. 3, pp168- 171
35. Mikalef, P., Boura, M., Lekakos, G., & Krogstie, J. (2019). Big data analytics and firm performance: Findings from a mixed-method approach. Journal of Business Research, 98, 261–276. https://doi.org/10.1016/j.jbusres.2019.01.044
36. Mikalef, P., Pateli, A. G., & Van De Wetering, R. (2016). IT Flexibility and Competitive Performance: The Mediating Role of IT-Enabled Dynamic Capabilities. European Conference on Information Systems.
37. Müller, O., Fay, M., & vom Brocke, J. (2018). The Effect of Big Data and Analytics on Firm Performance: An Econometric Analysis Considering Industry Characteristics. Journal of Management Information Systems, 35(2), 488–509. https://doi.org/10.1080/07421222.2018.1451955
38. Muller, V. C. (2016). Risks of artificial intelligence. Chapman and Hall/CRC, New York, United States. doi:10.1201/b19187.
39. Muller, V. C. (2020). Ethics of Artificial Intelligence and Robotics. Stanford Encyclopedia of Philosophy, 1–30, Department of Philosophy, Stanford University, Stanford, United States.
40. Odeibat, A., S. (2024). The impacts of artificial intelligence on the future of marketing and customer behaviour. *Cross-Cultural Management Journal*, XXVI (1), 19-34.
41. Okorie, G. M., Egieya, Z. E., Ikwue, U., Udeh, C. A., Adaga, E, M., DaraOjimba, O. D. & Oriekhoe, O. I. (2024). Leveraging big data for personalized marketing campaigns: A review. International Journal of Management & Entrepreneurship Research, 6(1), 216-242. https://doi.org/10.51594/ijmer.v6i1.778
42. Olatoye, F.O., Awonuga, K.F., Mhlongo, N.Z., Ibeh, C. V., Elufioye, O.A. and Ndubuisi, N.L. (2024). AI and ethics in business: A comprehensive review of responsible AI practices and corporate responsibility. International Journal of Science and Research Archive, 11(01), 1433–1443

43. Pasupuleti, M. K. (2024). Digital analytics: A real-time compass for consumer insights. Consumer Decode Unveiling the Power of Marketing Research and Digital Analytics in the Digital Age, 135-152. https://doi.org/10.62311/nesrpisbn9788196916374
44. Pitt, C. S., Bal, A. S., & Plangger, K. (2020). New approaches to psychographic consumer segmentation: Exploring fine art collectors using artificial intelligence, automated text analysis and correspondence analysis. European Journal of Marketing, 54(2), 305-326.
45. Priday, R. (2024). Samsung Galaxy S24's AI in-call translation makes talking in other languages shockingly easy — how to use Live Translate. Tomsguide. Retrieved from: https://www.tomsguide.com/phones/samsung- phones/how-to-use-live-translate-on-galaxy-s24
46. Puntoni, S., Reczek, R. W., Giesler, M., & Botti, S. (2021). Consumers and Artificial Intelligence: An Experiential Perspective. Journal of Marketing, 85(1), 131–151. doi:10.1177/0022242920953847.
47. Raguseo, E., & Vitari, C. (2018). Investments in big data analytics and firm performance: an empirical investigation of direct and mediating effects. International Journal of Production Research, 56(15), 5206–5221. https://doi.org/10.1080/00207543.2018.1427900
48. Roemer, E., Schuberth, F., & Henseler, J. (2021). HTMT2-An improved criterion for assessing discriminant validity in structural equation modelling. Industrial Management & Data Systems. doi:10.1108/IMDS-02-2021-0082
49. Sohn, K., & Kwon, O. (2020). Technology acceptance theories and factors influencing artificial Intelligence-based intelligent products. Telematics and Informatics, 47. doi:10.1016/j.tele.2019.101324.
50. Stone, M., Aravopoulou, E., Ekinci, Y., Evans, G., Hobbs, M., Labib, A., Laughlin, P., Machtynger, J. & Machtynger, L. (2020). Artificial intelligence (AI) in strategic marketing decision-making: a research agenda. The Bottom Line. ahead-of-print. 10.1108/BL-03-2020-0022.
51. Struhl, S. (2017). Artificial Intelligence Marketing and Predicting Consumer Choice: An Overview of Tools and Techniques. Kogan Page, London, United Kingdom.
52. Tosi, D., Kokaj, R. & Roccetti, M. (2024). 15 years of Big Data: a systematic literature review. *J Big Data* **11**, 73 https://doi.org/10.1186/s40537-024-00914-9
53. Vincent, A, (2024). The Power of Marketing: Data Analytics, Consumer Behaviors, and Marketing Strategies in Current Times. University Honors College. 4. https://scholars.indianastate.edu/honorsp/4
54. Walsh, J.W. (2017). How a small company used big data to increase its sales. https://www.imd.org/research-knowledge/marketing/articles/how-a-small-company-used-big-data-to-increase-its-sales/
55. Wamba, S. F., Dubey, R., Gunasekaran, A., & Akter, S. (2020). The performance effects of big data analytics and supply chain ambidexterity: The moderating effect of environmental dynamism.International Journal of Production Economics, 222, 107498.https://doi.org/10.1016/j.ijpe.2019.09.019
56. Wong, A. T.-T. (2023) "A Literature Study of Big Data Analytics in Marketing", *Journal of Economics, Management and Trade*, 29(8), pp. 1–7. doi: 10.9734/jemt/2023/v29i81110.
57. Yang, Y., See-To, E. W., & Papagiannidis, S. (2020). You have not been archiving emails for no reason! Using big data analytics to cluster B2B interest in products and services and link clusters to financial performance. Industrial Marketing Management, 86, 16–29. https://doi.org/10.1016/j.indmarman.2019.01.016
58. Yaşar, E., Demir, M., & Cobanoglu, C. (2024). Big data analytic capabilities, intrapreneurship, and service innovation behaviors: A moderated mediation model. The Service Industries Journal, 1–25. https://doi.org/10.1080/02642069.2024.2364816
59. Yoo, W. (2024). The Impact of Artificial Intelligence on Marketing Strategies. *International Journal of Science and Research Archive*, 13(01), 3211–3223
60. Yu, S. (2016). Big Privacy: Challenges and Opportunities of Privacy Study in the Age of Big Data. IEEE Access, 4, 2751–2763. https://doi.org/10.1109/access.2016.2577036
61. Yusuf, A. (2024). Leveraging Big Data and AI for Optimizing Digital Marketing Strategies: A Data-Driven Approach. *International Journal for Multidisciplinary Research (IJFMR)*, 6(6), pp1-8
62. Zhang, C., Wang, X., Cui, A. P., & Han, S. (2020). Linking big data analytical intelligence to customer relationship management performance. Industrial Marketing Management, 91, 483–494. https://doi.org/10.1016/j.indmarman.2020.10.012