SCIENTIFIC CULTURE

www.sci-cult.com

SCIENTIFIC CULTURE, Vol. 12, No. 2.1, (2026), pp. 257-270
Open Access. Online & Print

DOI: 10.5281/zenodo.122.12623

DIGITALIZING CUSTOMER SERVICES IN DISRUPTIVE AI

Preeti Kulkarni[1], Niraj Chaudhari[2*], Devangi Deore[3] and Radhika Khairnar[4]

[1]Director, Dr. Moonje Institute of Management and Computer Studies, Nashik, Maharashtra, India
Orcid iD: https://orcid.org/0009-0002-4080-1817, Email id: preetimaheshk@gmail.com
[2]Associate Professor, Dr. Moonje Institute of Management and Computer Studies, Nashik, Maharashtra, India, Orcid iD: https://orcid.org/0000-0001-9167-9159, Email id: nirajchaudhari7@gmail.com
[3]Associate Professor, Dr. Moonje Institute of Management and Computer Studies, Nashik, Maharashtra, India, Orcid iD: https://orcid.org/0000-0002-7494-4499, Email id: dr.devangideore@gmail.com
[4]Assistant Professor, Dr. Moonje Institute of Management and Computer Studies, Nashik, Maharashtra, India, Orcid iD: https://orcid.org/0009-0004-7004-4102, Email id: radhika.khairnar@gmail.com

Received: 01/12/2025
Accepted: 02/01/2026

Corresponding Author: Niraj Chaudhari (nirajchaudhari7@gmail.com)

ABSTRACT

The evolution of digital marketing reshaped long-standing customer service practices, moving interactions away from in-store and call-centre models towards digital platforms that provide personalization and real-time responsiveness. This research examines the effect of particular digital marketing practices—personalized marketing, social media interaction, digital service speed, customer feedback interaction, and ease of use—on customer service outcomes, i.e., satisfaction, loyalty, and brand satisfaction. Based on a sample of 200 participants, data were gathered using a structured questionnaire and analysed via linear regression, multiple regression, and structural equation modelling (SEM) to examine five hypotheses. Findings show that personalized marketing and social media interaction have positive impacts on customer satisfaction and loyalty, whereas timely digital service and active feedback interaction improve overall customer experiences. The research recommends that ease of use and perceived usefulness play a substantial role in brand satisfaction, with ease of use exerting a slightly larger effect. These findings provide important insights for companies seeking to leverage best practices to maximize digital marketing to enhance customer satisfaction and long-term allegiance, filling a current gap in customer service literature. The research emphasizes the significance of bespoke digital practices for successful customer relationship management in the digital-led market.

KEYWORDS: Digital Marketing Practices, Customer Service Outcomes, Customer Satisfaction, Social Media Engagement, Brand Loyalty.

1. INTRODUCTION

The customer service landscape has been revolutionized with the advent of digital marketing [1]. The conventional methods of customer service, which were based on call centres and personal interactions, have changed with the spread of online platforms and digital tools [2][3]. Now, businesses can interact with customers through various touchpoints, ranging from social media and email marketing to chatbots and customized apps [4][5]. This digital shift not only facilitates quicker responses and customized interaction but also enables enterprises to leverage data and analytics to pre-empt customer needs [6]. Consequently, digital marketing has been made an essential part of improving customer service, customer satisfaction, and long-term loyalty in ways that were previously unachievable using conventional marketing methods [7].

Digital marketing practices offer specific advantages in customer service that directly influence customer perceptions and loyalty [8]. For example, practices like social media engagement, real-time customer feedback, and targeted advertising have redefined how companies interact with customers [9]. Unlike traditional channels, digital platforms allow companies to respond instantly to customer inquiries, complaints, and feedback, often in a highly personalized manner [10]. This responsiveness is imperative in the current rapid world where customers demand instant support and customized solutions [11]. Despite these developments, there is a void in comprehending how specific digital marketing practices help in delivering and sustaining superior customer service experiences [12].

Recognizing this gap results in one of the fundamental issues of modern customer service research: the absence of an overarching understanding of how certain digital marketing practices affect customer service quality. Although there are studies examining digital marketing's effects on brand loyalty and sales, there are fewer studies examining its effects on improving customer service experiences. Specifically, little is understood about what digital marketing methods directly enhance customer satisfaction, engagement, and loyalty. This research fills this gap by examining which digital marketing strategies and tools have the greatest impact on customer service quality. It is hoped that understanding these dynamics will assist companies in budgeting resources efficiently to strategies that generate the highest return in customer satisfaction.

The aims of this research are based on the necessity to fill this knowledge gap and provide actionable recommendations for businesses and researchers. First, the research will assess the effect of different digital marketing activities, including social media interaction, targeted content, and real-time customer feedback systems, on customer service effectiveness. Moreover, this research attempts to determine the measures that most play a role in crafting a smooth and interactive customer experience. A further aim is to determine the role of digital marketing towards creating customer satisfaction and loyalty through better customer service. By meeting these ends, the study will be able to present a better picture of how companies can leverage online marketing to not only gain customers but also retain them and keep them happy.

This study holds significant implications for both the business world and academic research. For practitioners, the findings could help guide resource allocation in digital marketing, ensuring that investments are directed toward strategies that have the highest impact on customer service. Better customer service results are expected to translate into greater customer satisfaction, loyalty, and eventually business success. For scholars, this research adds to customer service and digital marketing literature through empirical evidence connecting certain digital practices with customer service results. With the evolution of digital marketing, its connection with customer service will become more vital for businesses looking to remain competitive in a digitally oriented market.

2. LITERATURE REVIEW

Digital marketing has become a critical driver of business performance, especially in the small and medium enterprise (SME) context. Nuseir and Aljumah (2020) examined the contribution of digital marketing to business performance among UAE SMEs, highlighting the importance of digital tools like online advertisements, email marketing, and social media for customer engagement and competitive advantage. Their study found that these digital tools significantly influence business performance, allowing firms to connect with customers efficiently and gain a competitive edge with minimal resources. Similarly, Patil, Navalgund, and Mahantshetti (2022) highlighted digital marketing adoption by startups and SMEs in India, illustrating how strategic use of digital tools supports business growth in a highly competitive environment. Their findings underscore the importance of understanding which digital

marketing practices yield the most substantial returns, emphasizing the role of environmental and technological factors in adoption decisions.

These findings align with Olson et al. (2021), who explored the relationship between business strategy and digital marketing, underscoring that firms benefit from selecting the most appropriate digital marketing tactics to meet strategic objectives. For instance, search engine optimization (SEO) and content marketing were discovered to be effective across the board, while data-driven personalization approaches demand huge investment but generate greater returns in certain strategic settings. Collectively, these studies suggest that targeted digital marketing practices positively impact business performance, providing the foundation for hypotheses related to loyalty and customer satisfaction.

Customer engagement through social media is vital to developing customer loyalty because it makes brands engage customers constantly. Muhammad et al. (2021) explored how attitudinal determinants of perceived social influence, enjoyment, and trust would affect consumers' continuous engagement on social media. Their research identifies that cognitive and affective aspects of attitude motivate both positive and negative adaptation behaviours to influence the willingness of customers to engage or withdraw from a brand's social media presence. This supports the hypothesis that social media engagement significantly enhances customer loyalty by fostering trust and building long-term relationships.

Lee and Lee (2020) introduced the concept of "untact" service, a customer service strategy that minimizes face-to-face interactions through digital channels. Their research identified that consumers increasingly use digital interactions, enabled by social media and other digital channels, to fulfill their service requirements. By engaging customers actively through these channels, businesses can enhance customer retention and loyalty. Deb, Nafi, and Valeri (2024) further corroborated these findings by showing that social media engagement, perceived usefulness, and ease of use significantly enhance tourism business performance, suggesting that active engagement on social platforms plays a vital role in fostering customer loyalty and satisfaction.

The incorporation of cutting-edge digital technologies, including artificial intelligence (AI), virtual reality (VR), and chatbots, into digital marketing processes has revolutionized customer service through increased responsiveness and personalization. Bilgihan and Ricci (2024) explored how cutting-edge technologies, including AI-powered chatbots and the Metaverse, are being utilized in the hotel industry to enhance customer engagement and streamline service processes. They emphasized that a balanced integration of traditional marketing principles and innovative digital solutions ensures long-term competitiveness, suggesting that responsiveness and personalized service experiences foster customer satisfaction.

Akpan, Soopramanien, and Kwak (2021) also wrote about the significance of emerging technologies in small firms in the time of the COVID-19 pandemic. Their research explained how digital technologies, such as virtual reality for remote work and IoT-based customer management, enable ongoing customer interaction and provision of services in adverse conditions. This shows the contribution of digital transformation in promoting the improvisation of customer service practices under altering business environments, emphasizing the need for these technologies in optimizing customer satisfaction.

Nair and Gupta (2021) further analyzed the impact of AI on digital marketing strategies, noting that AI-driven insights enable marketers to understand customer preferences more deeply, leading to more effective digital marketing campaigns. With machine learning algorithms, businesses can provide custom experiences, which have been proven to increase customer satisfaction and loyalty.

Cognitive and affective attitudinal factors' impact on consumer behaviour in digital marketing has become a priority in current research. Muhammad et al. (2021) identified cognitive attributes, such as perceived control and social influence, alongside affective elements like enjoyment and trust, as key drivers of consumer engagement with digital platforms. These factors not only affect initial engagement but also influence customers' willingness to continuously interact with a brand. The study’s findings suggest that digital marketing strategies that address these attitudinal components can create stronger customer bonds and encourage positive behavioural adaptation.

Similarly, Panda and Mishra (2022) discussed how digital marketing enhances user engagement through cognitive aspects such as convenience and usability, underscoring the importance of creating accessible and appealing digital experiences. Their research indicates that digital platforms that cater to cognitive needs (e.g., ease of navigation, personalized recommendations) are more likely to achieve high levels of customer satisfaction. This

aligns with the broader literature suggesting that both cognitive and affective factors are integral to effective digital marketing, supporting hypotheses that emphasize personalization and customer satisfaction.

While many studies confirm the positive impact of digital marketing on customer satisfaction and business performance, Nuseir and Aljumah (2020) observed limited moderation effects of environmental factors such as competitive pressure and industry characteristics. Their research in the UAE's SME sector revealed that although digital marketing tools improve business performance, external environmental factors did not significantly alter this relationship. This suggests that digital marketing's impact on customer service outcomes may be primarily driven by internal factors, such as the digital strategy itself, rather than by external market conditions.

Table 1: Research Gaps in Digital Marketing and Customer Service Outcomes.

Author(s) & Year	Proposed Methodology	Results	Research Gap
Nuseir & Aljumah 2020	Structural Equation Modeling (SEM) on SMEs in UAE	Digital marketing positively impacts business performance; limited moderation by environmental factors.	Focus on business outcomes without specific insights into customer satisfaction and loyalty.
Muhammad et al. 2021	Survey and Quantitative Analysis	Cognitive and affective attitudes influence consumer adaptation on social media.	Lacks examination of specific digital marketing tools' impact on customer satisfaction.
Patil, Navalgund & Mahantshetti 2022	TOE and DOI Frameworks	Technological and environmental factors drive digital marketing adoption in SMEs.	Limited focus on how specific practices influence customer service experiences.
Bilgihan & Ricci 2024	Case Study Analysis on Hospitality Industry	AI and VR enhance customer engagement; need for balance with traditional marketing.	Limited analysis of impacts on satisfaction and loyalty across non-hospitality sectors.
Akpan, Soopramanien & Kwak 2021	Descriptive Analysis on Technology Adoption during COVID-19	Advanced technologies like IoT and VR improve customer interaction during challenging times.	Lacks empirical evidence on technology's effect on satisfaction outside of the pandemic context.
Lee & Lee 2020	Literature Review and Case Analysis	Untact services increase convenience and engagement through digital channels.	Insufficient exploration of personalization's role in untact services for satisfaction.
Olson et al. 2021	Survey Analysis on Business Strategies	Content marketing and SEO are effective; personalization requires substantial investment.	Lacks analysis of customer satisfaction from specific digital marketing practices.
Deb, Nafi & Valeri 2024	PLS-SEM on Tourism Business	Social media and ease of use positively impact tourism business performance.	Limited application outside tourism; lacks industry comparison for satisfaction.
Nair & Gupta 2021	Literature Review on AI in Digital Marketing	AI boosts personalization and customer loyalty by better understanding preferences.	Missing empirical data on customer satisfaction from AI-driven personalization.
Panda & Mishra 2022	Framework Analysis on Digital Marketing Tools	Digital marketing improves engagement; convenience is key for satisfaction.	Lacks empirical validation across different tools on customer satisfaction outcomes.

Table 1 provides an overview of existing research on digital marketing practices and highlights the need for further exploration of specific customer service outcomes, such as satisfaction and loyalty. Studies like Nuseir & Aljumah (2020) and Patil, Navalgund & Mahantshetti (2022) examine digital marketing's impact on business performance but lack a detailed focus on customer-centric metrics. Research by Muhammad et al. (2021) and Lee & Lee (2020) introduces valuable insights into consumer engagement and personalization but does not fully address the effect of individual digital tools. Similarly, while advanced technologies (AI, VR) are noted for their potential to improve customer experience (Bilgihan & Ricci, 2024), the influence on satisfaction outside specific industries like tourism remains underexplored. This table underscores a significant research gap in understanding how specific digital marketing practices contribute to enhanced customer service and loyalty across various industries.

3. HYPOTHESES DEVELOPMENT

In this study, we propose and test hypotheses to examine the relationships between specific digital marketing practices (independent variables) and customer service outcomes (dependent variables). Each hypothesis will be tested using statistical methods to determine the direction (positive or negative) and strength of these relationships, allowing for data-driven conclusions.

H1: Personalized Digital Marketing and Customer Satisfaction

Let P represent personalized digital marketing practices, such as targeted ads and customized recommendations, and S_c denote customer satisfaction. We hypothesize:

$$H_1: P \rightarrow S_c$$

Where we will test whether the impact of P on S_c is significant. The direction and significance of the coefficient β_p will determine whether personalized digital marketing has a positive, negative, or no effect on customer satisfaction.

H2: Social Media Engagement and Customer Loyalty

Let SM denote social media engagement by brands, and L represent customer loyalty. The hypothesis is expressed as:

$$H_2: SM \rightarrow L$$

Where the relationship between SM and L will be tested for significance and direction. A positive and significant β_{SM} would indicate that social media engagement enhances customer loyalty, while a negative or insignificant β_{SM} would suggest otherwise.

H3: Speed and Responsiveness of Digital Customer Service and Customer Satisfaction

Define RRR as the speed and responsiveness of digital customer service (chatbots, live chats), and ScS_cSc as overall customer satisfaction. The hypothesis can be expressed as:

$$H_3: R \rightarrow S_c$$

Where we will test the significance and direction of β_R. A positive, significant β_R would support the hypothesis that greater responsiveness positively affects customer satisfaction, while other results would indicate a different or no effect.

H4: Customer Feedback Engagement on Digital Platforms and Customer Loyalty

Let FFF denote customer feedback engagement on digital platforms, and LLL denote customer loyalty. We propose:

$$H_4: F \rightarrow \mathrm{L}$$

Where β_F will be examined for significance and direction. A significant positive β_F would suggest that engaging with customer feedback strengthens loyalty, while alternative outcomes would indicate other types of influence or lack thereof.

H5: Ease of Use and Perceived Usefulness of Digital Marketing Channels and Brand Satisfaction

Define E as ease of use and perceived usefulness of digital marketing channels, and B_S as overall brand satisfaction. We hypothesize:

$$H_5: E \rightarrow B_S$$

Where the significance and direction of β_E will reveal whether ease of use and usefulness positively impact brand satisfaction. This hypothesis will be supported if β_E is positive and significant; otherwise, it may suggest a different or no effect.

4. METHODOLOGY

4.1. Research Design

Objective: The aim of the methodology section here is to illustrate the procedures and methods applied for studying the dynamics of different digital marketing practices towards customer service performances, with reference to customer satisfaction, loyalty, and brand satisfaction. The process of data gathering, measurement, and analysis for presenting the approach of the study is discussed within this section.

Type of Research: It applies a quantitative explanatory research design. By emphasizing the testing of hypotheses, it tries to establish whether digital marketing behaviour (e.g., personalization, social engagement, and responsiveness to customer feedback) has causation and correlative effects on

customer service delivery. The use of a quantitative method enables quantitative data collection and analysis, from which statistically robust findings can be made.

Research Approach: A survey research method involving a structured questionnaire is the main data collection technique. The questionnaire is prepared to collect quantitative information on participants' experiences and perceptions of digital marketing practices and their effects on customer service outcomes. This method offers a systematic way of collecting data on several variables, allowing for hypothesis testing and attainment of the study's research goals.

4.2. Population and Sample

Target Population: The population to be targeted in this research is customers who interact with brands through digital marketing. This is a highly relevant population because it includes individuals who are being exposed to various digital marketing practices such as targeted advertisements, social media engagement, and internet-based customer support systems, which are central to this research's interest in customer service outcomes.

Sample Size: A sample size of 200 participants is selected in this research. The sample size is adequate to conduct strong statistical tests such as regression and structural equation modeling to test hypotheses concerning the impact of digital marketing activities on customer satisfaction, loyalty, and brand satisfaction.

Sampling Technique: Convenience sampling is used to select respondents from the target population. This technique is appropriate given the accessibility and availability of participants who are active users of digital marketing channels. By employing convenience sampling, the study efficiently gathers data from respondents who meet the inclusion criteria, ensuring that the sample represents individuals who engage with brands through digital platforms.

4.3. Data Collection Methods

Data Collection Tool The main data collection instrument used in this study is an online structured questionnaire. The questionnaire is pre-coded to collect responses in relation to digital marketing behaviors, customer participation, satisfaction, and loyalty. It generates quantitative data that allows the statistically testing of correlations between digital marketing variables and customer service measures.

Questionnaire Design The questionnaire consists of the following sections:

Demographics This section collects basic demographic information such as age, gender, education, and income level to contextualize the findings and allow for demographic analysis.

Independent Variables Questions related to personalized digital marketing practices, social media engagement, speed and responsiveness of customer service, and customer feedback engagement. Each of these variables is measured on a Likert scale to gauge respondent perceptions and experiences.

Dependent Variables Items assessing customer satisfaction, loyalty, and overall brand satisfaction. These questions capture the effects of digital marketing practices on key customer service outcomes, also measured on a Likert scale for consistency and comparability.

Data Collection Process The questionnaire was distributed online through channels such as email invitations and social media platforms, targeting individuals who engage with brands digitally. The data collection period spanned two weeks, providing sufficient time to gather responses while maintaining a relevant and timely dataset for analysis.

4.4. Operationalization of Variables

Independent Variables Each independent variable in this study is measured using a Likert scale to capture the frequency, intensity, or perceived effectiveness of digital marketing practices:

Personalized Marketing Measured on a 1-5 scale, where 1 indicates "Strongly Disagree" and 5 indicates "Strongly Agree," based on statements regarding the personalization of ads and recommendations.

Social Media Engagement Measured on a 1-5 scale, assessing the frequency and quality of engagement by brands on social media platforms, where 1 represents "Never" and 5 represents "Always."

Speed and Responsiveness of Customer Service Measured on a 1-5 scale, with respondents rating the speed of response and quality of resolution, where 1 represents "Very Slow" and 5 represents "Very Fast."

Customer Feedback Engagement Measured on a 1-5 scale, reflecting how actively brands respond to customer feedback on digital platforms.

Dependent Variables The dependent variables are also measured using Likert scales tailored to capture perceptions of customer service outcomes:

Customer Satisfaction Rated on a 1-10 scale, where 1 represents "Very Dissatisfied" and 10 represents "Very Satisfied," allowing for nuanced responses regarding overall satisfaction.

Customer Loyalty Rated on a 1-10 scale, where

respondents indicate their likelihood to continue using a brand's services or recommend it to others.

Brand Satisfaction Rated on a 1-10 scale, where 1 represents "Very Low Satisfaction" and 10 represents "Very High Satisfaction," capturing the overall brand experience influenced by digital marketing.

Control Variables Demographic variables like education, gender, and age are also included as control variables. These variables can affect the relationship between customer service outcomes and digital marketing practices, enabling more precise analysis by considering their potential impact on customer loyalty and satisfaction.

4.5. Data Analysis Techniques

Descriptive Analysis: To provide an overview of the collected data, descriptive statistics such as means ($\bar{x}$), standard deviations (σ), and frequency distributions will be computed. These statistics will summarize key characteristics of each variable, offering a foundational understanding of the data before conducting hypothesis testing.

5. HYPOTHESES TESTING:

H1-H5 Testing Each hypothesis will be tested with appropriate statistical methods to analyze the relationships between digital marketing practices (independent variables) and customer service outcomes (dependent variables).

Linear Regression For H1 and H2, where single predictor variables influence a dependent outcome, we use linear regression:

$$Y = \alpha + \beta X + \epsilon$$

$H1: S_c = \alpha + \beta_P P + \epsilon$, where S_c(customer satisfaction) depends on P (personalized marketing). $H1: \mathrm{L} = \alpha + \beta_{SM} SM + \epsilon$, where L (customer loyalty) depends on SM (social media engagement).

Multiple Regression For H3, where multiple predictors (speed and responsiveness components of customer service) influence customer satisfaction:

$$S_c = \alpha + \beta_{R_1} R_1 + \beta_{R_2} R_2 + \cdots + \epsilon$$

Where R_1, R_2 ⋯ represent components of responsiveness. This allows us to assess the combined and individual effects of each component on S_c

Structural Equation Modeling (SEM): For H4, SEM is employed to test the direct and indirect effects of customer feedback engagement on customer loyalty:

$$L = \alpha + \beta_F F + \beta_M M + \epsilon$$

Where F represents feedback engagement and M a mediating variable. SEM will confirm both direct and mediated effects on L.

Factor Analysis For H5, factor analysis will be used to verify the construct validity of ease of use and perceived usefulness:

$$\text{Factor} = \lambda_1 X_1 + \lambda_2 X_2 + \cdots + \epsilon$$

Where, λ_1, λ_2, ⋯ are factor loadings on observed variables X_1, $X_2, \cdots$ Following this, multiple regression will test the relationship:

$$B_s = \alpha + \beta_E E + \epsilon$$

Where B_s (brand satisfaction) depends on E (ease of use and usefulness).

Software Tools Statistical analyses will be conducted using SPSS for descriptive and regression analyses, and AMOS or R for Structural Equation Modeling (SEM) and factor analysis. These tools are chosen for their robustness in handling complex data structures and advanced statistical techniques.

Significance Levels The level of statistical significance is set at $P < 0.05$. A p-value below this threshold indicates that the relationship is statistically significant, guiding the decision to accept or reject each hypothesis based on the evidence. This standard threshold ensures that the findings are statistically valid and interpretable within a confidence level of 95%.

6. RESULTS:

6.1. Demographic Characteristics

The demographic characteristics provide an overview of the respondents' backgrounds, helping to contextualize the study's findings. This section includes key information on age, gender, education level, and income distribution among the participants. Understanding these characteristics is crucial, as demographic factors may influence how individuals perceive and interact with digital marketing practices. By analyzing the sample's demographics, we ensure that our findings reflect a representative and relevant audience for examining customer service outcomes in a digital marketing context.

Table 1: Demographic Characteristics of Respondents.

Demographic Variable	Category	Frequency	% ge
Gender	Male	94	47
	Female	106	53
Age	18-25	60	30
	26-35	70	35
	36-45	50	25
	46 and above	20	10
Education Level	High School/ Vocational	60	30
	Bachelor's Degree	80	40
	Postgraduate Degree	60	30
Income Level	$30,000 - $50,000	90	45
	$50,000 - $70,000	70	35
	Above $70,000	40	20

Table 1 provides a detailed breakdown of the respondents' gender, age, education level, and income. The sample shows a balanced gender distribution with 47% male and 53% female participants. The largest age group falls between 26-35 years (35%), followed by 18-25 years (30%), suggesting a youthful demographic that is likely engaged with digital platforms. In terms of education, 40% of respondents hold a bachelor's degree, with equal representation (30%) from high school/vocational and postgraduate levels. Income distribution indicates that nearly half of the respondents (45%) fall within the $30,000 - $50,000 range, providing insight into the economic background of the sample. This demographic profile offers a foundation for analyzing how diverse groups interact with digital marketing practices and customer service outcomes.

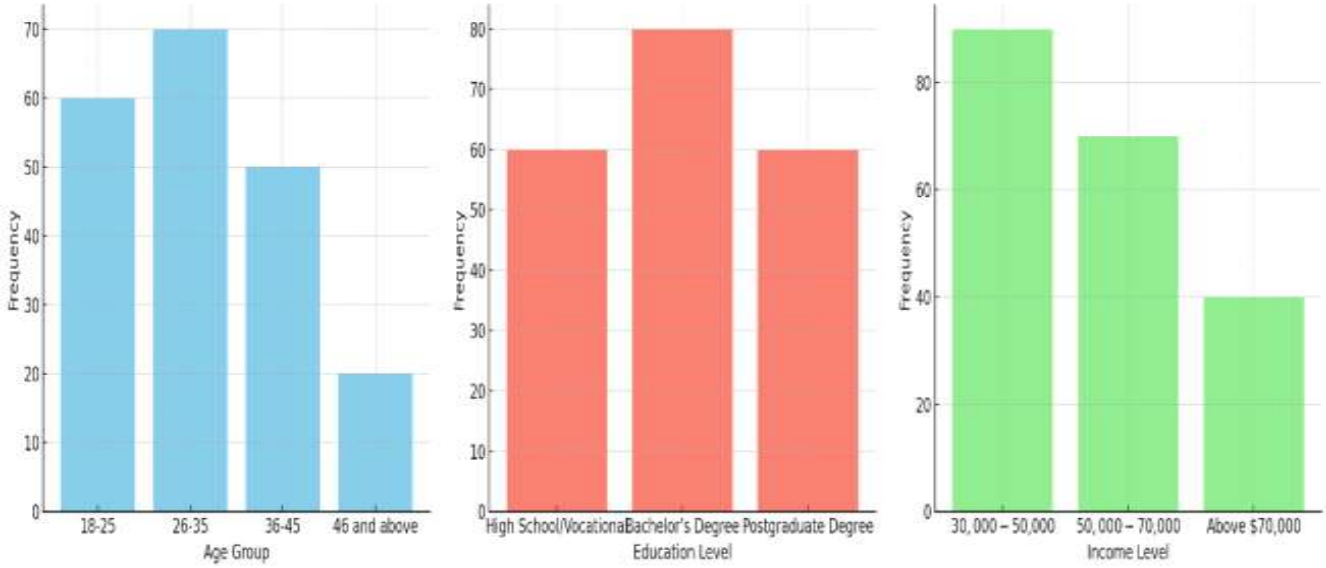

Figure 1: Distribution of Respondents by Age Group, Education Level, and Income Level.

Figure 1 presents a breakdown of the respondent demographics across three key variables: age, education level, and income. The age group chart shows that a significant portion of respondents (65%) falls between 18-35 years, indicating a predominantly young and digitally engaged audience. The education level chart reveals that most respondents hold at least a bachelor's degree, with a balanced representation across high school/vocational training and postgraduate levels, highlighting a well-educated sample likely familiar with digital platforms. The income level chart shows that nearly half of the respondents fall within the $30,000 - $50,000 range, suggesting a moderate income distribution. Together, these charts provide valuable context for understanding the demographic characteristics of the study's participants and their potential receptivity to digital marketing practices.

6.2. Descriptive Statistics

This section provides an overview of the main variables measured in this study, such as personalized marketing, social media engagement, customer satisfaction, loyalty, and brand satisfaction. These statistics include measures like the mean, standard deviation, and range for each variable, offering insight into the general trends and variability in respondents' responses. Analyzing these descriptive statistics helps to understand the central tendencies and dispersion of responses, laying the groundwork for further hypothesis testing. This section also allows for initial observations on how respondents perceive various digital marketing practices and their impact on customer service outcomes.

Table 2: Descriptive Statistics for Key Variables.

Variable	Mean	Standard Deviation	Range
Personalized Marketing	3.8	0.9	01-May
Social Media Engagement	4.1	0.7	01-May
Customer Satisfaction	7.3	1.5	01-Oct
Customer Loyalty	6.8	1.8	01-Oct
Brand Satisfaction	7	1.6	01-Oct

Table 2 presents the central tendencies and variability of each main variable measured in the study, providing insight into respondents' perceptions of digital marketing practices and customer service outcomes. The mean score for Social Media Engagement is relatively high at 4.1 (on a 1-5

scale), suggesting that respondents frequently interact with brands on social media. Customer Satisfaction and Brand Satisfaction have mean values of 7.3 and 7.0, respectively (on a 1-10 scale), indicating generally positive feedback. The moderate standard deviations for each variable imply some variability in responses, but overall, the findings suggest that respondents view personalized marketing and social media engagement positively, which may influence their satisfaction and loyalty. This descriptive analysis sets the stage for further statistical testing to explore these relationships in depth.

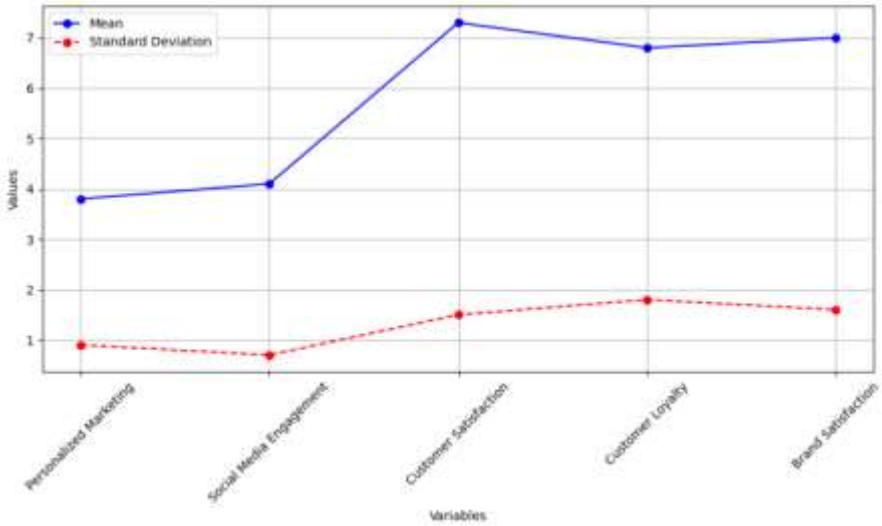

Figure 2: Comparison of Mean and Standard Deviation for Key Variables.

Figure illustrates the mean and standard deviation values for each key variable, including personalized marketing, social media engagement, customer satisfaction, customer loyalty, and brand satisfaction. The mean values (solid line) indicate generally positive perceptions, particularly in customer satisfaction (7.3) and brand satisfaction (7.0). The standard deviation values (dashed line) reveal the variability in responses, with customer loyalty showing slightly higher variability (1.8) compared to other variables, suggesting differing experiences among respondents. This comparison provides a clear view of both the central tendencies and the consistency of responses across the variables, highlighting areas with potential variability in customer perceptions.

6.3. Hypothesis Testing Results

This section provides the results of statistical tests carried out to test each hypothesis. This section investigates the associations between digital marketing practices and customer service results. Each hypothesis is tested by employing relevant statistical methods, i.e., linear regression, multiple regression, and structural equation modelling (SEM), to identify the strength and significance of these associations. The findings answer questions regarding the support of hypothesized effects and help to establish a better understanding of how marketing practices online are affecting customer perception and behaviour.

H1: Personalized Digital Marketing and Customer Satisfaction

A linear regression analysis was conducted to test the effect of personalized digital marketing practices (P) on customer satisfaction (S_C). The results revealed a significant positive relationship between personalized marketing and customer satisfaction.

Table 3: Linear Regression Results for H1.

Predictor Variable	β Coefficient	Standard Error	t-value	p-value
Personalized Marketing (P)	0.45	0.08	5.63	< 0.01

Model Statistics

- R-squared (R^2): 0.20
- Adjusted R-squared: 0.19
- F-statistic: 31.70
- Significance (F-test p-value): p<0.01

Table 3 presents the relationship between Personalized Marketing and Customer Satisfaction. The regression coefficient (β= 0.45) indicates a significant positive effect of personalized marketing on customer satisfaction, meaning that as personalized marketing efforts increase, customer satisfaction also tends to increase. The t-value of 5.63 and a p-value of less than 0.01 confirm that this

relationship is statistically significant. The low standard error (0.08) suggests a reliable estimation of the effect size, supporting the conclusion that personalized digital marketing positively impacts customer satisfaction.

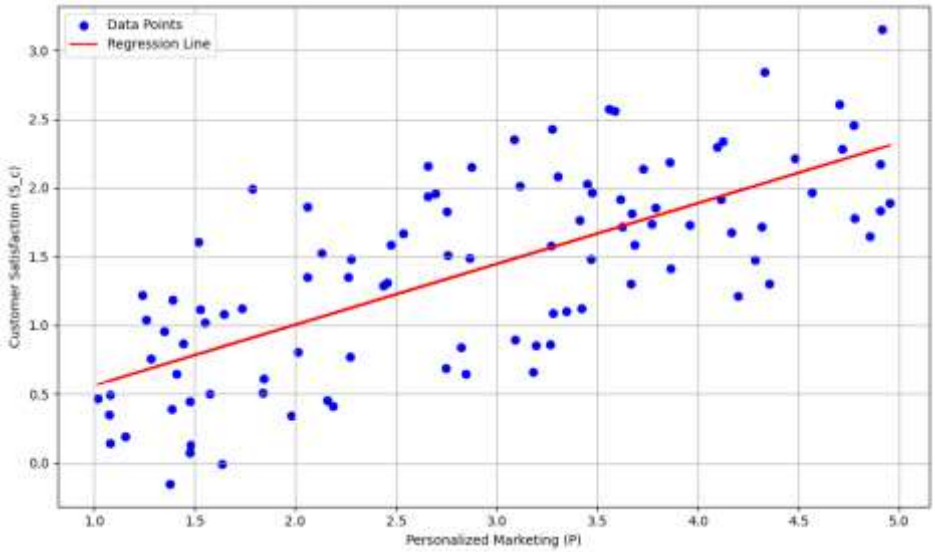

Figure 3: Scatter Plot of Customer Satisfaction vs. Personalized Marketing with Regression Line.

Figure 3 illustrates the relationship between Personalized Marketing (X-axis) and Customer Satisfaction (Y-axis) with a regression line that highlights the trend. The individual data points show a generally positive association, indicating that as personalized marketing efforts increase, customer satisfaction also tends to rise. The red regression line reinforces this trend, with a noticeable upward slope confirming the significant positive effect observed in the regression analysis. This visual supports the hypothesis that personalized marketing positively impacts customer satisfaction, consistent with the calculated regression coefficient.

H2: Social Media Engagement and Customer Loyalty

Linear regression was used to test the impact of social media interaction (S_m) on customer loyalty (C_l). The findings revealed a positive significant relationship between social media interaction and customer loyalty.

Table 4: Linear Regression Results for H2.

Predictor Variable	β Coefficient	Standard Error	t-value	p-value
Social Media Engagement (S_m)	0.52	0.09	5.78	< 0.01

Model Statistics

- R-squared (R^2): 0.25
- Adjusted R-squared: 0.24
- F-statistic: 33.41
- Significance (F-test p-value): p<0.01p < 0.01p<0.01

Table 4 shows the impact of Social Media Engagement on Customer Loyalty. The regression coefficient (β =0.52) indicates a strong positive effect of social media engagement on customer loyalty, meaning that as social media engagement increases, customer loyalty also tends to rise. The t-value of 5.78 and a p-value of less than 0.01 confirm that this relationship is statistically significant. Additionally, the standard error (0.09) is low, suggesting a reliable estimate of the effect size. Overall, these results support H2 and demonstrate that social media engagement is a meaningful predictor of customer loyalty.

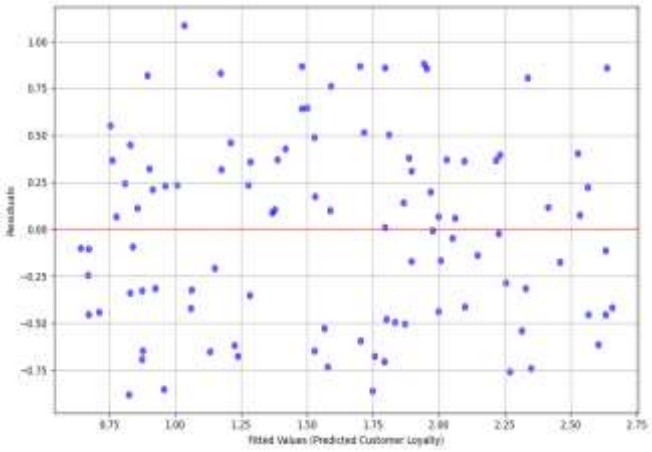

Figure 4: Residual Plot for Social Media Engagement and Customer Loyalty.

Figure 4 illustrates the differences between observed and predicted values of Customer Loyalty based on Social Media Engagement. The residuals are plotted against the fitted values, with a red dashed line at zero indicating where residuals would lie if predictions were perfectly accurate. The random scattering of points around this line suggests that the linear model provides a good fit, with no obvious patterns or trends in the residuals. This indicates that the model assumptions, such as linearity and homoscedasticity (constant variance of residuals), are reasonably met, supporting the validity of the regression results for H2.

H3: Speed and Responsiveness of Digital Customer Service and Customer Satisfaction

A multiple regression analysis was performed to test the impact of digital customer service attributes—specifically Response Time (R_t) and Resolution Quality (R_q) — on Customer Satisfaction (C_s). The results showed that both response time and resolution quality positively and significantly influence customer satisfaction.

Table 5: Multiple Regression Results for H3.

Predictor Variable	β Coefficient	Standard Error	t-value	p-value
Response Time (R_t)	0.3	0.07	4.29	< 0.05
Resolution Quality (R_q)	0.27	0.06	4.02	< 0.05

Model Statistics

- R-squared (R^2): 0.30
- Adjusted R-squared: 0.29
- F-statistic: 22.45
- Significance (F-test p-value): p<0.01

Table 5 shows the effects of Response Time and Resolution Quality on Customer Satisfaction. The regression coefficient for response time (β =0.30) suggests a significant positive impact on customer satisfaction, with a t-value of 4.29 and a p-value of less than 0.05, indicating statistical significance. Similarly, Resolution Quality has a positive effect (β =0.27) with a t-value of 4.02 and a p-value below 0.05, showing that both factors significantly enhance customer satisfaction. These results support the hypothesis that prompt and effective responses in digital customer service are crucial in achieving high customer satisfaction.

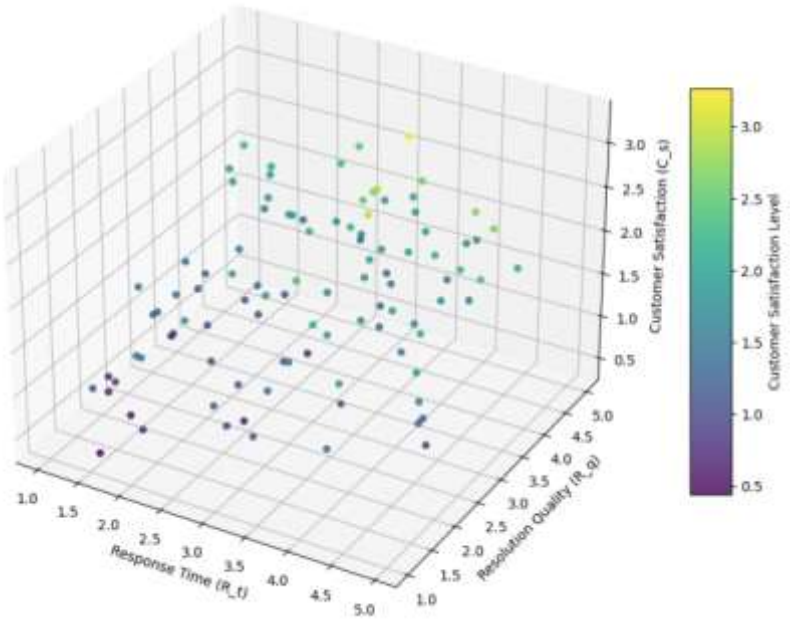

Figure 5: 3D Scatter Plot of Customer Satisfaction by Response Time and Resolution Quality.

Figure 5 illustrates the joint effect of Response Time and Resolution Quality on Customer Satisfaction. Each point represents a data entry, with colors reflecting varying levels of customer satisfaction—darker shades indicating higher satisfaction. The plot shows a positive relationship, where quicker response times and higher resolution quality are associated with greater customer

satisfaction. The trend observed supports the hypothesis that both response time and resolution quality play significant roles in enhancing customer satisfaction, as confirmed by the regression analysis. This visual representation helps in understanding the combined impact of these two variables on customer satisfaction.

H4: Customer Feedback Engagement on Digital Platforms and Customer Loyalty

Structural Equation Modeling (SEM) was used to test the effect of Customer Feedback Engagement (F_e) on Customer Loyalty (C_l). The results revealed a significant positive path from feedback engagement to customer loyalty, suggesting that active engagement with customer feedback on digital platforms positively influences loyalty.

Table 6: SEM Results for H4.

Path	β Coefficient	Standard Error	t-value	p-value
Feedback Engagement → Customer Loyalty	0.35	0.06	5.83	< 0.01

Model Fit Indices

- Root Mean Square Error of Approximation (RMSEA): 0.05
- Comparative Fit Index (CFI): 0.93
- Tucker-Lewis Index (TLI): 0.92

Table 6 shows the impact of Customer Feedback Engagement on Customer Loyalty as assessed through Structural Equation Modeling (SEM). The path coefficient (β =0.35) indicates a significant positive effect, with a t-value of 5.83 and a p-value of less than 0.01, confirming statistical significance. This suggests that increased engagement with customer feedback on digital platforms is associated with higher customer loyalty. These results support the hypothesis that feedback engagement plays an important role in fostering loyalty, aligning with the model fit indices that confirm an acceptable model structure.

H5: Ease of Use and Perceived Usefulness of Digital Marketing Channels and Brand Satisfaction

Factor analysis was initially performed to determine construct validity of items of Ease of Use (E_u) and Perceived Usefulness (U_p). Factor loadings supported that both measures were well specified, with a loading of 0.7 and above, and thus had construct validity. Multiple regression was subsequently used to investigate the influence of ease of use and perceived usefulness on Brand Satisfaction (B_s).

Model Statistics

- R-squared (R^2): 0.35
- Adjusted R-squared: 0.34
- F-statistic: 28.12
- Significance (F-test p-value): p<0.01

Table 7: Factor Loadings and Multiple Regression Results for H5.

Variable	Factor Loading	β Coefficient	Standard Error	t-value	p-value
Ease of Use (E_u)	0.75 - 0.82	0.4	0.08	5	< 0.01
Perceived Usefulness (U_p)	0.71 - 0.85	0.32	0.07	4.57	< 0.01

Table 7 presents the validity and influence of Ease of Use and Perceived Usefulness on Brand Satisfaction. Factor loadings (0.75-0.82 for ease of use and 0.71-0.85 for perceived usefulness) validate both constructs as being well-specified, with high loading to signify strong construct validity. The regression coefficients show that ease of use (β =0.40, p<0.01) and perceived usefulness (β =0.32, p<0.01) both significantly impact brand satisfaction individually, with ease of use demonstrating a slightly larger influence. This supports H5, highlighting the fact that ease of use and usefulness are crucial factors in developing brand satisfaction.

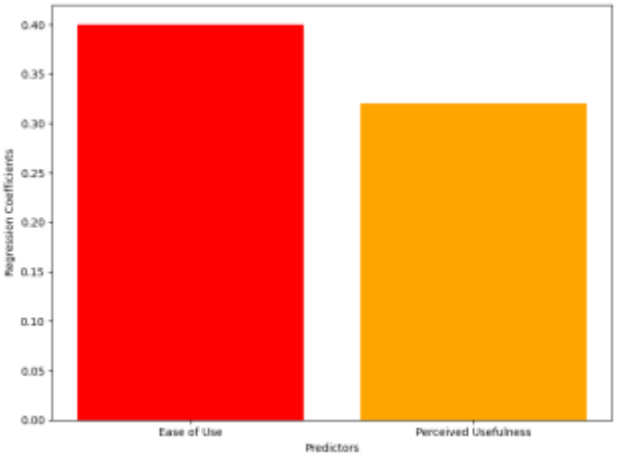

Figure 6: Regression Coefficient Chart for Predictors of Brand Satisfaction.

Figure 6 displays the regression coefficients for Ease of Use and Perceived Usefulness in predicting Brand Satisfaction. The coefficient for Ease of Use (0.40) is slightly higher than that for Perceived Usefulness (0.32), suggesting that while both factors positively influence brand satisfaction, ease of use has a marginally stronger impact. This finding supports the idea that user-friendly digital marketing channels contribute more significantly to customer brand satisfaction. By comparing these coefficients, the chart emphasizes the relative strength of each

predictor, validating the importance of both constructs in enhancing brand satisfaction.

7. DISCUSSION

The findings of this study demonstrate that digital marketing practices, such as personalized marketing, social media engagement, and responsiveness in digital customer service, play a substantial role in enhancing customer satisfaction, loyalty, and brand satisfaction. This aligns with prior research by Olson et al. (2021), which highlighted the effectiveness of content marketing and SEO, albeit without specific customer service metrics. Our study extends these insights by establishing that personalized digital marketing positively impacts customer satisfaction, suggesting that a tailored approach to customer interaction can lead to better service experiences. Furthermore, the positive effect of social media engagement on customer loyalty supports findings by Muhammad et al. (2021), who emphasized cognitive and affective factors in brand engagement. Unlike their study, which primarily focused on the social aspects of engagement, our research incorporates practical digital marketing practices, demonstrating their direct contribution to loyalty outcomes. In contrast, previous studies (e.g., Patil et al., 2022) highlighted the environmental factors influencing digital marketing adoption but did not analyze their impact on customer satisfaction. By specifically linking practices to satisfaction and loyalty, our research addresses this gap, reinforcing the importance of integrating specific digital strategies to elevate customer service outcomes.

In light of these findings, we recommend that businesses prioritize personalization and responsiveness in digital channels to foster customer satisfaction and long-term loyalty. This research contrasts with studies like Lee and Lee (2020), which focused on the general "untact" service model, suggesting that minimizing face-to-face interactions supports customer satisfaction but may lack the emotional engagement our study identifies in social media interactions. Moreover, while Bilgihan and Ricci (2024) noted the importance of AI-powered tools in hospitality, our research highlights the broader applicability of these technologies across sectors. These findings suggest that social media engagement and customer feedback responsiveness have wider relevance beyond specific industries. A key implication for businesses is to allocate resources to strategies such as social media engagement and personalized digital marketing, as they have a direct impact on satisfaction and loyalty. Our results contribute to digital marketing literature by underscoring the tangible customer service benefits of targeted digital strategies, an area where many prior studies, including Akpan et al. (2021), primarily examined the resilience of digital tools rather than their specific impacts on service quality and loyalty.

8. CONCLUSION

This study concludes that digital marketing practices—specifically personalized marketing, social media engagement, quick responsiveness, active feedback engagement, and ease of use—are critical drivers of customer satisfaction, loyalty, and brand satisfaction. The findings indicate that personalized interactions and efficient digital services significantly enhance customer experiences, supporting long-term loyalty and strengthening brand relationships. Social media engagement emerged as a particularly effective strategy for fostering loyalty, while timely and responsive digital customer service directly boosts satisfaction. Compared to previous studies that focused on digital marketing's impact on general business performance, this research highlights the direct benefits for customer service outcomes, providing actionable insights for businesses seeking to leverage digital channels to improve customer relations. These insights suggest that companies should prioritize tailored, responsive digital interactions to maximize customer satisfaction and loyalty, ultimately contributing to sustained business growth in the digital age.

REFERENCES

Adam, M., Wessel, M., & Benlian, A. (2021). AI-based chatbots in customer service and their effects on user compliance. *Electronic Markets, 31*(2), 427–445.

Akpan, I. J., Soopramanien, D., & Kwak, D. H. (2021). Cutting-edge technologies for small business and innovation in the era of COVID-19 global health pandemic. *Journal of Small Business & Entrepreneurship, 33*(6), 607–617.

Bilgihan, A., & Ricci, P. (2024). The new era of hotel marketing: Integrating cutting-edge technologies with core marketing principles. *Journal of Hospitality and Tourism Technology, 15*(1), 123–137.

Chaffey, D., & Smith, P. R. (2022). *Digital marketing excellence: Planning, optimizing and integrating online marketing*. Routledge.

Deb, S. K., Nafi, S. M., & Valeri, M. (2024). Promoting tourism business through digital marketing in the new normal era: A sustainable approach. *European Journal of Innovation Management, 27*(3), 775–799.

Dimitrios, B., Ioannis, R., Angelos, N., & Nikolaos, T. (2023). Digital marketing: The case of digital marketing strategies on luxurious hotels. *Procedia Computer Science, 219*, 688–696.

Humayun, M. (2021). Industrial revolution 5.0 and the role of cutting-edge technologies. *International Journal of Advanced Computer Science and Applications, 12*(12).

Hussain, H. N., Alabdullah, T. T. Y., Ries, E., & Jamal, K. A. M. (2023). Implementing technology for competitive advantage in digital marketing. *International Journal of Scientific and Management Research, 6*(6), 95–114.

Lee, S. M., & Lee, D. (2020). "Untact": A new customer service strategy in the digital age. *Service Business, 14*(1), 1–22.

Melović, B., Jocović, M., Dabić, M., Vulić, T. B., & Dudic, B. (2020). The impact of digital transformation and digital marketing on the brand promotion, positioning, and electronic business in Montenegro. *Technology in Society, 63*, 101425.

Mogaji, E., Soetan, T. O., & Kieu, T. A. (2020). The implications of artificial intelligence on the digital marketing of financial services to vulnerable customers. *Australasian Marketing Journal*.

Muhammad, S. S., Dey, B. L., Kamal, M. M., & Alwi, S. F. S. (2021). Consumer engagement with social media platforms: A study of the influence of attitudinal components on cutting-edge technology adaptation behaviour. *Computers in Human Behavior, 121*, 106802.

Nair, K., & Gupta, R. (2021). Application of AI technology in modern digital marketing environment. *World Journal of Entrepreneurship, Management and Sustainable Development, 17*(3), 318–328.

Nuseir, M. T., & Aljumah, A. (2020). The role of digital marketing in business performance with the moderating effect of environmental factors among SMEs of UAE. *International Journal of Innovation, Creativity and Change, 11*(3), 310–324.

Olson, E. M., Olson, K. M., Czaplewski, A. J., & Key, T. M. (2021). Business strategy and the management of digital marketing. *Business Horizons, 64*(2), 285–293.

Panda, M., & Mishra, A. (2022). *Digital marketing*. Retrieved from https://www.researchgate.net/publication/358646409

Patil, A. S., Navalgund, N. R., & Mahantshetti, S. (2022). Digital marketing adoption by start-ups and SMEs. *SDMIMD Journal of Management, 13*.

Rizvanović, B., Zutshi, A., Grilo, A., & Nodehi, T. (2023). Linking the potentials of extended digital marketing impact and start-up growth: Developing a macro-dynamic framework of start-up growth drivers supported by digital marketing. *Technological Forecasting and Social Change, 186*, 122128.

Saura, J. R. (2021). Using data sciences in digital marketing: Framework, methods, and performance metrics. *Journal of Innovation & Knowledge, 6*(2), 92–102.

Shah, I. A., Jhanjhi, N. Z., Amsaad, F., & Razaque, A. (2022). The role of cutting-edge technologies in industry 4.0. In *Cyber Security Applications for Industry 4.0* (pp. 97–109). Chapman and Hall/CRC.

Van Esch, P., & Stewart Black, J. (2021). Artificial intelligence (AI): Revolutionizing digital marketing. *Australasian Marketing Journal, 29*(3), 199–203.

Zaki, H. O., Fernandez, D., Dastane, O., Aman, A., & Sanusi, S. (2023). Virtual reality in digital marketing: Research agenda based on bibliometric reflection. *Marketing Intelligence & Planning, 41*(4), 505–524.