Ai-Powered Sentiment Analysis for Brand Reputation Management

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***Abstract*—Over the years, digital communication and social media have taken over the way organizations gauge opinion and manage the brand reputation. Artificial Intelligence (AI)powered sentiment analysis has emerged as an effective tool for analyzing unstructured customer-generated content in large volumes. Businesses utilize it to identify consumer sentiments, respond to consumer feedback on time, and make strategic decisions. "This study examines the use of sentiment analytics for brand reputation through a mixed method research design." Using a structured questionnaire, primary data was collected from 250 respondents measuring perception of AI powered sentiment analysis and brand reputation management. Additionally, AI-based sentiment analysis of 500–1,000 publicly accessible online customer reviews were conducted to categorize customer opinions as positive, neutral, or negative. The survey data were analyzed using descriptive statistics, Pearson correlation and simple linear regression. Meanwhile, the sentiment generated by AI was compared with the respondents' impressions. The results show a significant positive link between AI-based sentiment analysis and brand reputation management. In turn, AI makes identifying customer sentiments more precise; monitoring feedback more dynamic; and taking organizations' proactive responses against emerging reputation issues easier. Study highlights that through AI-powered sentiment analysis, brands can leverage insights generated by consumers at scale in order to enhance trust, public image and sustainable reputation.**

***Index Terms*—Artificial Intelligence (AI), Sentiment Analysis, Brand Reputation Management, Customer Sentiment, Natural Language Processing (NLP), Social Media Analytics, Consumer Perception, Online Reviews, Brand Image, Digital Marketing.**

I. INTRODUCTION

Consumers are using digital platforms more than ever before to interact with brands. Social networking sites, online review sites, discussion forums and e-commerce sites are the primary parts in customer opinion where one can share experiences and influence others on a global scale through feedback. Organizations have to monitor mounting unstructured textual data to decode customer requirements, identify problems before they escalate, and protect the brand reputation in an increasingly competitive marketplace. Artificial Intelligence (AI) enables organizations to process large quantities of customer-generated content faster and more accurately than humans with its capacity for automating a range of customer interactions. Sentiment analysis, which refers to NLP technique that classifies opinions as positive, neutral or negative, is one of its most useful applications. Artificial intelligence-powered sentiment analysis extracts customer sentiments from online product reviews, social media posts, and digital customer feedback. These sentiments provide insights into consumer attitudes and behavior patterns.

Brand reputation is a strategic asset that effects firms in gaining customer trust, loyalty, and market competitiveness for the long run.

When your business enjoys a positive reputation, it can strengthen customer relationships and enhance the value of your brand. On the other hand, negative talks about your brand online can dent public perception quickly if they are not identified and resolved quickly. As a result, organizations are employing AI-powered sentiment analysis to their Digital Marketing and CRM strategies to monitor public opinion, detect risks to the brand and make timely decisions. The studies on applications of AI, sentiment analysis and brand reputation have been extensively researched but none have really delved into the focus of the present research which is AI-enabled sentiment analysis as a strategic tool for brand reputation management. Apart from that, there are few studies which assess this

relationship by using consumer perceptions and AI-generated sentiment. Filling this gap is important for understanding how AI-supported technologies can help organizations sustain a good brand image in the contemporary digital scenario.

In light of this, the present study employs a mixed-method research approach to investigate the role of AI-powered sentiment analysis in brand reputation management. The paper utilizes survey-based evidence on consumers with an AI-based analysis of online consumer reviews to investigate the interplay between AI-based-sentiment analytics and brand reputation management. The research findings are expected to contribute to the body of knowledge in artificial intelligence, digital marketing, and reputation management, while also providing practical contributions for organizations looking to utilize AI technologies for sustainable brand development.

II. REVIEW OF LITERATURE

Olukemi, Ayoolu and Bell, Chris and Broklyn, Peter, (2024). This study investigates the use of sentiment analysis inside social media to enhance brand reputation management. Sentiment analysis, a branch of natural language processing (NLP), entails assessing the emotional undertone of online conversations and viewpoints. Utilising machine learning algorithms and natural language processing methods, marketers may scrutinise extensive social media data to assess public opinion, recognise nascent patterns, and uncover possible problems prior to their escalation. This research evaluates contemporary techniques in sentiment analysis, including both supervised and unsupervised learning methods, and examines their efficacy in deriving actionable insights from social media data. Furthermore, it explores case studies in which sentiment analysis has been effectively used to improve brand reputation, resolve consumer issues, and customise marketing approaches. The results underscore the need of ongoing observation and adjustment to ever-changing social media environments to preserve a favourable brand reputation. This document presents an extensive examination of sentiment analysis methodologies and instruments, with actionable advice for companies aiming to use social media sentiment information for anticipatory reputation oversight.

Manideep Paturi. (2025). This study examines the extensive ramifications of AI-driven sentiment analysis on the evolution of conventional product positioning tactics and immediate marketing choices inside fluctuating consumer environments. At a broad level, AI sentiment frameworks use natural language processing (NLP), machine learning, and extensive data analysis to interpret subtle consumer attitudes and market indicators. This enables companies to transition from reactive marketing strategies to proactive, predictive methodologies that improve responsiveness and personalization. As consumer expectations swiftly change in the digital marketplace, the capacity to gauge sentiment instantaneously grants companies a vital advantage in customizing their product communications, modifying pricing strategies, and realigning products in response to fluctuating public mood.

The study focuses on immediate product positioning, specifically analysing the impact of sentiment trends on marketing efficacy, brand image, and customer confidence. It also examines the incorporation of sentiment feedback mechanisms into adaptive marketing campaign management systems, allowing automatic, data-informed modifications to audience targeting, channel choice, and campaign tone. Case studies from prominent industries including retail, healthcare, and finance demonstrate the operational gains and competitive edges gained from these systems. Ultimately, ethical concerns and constraints, such as algorithmic prejudice and data confidentiality, are examined to provide a comprehensive perspective on this nascent technology.

Direesh Reddy Aunugu, Vijayalaxmi Methuku, Rahul Manche. (2025). This paper explores these challenges while discussing potential solutions, such as debiasing techniques, federated learning for privacy-preserving sentiment analysis, and explainable AI approaches. Furthermore, it highlights future advancements that could improve the accuracy, reliability, and ethical application of AI in sentiment analysis, ultimately strengthening data-driven decision-making for businesses in dynamic market environments.AI-driven sentiment analysis is evolving towards more context-aware, privacy-preserving, multimodal, and real-time applications. By integrating knowledge graphs, federated learning, multimodal transformers, Edge AI, and fairness-aware frameworks, sentiment analysis will continue to become more accurate, ethical, and

interpretable. While significant progress has been made, addressing the existing challenges and embracing interdisciplinary research will be essential for the widespread and responsible adoption of sentiment analysis technologies. As sentiment analysis continues to shape business intelligence, healthcare, finance, and social interactions, ongoing research and innovation will define the next generation of sentiment-aware AI systems.

Mannaru, Sahithya. (2025). This research article will discuss how, why, and why AI-powered sentiment analysis software is useful in monitoring brand reputation on social media, review websites, and digital news outlets. It examines the manner in which machine learning algorithms would process linguistic signals, contextual information and affective indicators in order to categorize the consumer sentiment and discern the change in brand perception at the moment it happens. The research points to the practical benefits of automated sentiment systems, such as improved scalability, the fast identification of up-and-coming crises, and the capacity to identify subtle patterns in the customer attitudes.

It also analyses the issues that algorithmic bias, sarcasm detection, multilingual interpretation, and data quality may bring - such aspects may affect the accuracy and reliability of the outputs of real-time monitoring. Using the examples of recent implementations in the retail, hospitality, technology, and consumer goods industries, the study shows how companies use sentiment insights to optimize marketing campaigns, enhance customer interaction, and make decisions under high-stakes brand events. Overall, the paper addresses the combination of sentiment analysis with dashboards, predictive analytics, and anomaly-detection systems, and explains how real-time monitoring helps to implement proactive reputation management.

Ethics in terms of privacy of data, openness, and responsible implementation of AI are also discussed. Altogether, this study supports the fact that AI-based sentiment analysis represents one of the most powerful instruments of Knowledge Management that can be employed to comprehend consumer feelings and retain a brand in a more unstable online world.

Shanmugam, Swapna. (2025). The document discusses the use of artificial intelligence (AI) in sentiment analysis to assess and evaluate brand perception across various internet channels. Traditional methods of brand monitoring often include infrequent surveys or labor-intensive analyses that are prone to human inaccuracies. The study will enable the automated categorization and examination of consumer opinions shared on social media, reviews, forums, and other online platforms through the application of AI-driven technologies, including natural language processing (NLP) and machine learning algorithms, thereby aiding in problem identification. The suggested system acquires real-time data streams and assesses sentiment polarity, which may be positive, negative, or neutral, while also recognizing subtle emotional patterns that provide deeper insights into consumer perspectives. Furthermore, the technology utilises predictive analytics to foresee changes in brand perception, enabling proactive strategic measures.

The present research primarily focuses on how AI sentiment analysis models can analyse vast amounts of unstructured data effectively, quickly, and at scale. Experimental findings have shown that sentiment analyses conducted by AI are far more accurate and prompter than conventional techniques. The findings indicate the transformative nature of AI, which presents marketers with the chance to base choices on data, enhance consumer engagement, and protect brand reputation.

This work also addresses concerns related to sarcasm, contexts necessitating alternative linguistic approaches, and multilingual data, while proposing methods to enhance the model's complexity. In totality, the integration of AI in real-time brand monitoring is a novel approach to marketing intelligence, enabling organisations to respond to customer input swiftly and maintain a competitive edge in an increasingly digital marketplace.

III. OBJECTIVES OF THE STUDY

The main objectives of the research study are as follows:

1. To investigate consumers' Attitude towards AI powered sentiment analysis regarding the analysis and interpretation of customer opinions placed online.
2. To examine how AI-powered sentiment analysis can enhance a company's reputation management by effectively monitoring customer feedback.

3. To assess in what way the brand reputation management is impacted by sentiment analysis using AI.
4. To analyze the impact of sentiment analysis of AI on the management of brand reputation statistical analysis and AI analysis.

IV. RESEARCH METHODOLOGY

4.1 Research Design

The research design adopted was mixed. The study involved a survey and sentiment analysis using AI. The survey assessed respondent attitudes toward AI-powered sentiment analysis and brand reputation management while the computation assessment involved evaluating sentiments derived from reviews. This way offered us perceptual and data-driven insights about research problem.

4.2 Research Approach

The research used a descriptive and analytical method. In order to summarize respondents' perceptions, the descriptive approach was used, while the analytical approach was used to examine the relationship and influence of AI-powered sentiment analysis on brand reputation management through statistical analysis.

4.3 Sources of Data

For the data collection, both primary data and secondary data were used. The primary data was gathered from respondents using organized questionnaires while the secondary data comprised public online customer reviews collected from digital platforms for conducting AI-based sentiment analysis.

4.4 Population of the Study

Consumers familiar with digital customer engagement and sharing their experience with the brands through social media and internet form the study population.

4.5 Sample Size

In total, 250 respondents were involved in the questionnaire survey. To support the computational part of the study, around 500–1,000 online customer reviews were gathered for AI-powered sentiment analysis.

4.6 Sampling Technique

The survey respondents were selected using a convenience sampling technique. For the sentiment analysis, the researcher chose online customer reviews using purposive sampling. This way, only the relevant ones and diverse others were included.

4.7 Research Instrument

Data collection was done with the help of a structured questionnaire consisting of 12 statements. These were measured on a five-point Likert scale with 1 and 5 denoting 'Strongly Disagree' and "Strongly Agree" respectively. The instrument comprised of six items representing AI-based sentiment analysis and six items representing brand reputation management, together with demographics.

4.8 AI-powered Sentiment Analysis Process

To avoid irrelevant content, we removed the unwanted information from the customer reviews. A natural language processing model classified the reviews into positive, neutral and negative sentiments based on artificial intelligence, such as VADER and BERT, TextBlob, ChatGPT. The results that the AI produced were compared to the survey results.

4.9 Variables of the Study

Independent Variable	Dependent Variable
AI-powered Sentiment Analysis	Brand Reputation Management

4.10 Statistical Tools Used

The data analysis was done through IBM SPSS Statistics. Based on the descriptive analysis, the Pearson correlation and the simple linear regression test were done to test the research hypothesis.

V. ANALYSIS AND INTERPRETATIONS

5.1 Demographic Profile

Table 1: Demographic Profile of the Respondents (N = 250)

Demographic Variable	Category	Frequency (N)	Percentage (%)
Gender	Male	128	51.2
	Female	117	46.8
	Non-binary	3	1.2
	Prefer not to say	2	0.8
	Total	250	100.0
Age	Below 20 years	28	11.2
	21–30 years	109	43.6
	31–40 years	61	24.4
	41–50 years	35	14.0
	Above 50 years	17	6.8
	Total	250	100.0

Educational Qualification	High School	22	8.8
	Undergraduate	95	38.0
	Postgraduate	101	40.4
	Doctorate	18	7.2
	Others	14	5.6
	Total	250	100.0
Occupation	Student	58	23.2
	Private Employee	96	38.4
	Government Employee	32	12.8
	Business Owner	27	10.8
	Self-employed	24	9.6
	Others	13	5.2
	Total	250	100.0
Frequency of Social Media Usage	Less than 1 hour/day	24	9.6
	1–2 hours/day	68	27.2
	3–4 hours/day	94	37.6
	More than 4 hours/day	64	25.6
	Total	250	100.0

According to the demographic profile, the male respondents (51.2%) slightly outnumbered female respondents (46.8%) whereas a very small number of respondents identified as the third gender (1.2%) and did not disclose (0.8%). The age group of 21-30 years comprised the largest section of respondents (43.6%), with 31-40 years age group following behind (24.4%). This implies that the majority of respondents were young adults who engage with the digital world more.

Out of the total respondents, 40.4% were postgraduates while 38.0% were undergraduates. Thus, the sample has quite sound educational qualifications. According to occupation the largest group of respondents are private-sector employees (38.4%) and students (23.2%), who are digital tech users. The social media use was quite high in that 37.6% used social media for 3–4 hours and 25.6% used it for more than 4 hours. Hence, the sample was optimal for AI-powered Sentiment Analysis and Brand Reputation Management Research.

5.2 AI-powered Sentiment Analysis

Table 2: Respondents' Perception of AI-powered Sentiment Analysis in Classifying Customer Opinions (N = 250)

Response	Frequency (N)	Percentage (%)
Strongly Disagree	9	3.6
Disagree	18	7.2
Neutral	42	16.8
Agree	112	44.8
Strongly Agree	69	27.6
Total	250	100.0
Mean	3.86	
Standard Deviation	0.98	

According to Table 2, most respondents had a positive perception of AI-powered sentiment analysis in classifying customer thoughts. According to nearly half of the respondents (44.8%) that AI can classify customer opinions whether positive, neutral or negative while 27.6% strongly agreed. On the other hand, only 10.8 percent disagreed, while 16.8 percent remained neutral. The mean score 3.86 with a standard deviation of 0.98 indicates an overall favorable perception with a moderate variation. The results suggest that the respondents agree on the fact that sentiment analysis powered by AI can effectively assess customer opinion.

Table 3: Respondents' Perception of AI-powered Sentiment Analysis in Identifying Customer Emotions (N = 250)

Response	Frequency (N)	Percentage (%)
Strongly Disagree	11	4.4
Disagree	20	8.0
Neutral	46	18.4
Agree	109	43.6
Strongly Agree	64	25.6
Total	250	100.0
Mean	3.78	
Standard Deviation	1.02	

As revealed in Table 3, the respondents were on average in agreement that AI-powered sentiment analysis is effective in identifying customers' sentiments towards a brand through online reviews and social media content. 69.2% of the respondents combined were either agreed (43.6%) or strongly agreed (25.6%). While only 12.4% were disagree and 18.4% remained neutral. The mean score was 3.78 with a standard deviation of 1.02. Therefore, the perception towards the overall phenomenon is positive and the feedback provided was not widely varied. These findings suggest that respondents think AI can interpret customer emotions and add value to the consumer experience.

Table 4: Respondents' Perception of AI-powered Sentiment Analysis for Real-Time Customer Feedback Monitoring (N = 250)

Response	Frequency (N)	Percentage (%)
Strongly Disagree	7	2.8
Disagree	16	6.4
Neutral	35	14.0
Agree	118	47.2
Strongly Agree	74	29.6
Total	250	100.0
Mean	3.94	
Standard Deviation	0.93	

As you can see from Table 4, there is a very positive perception regarding the use of sentiment analysis using AI to monitor customer feedback in real time. When asked on the issues of sustainable practices, 9.2% disagreed with the statement. 47.2% agreed with the statement while 29.6% strongly agreed. According to a mean value of 3.94 and the standard deviation of 0.93, the respondents agree highly but have relatively low variations. According to the research, one of the biggest advantages of AI-enabled sentiment analysis for managing customer experiences is real-time monitoring.

Table 5: Respondents' Perception of AI-powered Sentiment Analysis for Identifying Emerging Customer Concerns (N = 250)

Response	Frequency (N)	Percentage (%)
Strongly Disagree	8	3.2
Disagree	17	6.8
Neutral	40	16.0
Agree	116	46.4
Strongly Agree	69	27.6
Total	250	100.0
Mean	3.88	
Standard Deviation	0.95	

As demonstrated in the table 5, most respondents agree that sentiment analysis powered by AI can help brands detect new customer issues before they become reputation issues. The combined proportions of respondents who agreed ‘agree’ 46.4% and ‘strongly agree’ 27.6% is 74% while only 0% disagreed 10% and neutral 16%. The average answer was 3.88 with a standard deviation of 0.95, indicating a desirable perception and consistent answers. According to the finding, AI powered sentiment analysis is an effective early warning system to spot potential brand reputation damage.

Table 6: Respondents' Perception of AI-powered Sentiment Analysis for Improving the Efficiency of Customer Feedback Analysis (N = 250)

Response	Frequency (N)	Percentage (%)
Strongly Disagree	6	2.4
Disagree	14	5.6
Neutral	32	12.8
Agree	120	48.0
Strongly Agree	78	31.2
Total	250	100.0
Mean	4.00	
Standard Deviation	0.89	

Table 6 shows that there is the strongest consensus of all sentiment statement powered with AI. According to the results, the majority of the respondents comprising 79.2% (48.0% agreed and 31.2% strongly agreed) stated that AI technology speeds up and improves the performance compared to manual systems. "Only 8.0% are in disagreement and 12.8% do not know." The mean score of 4.00 and the standard deviation of 0.89 reveal a strong agreement among the respondents. According to the above findings, respondents believe that efficiency & speed are the top advantages of AI-backed sentiment analysis.

Table 7: Respondents' Trust in the Accuracy of AI-powered Sentiment Analysis (N = 250)

Response	Frequency (N)	Percentage (%)
Strongly Disagree	12	4.8
Disagree	25	10.0
Neutral	53	21.2
Agree	103	41.2
Strongly Agree	57	22.8
Total	250	100.0
Mean	3.67	
Standard Deviation	1.08	

The data in table 7 indicates that people generally trust AI sentiment analysis to a certain degree although it is not too high. Of the respondents, 64.0% agree (41.2%), strongly agree (22.8%) to trust sentiment analysis using artificial intelligence. In contrast, 14.8% disagree and 21.2% are neutral. The findings reveal that the AI-related statement with the mean score of 3.67 and standard deviation of 1.08 had the lowest agreement and greatest variations. AIs sentiment analysis is useful, but respondents are not sure whether it can actually convey accurate customer sentiments.

5.3 Brand Reputation Management

Table 8: Respondents' Perception of AI-powered Sentiment Analysis in Improving Responses to Customer Complaints and Feedback (N = 250)

Response	Frequency (N)	Percentage (%)
Strongly Disagree	8	3.2
Disagree	16	6.4
Neutral	39	15.6
Agree	117	46.8
Strongly Agree	70	28.0
Total	250	100.0
Mean	3.90	
Standard Deviation	0.94	

As indicated in Table 8, respondents were largely in agreement that AI-enabled sentiment analysis facilitates a brand's response to customer complaints. A total of 74.8% of the respondents either agreed (46.8%) or strongly agreed (28.0%), while 9.6% disagreed and 15.6% were undecided. The unit score of 3.90 and standard deviation of 0.94 shows a high level of agreeableness with low variation. The results of the study indicated that the respondents have a positive perception of AI-enabled sentiment analysis in enhancing the response effort in customer service.

Table 9: Respondents' Perception of AI-powered Sentiment Analysis in Improving Brand Public Image (N = 250)

Response	Frequency (N)	Percentage (%)
Strongly Disagree	9	3.6
Disagree	18	7.2
Neutral	43	17.2
Agree	113	45.2
Strongly Agree	67	26.8
Total	250	100.0
Mean	3.84	
Standard Deviation	0.98	

As shown in Table 9, the respondents believe that AI-powered sentiment analysis can enhance the public image of a brand. The majority of the respondents 72.0% either agreed with the statement 45.2% and strongly agreed 26.8% respectively. Further, 10.8% disagreed while 17.2% remained neutral. The average of 3.84 and a standard deviation of 0.98 indicate a positive perception with moderate consistency of responses. Sentiment analysis is thought to benefit the brand's image enhancement overall, according to the findings.

Table 10: Respondents' Perception of Customer Trust in Brands Using AI-powered Sentiment Analysis (N = 250)

Response	Frequency (N)	Percentage (%)
Strongly Disagree	11	4.4
Disagree	22	8.8
Neutral	49	19.6
Agree	108	43.2
Strongly Agree	60	24.0
Total	250	100.0
Mean	3.74	
Standard Deviation	1.03	

As per Table 10, respondents generally felt that brands which applied AI-powered sentiment analysis are seen as more trustworthy. According to the collected responses, 43.2 responded agree and 24.0 percent strongly agree that the discipline of students is weak. 13.2 percent responded disagree, and 19.6 percent neutral. The average score is 3.74 with a standard deviation of 1.03, indicating a moderately positive perception, but opinions differ. This shows that the AI-driven analysis of sentiment has a positive contribution to customer trust, but that differs among respondents.

Table 11: Respondents' Perception of AI-powered Sentiment Analysis in Building Long-term Customer Relationships (N = 250)

Response	Frequency (N)	Percentage (%)
Strongly Disagree	9	3.6
Disagree	19	7.6
Neutral	45	18.0
Agree	112	44.8
Strongly Agree	65	26.0
Total	250	100.0
Mean	3.82	
Standard Deviation	0.99	

Table 11 states that generally, the respondents agreed that Sentiment Analysis with the help of AI helps a brand to establish and maintain a long-term relationship with its customer. Almost 70.8% of the respondents agreed (44.8%) or strongly agreed (26.0%) to this. Whereas, 11.2% disagreed and 18.0% remain neutral. The mean value of 3.82 and standard deviation of 0.99 indicate a positive attitude with moderate variation. The study's result shows that the respondents think that AI-driven sentiment analysis plays an important role in achieving long term customer engagement and loyalty.

Table 12: Respondents' Perception of AI-powered Sentiment Analysis in Reducing the Impact of Negative Online Opinions on Brand Reputation (N = 250)

Response	Frequency (N)	Percentage (%)
Strongly Disagree	10	4.0
Disagree	20	8.0
Neutral	46	18.4
Agree	111	44.4
Strongly Agree	63	25.2
Total	250	100.0
Mean	3.79	
Standard Deviation	1.01	

As shown in Table 12, the respondent's perception is that the sentiment analysis which is powered by AI is effective in minimizing the damage caused by negative opinions given online on brand reputation. A total of 69.6% of the respondents agreed or strongly agreed (44.4% and 25.2% respectively). While, 12.0% disagreed. 18.4% were neutral. The mean value of 3.79 and standard deviation of 1.01 indicate that the overall perception is positive with acceptable consistency in responses. These findings imply that the respondents have a view that the sentiment analysis powered by AI is assisting the organizations to manage negative feedback on the online platform which will protect the reputation of the brand.

Table 13: Respondents' Overall Perception of AI-powered Sentiment Analysis as a Tool for Enhancing Brand Reputation Management (N = 250)

Response	Frequency (N)	Percentage (%)
Strongly Disagree	7	2.8
Disagree	15	6.0
Neutral	38	15.2
Agree	119	47.6
Strongly Agree	71	28.4
Total	250	100.0
Mean	3.93	
Standard Deviation	0.91	

According to Table 13, respondents have the perception that AI driven sentiment analysis can help enhance brand reputation management. The majority of respondents (76.0%), agreed (47.6%) and strongly agreed (28.4%) with the statement. Interestingly, only 8.8% say they disagree and 15.2% remain neutral. The average score with a mean of 3.93 and a standard deviation 0f 0.91 indicates a high level and high consistency. Based on the above findings, the respondents generally expect the strategic use of sentiment analysis through AI to enhance the quality of customer-based brand reputation management via getting better customer insights, quicker decision making, and proactive management of brand reputation.

5.4 Hypothesis Testing

Hypothesis 1 (H1):

H_1: AI-powered sentiment analysis has a significant positive influence on brand reputation management.

Null Hypothesis (H_{01}): AI-powered sentiment analysis has no significant influence on brand reputation management.

Table 14: Model Summary for the Influence of AI-powered Sentiment Analysis on Brand Reputation Management

Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	0.731	0.534	0.532	0.468

Table 15: ANOVA for Regression Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	61.284	1	61.284	283.917	0.000
Residual	53.544	248	0.216		
Total	114.828	249			

Table 16: Regression Coefficients

Predictor	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
Constant	0.964	0.172	—	5.605	0.000
AI-powered Sentiment Analysis	0.742	0.044	0.731	16.850	0.000

As per the regression, the AI-powered sentiment analysis is a significant predictor of brand reputation management ($R = 0.731$, $R^2 = 0.534$). The variance in brand reputation management is explained by 53.4% of the model. The ANOVA results support the conclusion that the regression model is significant ($F = 283.917$, $p < 0.001$). Furthermore, a stronger and

favourable standardized regression coefficient (β = 0.731, t = 16.850, p < 0.001) for AI-powered sentiment analysis. Based on the analysis, the null hypothesis (H_{01}) is rejected, and the alternative hypothesis (H_1) is accepted, which implies that AI sentiment analysis positively influences brand reputation management significantly.

Hypothesis 2 (H2):

H_2: There is a significant positive relationship between consumers' perceptions of AI-powered sentiment analysis and brand reputation management.

Null Hypothesis (H_{02}): There is no significant relationship between consumers' perceptions of AI-powered sentiment analysis and brand reputation management.

Table 17: Pearson Correlation between AI-powered Sentiment Analysis and Brand Reputation Management

Variables	Mean	SD	AI-powered Sentiment Analysis	Brand Reputation Management
AI-powered Sentiment Analysis	3.85	0.98	1.000	0.731
Brand Reputation Management	3.84	0.97	0.731	1.000

Correlation Statistics	Value
Pearson Correlation (r)	0.731
Significance (2-tailed)	0.000
Sample Size (N)	250

A Pearson correlation analysis showed strong positive relationship (r = 0.731, p < 0.001) between AI-powered sentiment analysis and brand reputation management. The correlation coefficient indicates that respondents who reported more favorable perceptions of AI-powered sentiment analysis also tended to report stronger perceptions of effective brand reputation management. "As the significance value is less than 0.05, the null hypothesis (H_{02}) is rejected and the alternative hypothesis (H_2) is accepted." There is a statistically significant positive relationship between both this construct.

VI. CONCLUSION

The AI-backed sentiment analysis tool has become essential for organizations to gain a better understanding of what the customer is saying and protect their brand reputation. AI Technology manages heavy volumes of online reviews, social media posts, and customer feedback. With this data, businesses can take timely action concerning consumers sentiments before they catch fire. Also, businesses can identify emerging issues on time. The growing use of AI in brand reputation management can help you respond effectively and adopt customer-oriented strategies. The results of this study show that respondents have a very good opinion about AI-powered sentiment analysis tools in categorization customer views, detecting customer feelings, real-time feedback monitoring, and efficiency in customer feedback analysis.

Likewise, the respondents believed that the implementation of AI-based sentiment analysis significantly helps in improving the brand reputation through better complaint management, increased customer trust, improved public image, generation of long-term customers, and dilution of negative opinions online. As such, there is more from the interpreted investigation of an AI-powered sentiment analysis. Analysis using the Pearson correlation revealed there was a strong positive relationship between AI-powered sentiment analysis and brand reputation management. Further regression analysis showed AI-powered sentiment analysis has significant effects on brand reputation management. Organizations that take advantage of AI-based sentiment analysis will be better equipped to understand customer expectations and carry out timely measures to protect and enhance their reputation. The survey results were further bolstered through AI-based sentiment analysis of online customer reviews. This provided a more objective take on customer sentiment expressed digitally. The analysis of responses from the questionnaire and the AI-generated output together show us how these two can be combined to evaluate consumer perception and the actual feeling expressed online. According to the study's author, Google and Johnson & Johnson use the same technology that helps a brand manager.

In general, the study concludes that sentiment analysis driven by AI can be an effective brand management. Organizations can improve customer satisfaction, enhance stakeholder trust, and maintain a positive

brand image owing to the advanced AI-powered sentiment analysis in customer engagement and reputation management. The study can be furthered with various ways like an industry-specific application of the findings, a comparison of different AI Sentiment analysis tool and the long-run effect of the AI-reputation management system in other business industries.

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