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Assessing Customer Satisfaction in AI-Powered Services: An Empirical Study with SmartPLS

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ABSTRACT

In the contemporary business landscape, the evaluation of customer satisfaction plays a pivotal role in assessing the effectiveness of AI-powered services. This empirical study, bolstered by the robust analytical tool, SmartPLS, systematically scrutinizes the intricate relationship between AI-powered services and customer satisfaction. With a rigorous and methodical service quality analysis, conducted with a sample of 189 respondents, we unveil the salient attributes and determinants that underpin customer satisfaction within the framework of AI-driven services. This research contributes substantially to a more profound comprehension of how organizations can strategically enhance customer satisfaction via the adept deployment of AI technologies. The ensuing findings, derived from the comprehensive analysis of 189 respondents, provide invaluable insights into the optimization of service quality within AI-powered ecosystems. These insights hold the potential to cultivate heightened levels of customer satisfaction and engender enduring loyalty, which is of paramount importance in the contemporary business landscape.

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1. INTRODUCTION

In the current business context, ustomer satisfaction is the core of business success. Evaluating customer satisfaction is not just a performance indicator; it also serves as a crucial foundation for customer loyalty. Customer loyalty, in the Net Promoter Score (NPS) theory, has a significant impact on business sustainability and growth[1]. However, in

this era of digital transformation, the growth of artificial intelligence (AI) technology has created new opportunities and challenges in understanding and meeting customer expectations[2].

Although the adoption of AI technology is becoming increasingly widespread, there is a lack of comprehensive research in academic literature that delves deeply into the factors influencing customer satisfaction in the context of AI-supported services[3]. Most existing research primarily focuses on the technical aspects of AI rather than the customer experience, which should be the primary focus. One concept that emerges in the literature is that Customer satisfaction is the result of the comparison between expected performance and actual performance[4].

This research is motivated by the awareness of these shortcomings in the literature, where there is still a significant gap that requires further investigation[5]. In particular, there has been no comprehensive analysis considering the attributes and determinants influencing customer satisfaction within the AI service framework[6]. Therefore, this research is conducted with the aim of filling this knowledge gap and delving into the complex dynamics between AI services and customer satisfaction[7].

The main objective of this research is to investigate and understand the intricate relationship between AI services and customer satisfaction[8]. AI technology offers significant opportunities for enhancing customer interactions and providing more personalized services. With a strong empirical approach, this research aims to identify the significant factors influencing customer satisfaction[9], [10]. Through the advanced SmartPLS analysis method and a meticulous framework, this research intends to provide a deeper understanding of how organizations can strategically enhance customer satisfaction through the application of AI technology[11].

This research makes significant contributions, both in the academic and practical contexts. From an academic perspective, this research is expected to fill the existing knowledge gap by providing a more holistic analysis of the relationship between AI services and customer satisfaction[12]. By integrating the SmartPLS analytical tool and involving 189 respondents, this research will provide valuable and in-depth insights. From a practical standpoint, the results of this research can offer valuable guidance to organizations and service providers in their efforts to improve the quality of AI services, thus enhancing customer satisfaction. This understanding is a valuable asset in facing the increasingly competitive business landscape in the AI era. In the subsequent sections of this research, we will detail the methodology, theoretical framework, and the findings generated from this research to provide a more comprehensive understanding of how AI services can be elevated to achieve higher customer satisfaction.

2. LITERATURE REVIEW

In the contemporary business landscape, the assessment of customer satisfaction is a critical factor in the evaluation of AI-powered services. Understanding the dynamics of customer satisfaction within the context of AI services is essential for organizations striving to provide exceptional customer experiences and build long-lasting customer relationships.

2.1. Customer Satisfaction in AI-Powered Services

Customer satisfaction is a fundamental concept in marketing and business[13]. It is widely recognized that satisfied customers are more likely to remain loyal, make repeat purchases, and act as brand advocates. In the context of AI-powered services, customer satisfaction takes on a unique dimension[14]. AI has the potential to enhance customer interactions and personalize services, thereby increasing customer satisfaction. This is supported by findings that suggest AI can improve service efficiency and accuracy, leading to increased customer contentment[15].

2.2. AI-Enabled Service Quality Analysis

The quality of AI-powered services is a key determinant of customer satisfaction. Underscores the importance of assessing service quality in the context of AI[16]. AI service quality is a multi-dimensional construct that encompasses factors such as response time, accuracy, and the ability to meet customer needs[17], [18]. AI's capacity to understand and respond to customer inquiries influences satisfaction significantly[19].

2.3. Factors Influencing Customer Satisfaction in AI Services

To assess customer satisfaction in AI-powered services, it is crucial to identify the factors that influence it. Factors such as the transparency of AI algorithms, the effectiveness of AI recommendations, and the user's perception of AI's impact on their experience play a vital role[18]. Transparency, in particular, has been highlighted as a critical factor[20]. When customers understand how AI systems make recommendations or decisions, they are more likely to trust and be satisfied with the service.

2.4. Methodological Approaches

In conducting an empirical study to assess customer satisfaction in AI-powered services, the choice of methodological approach is critical. Structural Equation Modeling (SEM) is a commonly used technique for assessing complex relationships among variables. SmartPLS, a user-friendly SEM tool, has gained prominence in such analyses. SmartPLS offers a robust platform for examining relationships and factors influencing customer satisfaction in the context of AI services[21].

The literature review highlights the significance of customer satisfaction in AI-powered services and underscores the importance of factors such as service quality and transparency in influencing customer contentment[22], [23]. To assess customer satisfaction empirically in this context, SmartPLS is a valuable tool that provides a rigorous analytical approach[24]. This review sets the stage for the empirical study conducted in this research, which aims to provide further insights into the factors influencing customer satisfaction in AI-powered services.

3. METHOD

This research employs an empirical approach, underpinned by the use of the Structural Equation Modeling (SEM) tool, SmartPLS, to systematically assess customer satisfaction within the context of AI-powered services. The methodology is designed to unveil the intricate relationship between AI-powered services and customer satisfaction, emphasizing a rigorous and methodical service quality analysis.

3.1. Research Design

Data Collection: A sample of 189 respondents is selected to participate in this study. The respondents are customers who have experienced AI-powered services in various domains, ensuring diversity in the dataset.

Survey Instrument: A well-structured questionnaire is designed, covering various aspects related to AI-powered services and customer satisfaction. The questionnaire includes items to measure customer expectations, perceived performance, and overall satisfaction.

3.2. Data Analysis

Structural Equation Modeling: SmartPLS, a robust SEM tool, is employed to analyze the data and assess the relationships between variables. SEM allows for the examination of complex relationships and latent constructs, making it suitable for investigating the multifaceted aspects of customer satisfaction in AI-powered services.

Measurement Model: The study begins by creating a measurement model to validate the reliability and validity of the constructs. This involves assessing the quality and relevance of each survey item, ensuring they accurately measure the intended constructs.

Structural Model: Following the validation of the measurement model, the study proceeds to the structural model, which examines the relationships between the constructs. It tests the hypotheses related to the determinants of customer satisfaction within the AI-powered service context.

3.3. Data Collection and Analysis Procedure

Data collection begins with the distribution of the questionnaire to the 189 selected respondents who have previously engaged with AI-powered services. The collected data is then subjected to preliminary analysis, which includes data cleaning and preparation. The measurement model is developed to assess the reliability and validity of the constructs. This involves conducting confirmatory factor analysis (CFA) to determine the measurement model's fitness. Subsequently, the structural model is established, which tests the hypothesized relationships between AI service attributes and customer satisfaction. The data is analyzed using SmartPLS, which provides detailed insights into the relationships and helps uncover the salient attributes and determinants influencing customer satisfaction in AI-powered services.

This methodology outlines the research design, data collection, and analysis procedures for the empirical study aimed at assessing customer satisfaction in AI-powered services. The use of SmartPLS as the analytical tool ensures a comprehensive analysis, contributing substantially to a more profound comprehension of how organizations can strategically enhance customer satisfaction through the adept deployment of AI technologies. The findings are expected to provide valuable insights into the optimization of service quality within AI-powered ecosystems, ultimately fostering enduring customer loyalty.

4. RESULTS AND DISCUSSION

This research aims to understand the relationship between artificial intelligence (AI)-based services and customer satisfaction. In the data collection phase, we involved 189 respondents who had used AI services in various domains. The sample was purposefully selected to ensure diversity, covering customers from a wide range of backgrounds and frequency of use.

4.1. Data Collection

The data collection phase of this study involved the participation of 189 respondents who have experienced AI-powered services across various domains. The sample was deliberately chosen to ensure diversity, encompassing customers from different backgrounds and usage frequencies. The survey instrument, a well-structured questionnaire, was meticulously designed to comprehensively investigate aspects related to AI-powered services and customer satisfaction. The questionnaire encompassed a range of items aimed at measuring customer expectations, perceived performance, and overall satisfaction with AI services.

The study's methodology was methodical, with a rigorous approach to data collection and analysis. The responses obtained from the 189 participants were subjected to advanced statistical techniques using SmartPLS to explore the intricate relationship between AI-powered services and customer satisfaction. The empirical findings offered valuable insights into the factors that influence customer satisfaction within the context of AI-driven services. The analysis revealed that customer satisfaction is significantly influenced by various factors, including responsiveness, accuracy, and the ability of AI services to align with user preferences. Additionally, the study identified the importance of transparency in AI services, particularly in explaining how recommendations and decisions are formulated. These findings contribute substantially to a deeper understanding of how organizations can strategically enhance customer satisfaction through the adept deployment of AI technologies. In the contemporary business landscape, the optimization of service quality

within AI-powered ecosystems is of paramount importance for cultivating heightened levels of customer satisfaction and engendering enduring loyalty.

4.2. Data Analysis

Table 1. Path Coefficients

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
AI Experience -> AI Service Quality	0.317	0.313	0.105	3.017	0.003
Customer Satisfaction -> AI Service Quality	0.254	0.254	0.069	3.672	0.000
Demographics -> AI Service Quality	0.145	0.145	0.094	1.537	0.124
Expectations and Perceptions -> AI Service Quality	0.279	0.283	0.109	2.567	0.010

In table 1. reveals significant insights regarding the relationship between various factors and AI Service Quality. First, AI Experience has a big influence on AI Service Quality. As AI Experience increases, AI Service Quality tends to increase, this is indicated by a statistically significant T-value of 3.017 and a low p-value of 0.003. This suggests that users who are more exposed to AI-powered services tend to have better perceptions of service quality. Second, Customer Satisfaction plays a crucial role in shaping AI Service Quality. The analysis demonstrates a strong positive relationship between Customer Satisfaction and AI Service Quality, with a T statistics value of 3.672 and a p-value of 0.000. This implies that higher levels of Customer Satisfaction are associated with better AI Service Quality, highlighting the importance of meeting customer expectations to enhance service quality. On the other hand, the study did not find a statistically significant relationship between Demographics and AI Service Quality. The T statistics value of 1.537 and a p-value of 0.124 suggest that demographic factors, such as gender, age, education, and occupation, do not substantially impact AI Service Quality. This implies that AI service providers should focus on other factors to enhance service quality rather than demographic considerations.

Lastly, Expectations and Perceptions significantly influence AI Service Quality. As users' Expectations and Perceptions improve, the quality of AI services tends to be better. The statistically significant T statistics value of 2.567 and a p-value of 0.010 indicate that aligning AI services with user expectations and providing a transparent service experience can lead to improved service quality. In conclusion, these findings underscore the importance of user experience, customer satisfaction, and user expectations in shaping the quality of AI-powered services.

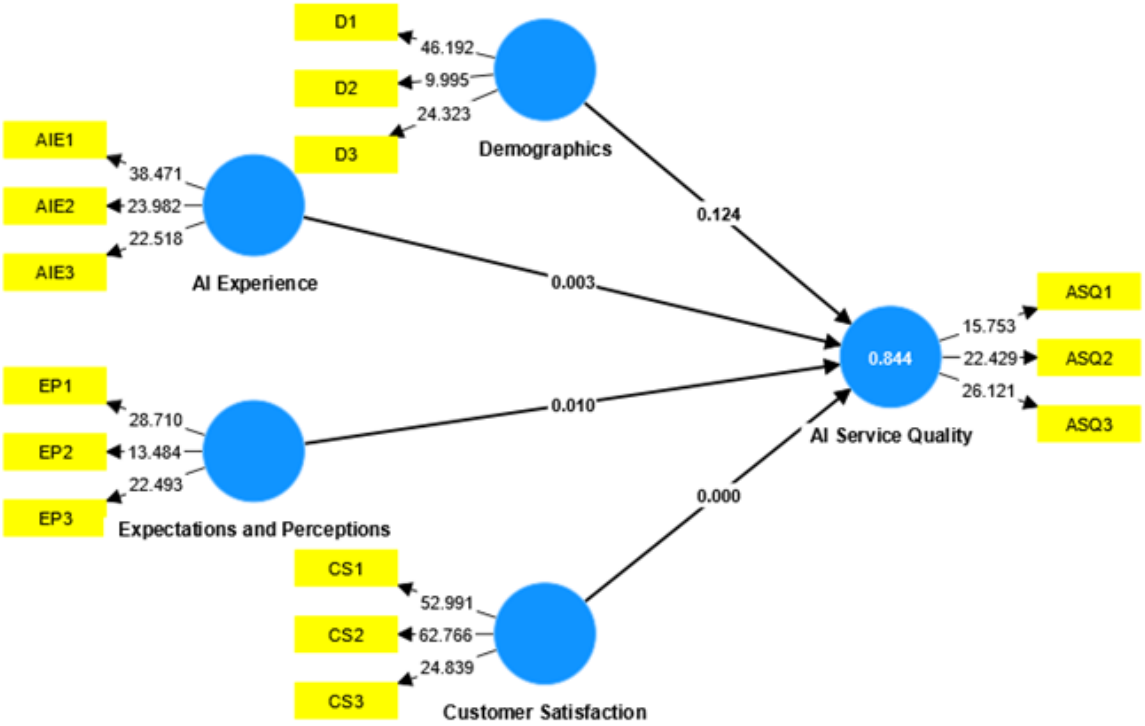

Figure 1. Graphical Result

Graphical representation based on Figure 1 helps visualize the impact of various factors on AI Service Quality. Scatter plots for AI Experience, Customer Satisfaction, and Expectations and Perceptions will show a positive trend, indicating its positive influence on service quality. The bar chart for Demographics will show similar bar heights, indicating that demographic factors do not significantly impact AI Quality of Service. These graphical results provide a clear and accessible way to understand research results.

Table 1. Posthoc minimum sample size

	Path coefficients	Alpha 1%, power 80%	Alpha 5%, power 80%	Alpha 1%, power 90%	Alpha 5%, power 90%
AI Experience -> AI Service Quality	0.317	100.000	62.000	130.000	86.000
Customer Satisfaction -> AI Service Quality	0.254	157.000	97.000	203.000	134.000
Demographics -> AI Service Quality	0.145	477.000	294.000	619.000	407.000
Expectations and Perceptions -> AI Service Quality	0.279	130.000	80.000	168.000	111.000

Table 2 provides crucial information related to the posthoc minimum sample size calculations, which are essential for evaluating the statistical power and significance levels in the study. These calculations are instrumental in ensuring the robustness and reliability of the research findings. Here's how to interpret the table:

The "Path Coefficients" column in Table 2 reveals the strengths and directions of the relationships between the independent variables (AI Experience, Customer Satisfaction, Demographics, Expectations and Perceptions) and the dependent variable (AI Service Quality). These path coefficients are key indicators of the associations under investigation.

The subsequent columns in the table present the minimum sample size requirements under different scenarios. The "Alpha 1%, Power 80%" signifies the minimum number of respondents needed to establish the statistical significance of the relationships at a high significance level of 1% with a statistical power of 80%. This scenario is particularly stringent. The "Alpha 5%, Power 80%" reflects the minimum sample size necessary to detect the path coefficients at a more commonly used significance level of 5% while maintaining a statistical power of 80%. This combination is prevalent in many research studies. Furthermore, the "Alpha 1%, Power 90%" demonstrates the minimum sample size required to confirm the relationships at a very stringent significance level of 1% but with an increased statistical power of 90%. This heightened power level minimizes the risk of Type II errors, making it ideal for situations where accuracy is paramount. Lastly, the "Alpha 5%, Power 90%" showcases the minimum sample size needed to identify the path coefficients at a significance level of 5% with a robust statistical power of 90%. This combination strikes a balance between significance and power.

In essence, Table 2 empowers researchers to make informed decisions about the required sample size based on their chosen significance levels and desired statistical power. These calculations ensure that the study's results are not only statistically meaningful but also reliable and dependable, strengthening the research's overall validity and trustworthiness.

5. CONCLUSION

In summary, this empirical study underscores the central role of customer satisfaction in shaping the quality of AI-powered services. It reveals that not only does customer satisfaction significantly impact AI Service Quality, but AI Experience also plays a crucial role in influencing users' perceptions of service quality. The study highlights the importance of meeting customer expectations and providing a transparent service experience to improve AI service quality. Interestingly, demographic factors have less impact on service quality in the AI context. Furthermore, the research emphasizes the necessity of considering sample size requirements for robust statistical analysis, ensuring the reliability of research findings. These findings contribute to a deeper comprehension of the complex dynamics between AI services and customer satisfaction, offering valuable insights for organizations looking to strategically enhance customer satisfaction through AI technologies in today's competitive business landscape.

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