

# **The impact of Artificial Intelligence utilization on customer experience in the telecommunications sector**

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**Abstract.** *The way businesses handle customer relations and service quality has changed as a result of the increasing integration of artificial intelligence (AI) into telecommunications services. Although AI is frequently acknowledged in the literature as a force for efficiency, responsiveness, and individualized service, research also raises issues with data security, accuracy, and the absence of human empathy. In light of this, the current study examines how AI affects customer experience in the telecom industry, emphasizing effectiveness, satisfaction, and trust. A structured questionnaire given to telecom users serves as the basis for the quantitative design of the study. Both descriptive and inferential methods are used in the processing and analysis of respondent data using IBM SPSS Statistics. The following are the primary research questions: Does AI help make services faster and more dependable? How much do consumers trust AI systems? What connection exists between willingness to accept AI-enabled service interactions and customer satisfaction?*

*Initial findings indicate that although consumers appreciate AI-based services' speed, availability, and convenience, they also voice concerns about data privacy and the precision of automated responses. These results suggest that while AI can enhance customer satisfaction and service quality, it must be used in conjunction with managerial techniques that foster openness and confidence. With its empirical data and insights into how managers can strategically integrate AI to maximize resources, enhance service quality, and boost customer loyalty, this paper adds to the body of literature already available on how customers perceive AI in telecommunications. Thus, the study fills the gap between theoretical viewpoints and useful suggestions for managing innovation in the telecom sector. Furthermore, the results highlight that the effectiveness of AI deployment in telecommunications is contingent not only on technical prowess but also on how businesses interact openly with clients and handle security and trust issues.*

**Keywords:** artificial intelligence, telecommunications, customer experience, service quality, innovation management

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## **Introduction**

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One of the industries most impacted by the rapid advancements in artificial intelligence (AI) is telecommunications. The highly dynamic environment in which telecommunications companies operate is marked by increasing competition, the constant development of new technologies, and rising customer expectations. Customers want services that are not only dependable and affordable, but also individualized and always available as digitalization picks up speed. The way telecom operators plan, deliver, and oversee their services must be fundamentally rethought to meet these expectations. In this regard, artificial intelligence (AI) has become a potent innovation enabler, able to offer solutions that blend improved customer experience with operational efficiency.

Two complementary viewpoints can be used to analyze the importance of AI in telecommunications. From a technological standpoint, AI makes it possible to perform predictive maintenance, optimize networks in real time, resolve incidents automatically, and use resources more effectively. Particularly in the context of 5G and future 6G networks, these applications guarantee that operators can manage growing traffic volumes, minimize downtime, and avoid service interruptions. Through the introduction of chatbots, virtual assistants, and intelligent recommendation systems, artificial intelligence (AI) presents managerial opportunities to rethink customer relationship management. These tools raise questions about data protection, transparency, and the lack of human empathy in customer interactions, but they also promise faster problem-solving and more individualized services.

From a management standpoint, implementing AI in telecom is a strategic decision that affects customer trust, organizational culture, and long-term competitiveness in addition to being a technological one. To make sure that the adoption of AI-based tools does not erode trust in the company's offerings, managers must carefully weigh efficiency improvements against customer perceptions. Because of this, evaluating the customer experience and acceptance of AI solutions becomes crucial for directing managerial choices.

By examining how AI affects customer experience in the telecom industry, the current study fills this research gap. Efficiency, trust, and satisfaction are three important factors that are important to managers and customers alike. The paper's central research question is: *How much does the use of AI enhance the telecom industry's customer experience, and under what circumstances is it embraced by consumers?*

The study develops the following theories in order to respond to this query:

H1: AI improves operational efficiency by facilitating quicker and more dependable service delivery.

H2: Perceptions of data security and the precision of automated responses have a significant impact on customer trust in AI-based systems.

H3: Customers are more inclined to use AI-enabled services in future interactions when they are more satisfied with them.

This study aims to give a thorough grasp of how AI adoption impacts customer perceptions by fusing empirical data collected via a structured questionnaire with a literature-based analysis. It is anticipated that the results will add to scholarly discussions on the digital transformation of telecommunications as well as to useful suggestions for managers looking to successfully incorporate AI into their service plans.

## Literature review

The telecommunications sector is rapidly embracing artificial intelligence (AI), which is widely considered to be one of the most revolutionary technologies reshaping the industry. AI-driven analytics can predict equipment failures before they happen by incorporating predictive maintenance, which minimizes downtime and expensive service interruptions [1][2]. In order to maintain constant service quality even during periods of high demand, self-optimizing networks use machine learning algorithms to dynamically modify configurations based on traffic patterns [1][3]. Additionally, telecom operators can more efficiently distribute bandwidth thanks to intelligent traffic management systems, which balance network performance and lower operating costs while enhancing overall reliability [2][4]. These developments help businesses scale their infrastructures more flexibly in response to rapidly increasing data consumption and emerging technologies like 5G and IoT, in addition to improving operational efficiency. [3] [4].

From a customer experience standpoint, AI has revolutionized the way service providers interact with their subscribers. Virtual assistants and sophisticated chatbots provide round-the-clock, real-time assistance, addressing common questions like troubleshooting, service upgrades, and billing concerns [5]. It has been demonstrated that this automation improves customer satisfaction and brand loyalty by reducing response times and freeing up human agents to work on more difficult issues [5]. At the same time, personalized recommendations—powered by AI—help tailor offers and services to individual preferences, improving perceived value. Customer trust is, however, seriously hampered by enduring worries about algorithmic transparency, data privacy, and the apparent lack of human empathy in AI interactions [6][7]. Even the most effective AI-driven service strategies could be jeopardized if these issues are not resolved.

Researchers commonly use theoretical frameworks like the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Technology Acceptance Model (TAM) to better understand how users adopt and accept AI-enabled services. These models highlight how people's behavioral intentions toward new technologies are shaped by perceived value, perceived utility, perceived ease of use, and perceived trust [8][9]. These factors are especially important in the telecom sector: efficiency gains and perceived added value generate initial interest, but trust frequently acts as a moderator or mediator, affecting whether or not better performance truly results in customer adoption [8][10]. Furthermore, according to recent research, the relationship between perceived value and long-term acceptance may be reinforced by satisfaction, which is an emotional assessment of the service experience [8].

Even though there is a growing amount of research on AI in telecommunications, it frequently treats trust-related issues and operational enhancements as distinct fields of study, failing to sufficiently examine how these factors interact to affect user choices. This disjointed strategy runs the risk of ignoring crucial relationships between technical performance, client perceptions, and affective reactions. By carefully analyzing the connections between efficiency, trust, satisfaction, perceived value, and customer acceptance of AI-driven services in the telecom industry, the current study aims to close this gap. By doing this, it hopes to offer practical advice to scholars and professionals who are trying to strike a balance between customer trust and operational excellence in the era of intelligent networks.

## Methodology

The study uses a quantitative design and was created to investigate how artificial intelligence (AI) affects the telecom industry's customer experience. By concentrating on efficiency, trust, and acceptance of AI-based services, the study expands on earlier research that looked at the connection between AI adoption, service quality, and customer satisfaction. Telecom users were given a structured questionnaire to complete in order to gather data. The survey's Likert-scale items and closed-ended questions were intended to gauge respondents' opinions about AI-enabled services' effectiveness, dependability, and level of satisfaction. The sample size of 100 respondents was established according to methodological recommendations for exploratory quantitative research, which suggest a minimum of 5–10 participants per questionnaire item to ensure adequate statistical reliability. Given that the instrument included 25 items, this number was considered sufficient to test the proposed theoretical model. The instrument's structure was determined by the research questions and hypotheses presented in the introduction.

The purpose of the questionnaire was to assess how customers felt about artificial intelligence (AI) in telecommunications in five important areas: acceptance, value added, efficiency, trust, and satisfaction. Efficiency measured respondents' opinions about the responsiveness, accuracy, and speed of AI-enabled services, while trust gauged their level of confidence in the security, dependability, and transparency of AI systems. Value added assessed the degree to which AI offers extra advantages and personalization beyond basic telecom services, while satisfaction gauged general positive sentiments and fulfillment from AI-based interactions. Customers' readiness to embrace and suggest AI-powered solutions was reflected in acceptance. Twenty-five items total, divided into five sections (five items per construct), made up the final instrument. A five-point Likert scale, with 1 denoting "strongly disagree" and 5 denoting "strongly agree," was used to rate each statement. Because of the thorough coverage of both the functional and emotional aspects of AI usage in telecommunications provided by this structured design, it was possible to measure customer attitudes toward AI-powered services with confidence.

IBM SPSS Statistics was used to process and analyze the gathered data. The demographic traits of the respondents and their overall opinions regarding AI in telecom services were summed up using descriptive statistics. The associations between customer satisfaction, trust in AI systems, and readiness to embrace AI-based interactions were investigated using inferential methods such as Chi-square tests and Pearson correlation tests. An overview of general trends as well as a more thorough testing of the suggested hypotheses was made possible by this dual-level analysis.

The methodology guarantees objectivity and replicability by integrating statistical modeling with quantitative survey data, offering a strong framework for evaluating customer perceptions. The selection of SPSS as the primary analytical instrument is consistent with related research in the literature that examines consumer perceptions of digital transformation in service sectors. As a result, this methodological approach enhances the findings' comparability and reliability.

## Results and further discussions

The dataset was obtained through an online questionnaire distributed to individual telecom users in Romania. The survey was administered via Google Forms to ensure accessibility and respondent anonymity. Participants were

selected through convenience sampling from academic and professional networks, with the condition that all were active telecom users familiar with AI-enabled customer services. Although the sampling was non-random, it provided sufficient diversity for the exploratory purpose of the study.

The dataset was put through a number of statistical processes in IBM SPSS Statistics in order to test the suggested research model. The 25 questionnaire items were categorized into five dimensions for analysis: Perceived Value Added (E1–E5), Customer Satisfaction (C1–C5), Acceptance and Future Intentions (D1–D5), Efficiency (A1–A5), and Trust and Data Security (B1–B5). Five aggregated variables were produced by using SPSS to calculate the mean scores for each dimension.

The five latent constructs—efficiency, trust, satisfaction, acceptance, and perceived value added—were first examined for central tendency and variability using descriptive statistics. Cronbach's Alpha was then used to evaluate internal consistency in order to guarantee the scales' dependability. The direction and strength of linear relationships between constructs were ascertained using Pearson's correlation analysis. An exploratory factor analysis (Principal Component Analysis with Varimax rotation) was carried out to confirm the instrument's dimensionality. In order to determine the relative contribution of each component to the adoption of AI in telecommunications, multiple linear regression was finally used, with acceptance serving as the dependent variable and the other four constructs as predictors. The following tables display the main statistical results from these analyses.

**Table 1:** Means and standard deviations of AI perception dimensions

| Descriptive Statistics |     |         |         |        |                |
|------------------------|-----|---------|---------|--------|----------------|
|                        | N   | Minimum | Maximum | Mean   | Std. Deviation |
| Efficiency_Score       | 100 | 1.48    | 4.92    | 2.9197 | .71720         |
| Trust_Score            | 100 | 1.45    | 4.60    | 3.2333 | .68321         |
| Satisfaction_Score     | 100 | 1.25    | 4.76    | 3.1954 | .76234         |
| Acceptance_Score       | 100 | 1.05    | 4.62    | 2.8836 | .87694         |
| ValueAdded_Score       | 100 | 1.54    | 4.63    | 3.1233 | .65714         |
| Valid N (listwise)     | 100 |         |         |        |                |

Source: Authors' own research

The descriptive findings imply that consumers have generally positive opinions about artificial intelligence in telecommunications. The two categories with the highest scores, above the neutral midpoint of the Likert scale, were Satisfaction ( $M = 3.20$ ,  $SD = 0.76$ ) and Trust ( $M = 3.23$ ,  $SD = 0.68$ ). This suggests that respondents are likely to believe AI-enabled services are dependable and able to provide a positive client experience. AI's potential to improve operational efficiency and service quality was further supported by the positive score for Perceived Value Added ( $M = 3.12$ ,  $SD = 0.66$ ).

Although Acceptance ( $M = 2.88$ ,  $SD = 0.87$ ) and Efficiency ( $M = 2.92$ ,  $SD = 0.72$ ) scored nearer neutrality, these findings can be interpreted as indicating cautious openness rather than rejection. Although consumers recognize the advantages of AI, they anticipate more advancements in its application before embracing the technology completely. Therefore, the overall picture is positive: AI is already linked to satisfaction and trust, and as providers maximize efficiency and show measurable value, its acceptance is probably going to grow.

**Table 2:** Correlations between AI perception dimensions

|                    |                     | <b>Correlations</b> |             |                    |                  |                  |
|--------------------|---------------------|---------------------|-------------|--------------------|------------------|------------------|
|                    |                     | Efficiency_Score    | Trust_Score | Satisfaction_Score | Acceptance_Score | ValueAdded_Score |
| Efficiency_Score   | Pearson Correlation | 1                   | -.046       | -.070              | .850**           | .353**           |
|                    | Sig. (2-tailed)     |                     | .653        | .486               | <.001            | <.001            |
|                    | N                   | 100                 | 100         | 100                | 100              | 100              |
| Trust_Score        | Pearson Correlation | -.046               | 1           | .861**             | -.099            | .660**           |
|                    | Sig. (2-tailed)     | .653                |             | <.001              | .327             | <.001            |
|                    | N                   | 100                 | 100         | 100                | 100              | 100              |
| Satisfaction_Score | Pearson Correlation | -.070               | .861**      | 1                  | -.069            | .625**           |
|                    | Sig. (2-tailed)     | .486                | <.001       |                    | .497             | <.001            |
|                    | N                   | 100                 | 100         | 100                | 100              | 100              |
| Acceptance_Score   | Pearson Correlation | .850**              | -.099       | -.069              | 1                | .332**           |
|                    | Sig. (2-tailed)     | <.001               | .327        | .497               |                  | <.001            |
|                    | N                   | 100                 | 100         | 100                | 100              | 100              |
| ValueAdded_Score   | Pearson Correlation | .353**              | .660**      | .625**             | .332**           | 1                |
|                    | Sig. (2-tailed)     | <.001               | <.001       | <.001              | <.001            |                  |
|                    | N                   | 100                 | 100         | 100                | 100              | 100              |

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors' own calculation

Numerous noteworthy and significant connections between the main aspects of the customer experience with AI in telecommunications are highlighted by the correlation matrix. Customers who have more faith in AI are also more satisfied with the services it offers, according to the strongest correlation between trust and satisfaction ( $r = 0.861$ ,  $p < 0.001$ ). This lends credence to the notion that long-term adoption and favorable user experiences are significantly influenced by trust.

Efficiency and Acceptance showed yet another strong correlation ( $r = 0.850$ ,  $p < 0.001$ ). According to this research, consumers are much more likely to accept AI-based solutions in subsequent communications with telecom providers when they believe AI is effective at resolving issues and speeding up response times. In this context, the term “telecom providers” refers generically to telecommunications companies operating in Romania, without indicating any specific operator. Additionally, there was a positive correlation between Perceived Value Added and every other dimension, especially with Satisfaction ( $r = 0.625$ ,  $p < 0.001$ ) and Trust ( $r = 0.660$ ,  $p < 0.001$ ). This indicates that consumers are more likely to trust AI and express greater satisfaction when they acknowledge its role in enhancing services. The integrative role of value perceptions in influencing adoption behaviors is highlighted by even the moderate correlations with Efficiency ( $r = 0.353$ ,  $p < 0.001$ ) and Acceptance ( $r = 0.332$ ,  $p < 0.001$ ).

When combined, these findings imply that AI is viewed as a catalyst for interrelated gains in acceptance, efficiency, satisfaction, and trust rather than as a stand-alone technological tool. Therefore, improving any one of these areas can have a cascading effect that improves customer experience and encourages the adoption of AI.

Three primary patterns emerged from the correlation analysis. First, trust was positively and strongly correlated with satisfaction, demonstrating that greater customer satisfaction is a direct result of increased trust in AI systems. Second, there was a very strong positive correlation between Efficiency and Acceptance, suggesting that when AI is shown to increase service efficiency, customers are more likely to adopt it. Lastly, the integration of Perceived Value Added into operational and trust perceptions of AI in telecommunications was demonstrated by its moderate but consistent correlation with all other dimensions.

**Table 3:** Cronbach's Alpha values for AI perception scales

| Reliability Statistics |                                              |            |
|------------------------|----------------------------------------------|------------|
| Cronbach's Alpha       | Cronbach's Alpha Based on Standardized Items | N of Items |
| .704                   | .720                                         | 5          |

Source: Authors' own research

The reliability analysis's Cronbach's Alpha of .704 was higher than the generally recognized cutoff point of .70 for exploratory research. Internal consistency was further confirmed when Alpha increased marginally to .720 when standardized items were taken into account. The scale can be regarded as sufficiently consistent for gauging consumer perceptions of artificial intelligence in telecommunications, since each of the five items positively contributes to the overall reliability.

**Table 4:** Communalities of AI perception dimensions after extraction

| Communalities                                    |         |            |
|--------------------------------------------------|---------|------------|
|                                                  | Initial | Extraction |
| Efficiency_Score                                 | 1.000   | .913       |
| Trust_Score                                      | 1.000   | .908       |
| Satisfaction_Score                               | 1.000   | .885       |
| Acceptance_Score                                 | 1.000   | .913       |
| ValueAdded_Score                                 | 1.000   | .817       |
| Extraction Method: Principal Component Analysis. |         |            |

Source: Authors' own research

**Table 5:** Rotated component matrix of AI perception dimensions

| Rotated Component Matrix <sup>a</sup>               |           |       |
|-----------------------------------------------------|-----------|-------|
|                                                     | Component |       |
|                                                     | 1         | 2     |
| Trust_Score                                         | .948      | -.099 |
| Satisfaction_Score                                  | .935      | -.103 |
| ValueAdded_Score                                    | .809      | .403  |
| Acceptance_Score                                    | -.009     | .956  |
| Efficiency_Score                                    | .020      | .955  |
| Extraction Method: Principal Component Analysis.    |           |       |
| Rotation Method: Varimax with Kaiser Normalization. |           |       |

a. Rotation converged in 3 iterations.

Source: Authors' own research

Two primary components that explain the structure of consumer perceptions of AI in telecommunications were found by the exploratory factor analysis. Efficiency and Acceptance loaded heavily on the second factor, while Trust, Satisfaction, and Value Added loaded heavily on the first, according to the rotated component matrix. All constructs were well represented by the factor solution, as evidenced by the consistently high communalities (.817–

.913). These findings imply that opinions about AI tend to revolve around two more general dimensions: an efficiency-acceptance dimension that represents operational advantages and adoption openness, and a value-trust dimension that engenders confidence and satisfaction.

**Table 6:** Model summary for predictors of AI acceptance

| Model Summary |                   |          |                   |                            |                 |                   |     |     |               |
|---------------|-------------------|----------|-------------------|----------------------------|-----------------|-------------------|-----|-----|---------------|
| Model         | R                 | R Square | Adjusted R Square | Std. Error of the Estimate | R Square Change | Change Statistics |     |     |               |
|               |                   |          |                   |                            |                 | F Change          | df1 | df2 | Sig. F Change |
| 1             | .861 <sup>a</sup> | .742     | .731              | .45464                     | .742            | 68.334            | 4   | 95  | <.001         |

a. Predictors: (Constant), ValueAdded\_Score, Efficiency\_Score, Satisfaction\_Score, Trust\_Score

Source: Authors' own research

With  $R = .861$ , the model summary shows a strong correlation between the predictors and the dependent variable. Efficiency, trust, satisfaction, and value added account for about 74.2% of the variance in customer acceptance of AI, according to the coefficient of determination ( $R^2 = .742$ ). The standard error of the estimate (.454) indicates a good degree of accuracy, and the adjusted  $R^2$  of .731 validates the model's stability when applied to the sample. All things considered, these findings show that the regression model offers a solid foundation for interpretation and has a high explanatory power.

**Table 7:** ANOVA results for the regression model predicting AI acceptance

| ANOVA <sup>a</sup> |            |                |    |             |        |                    |
|--------------------|------------|----------------|----|-------------|--------|--------------------|
| Model              |            | Sum of Squares | df | Mean Square | F      | Sig.               |
| 1                  | Regression | 56.497         | 4  | 14.124      | 68.334 | <.001 <sup>b</sup> |
|                    | Residual   | 19.636         | 95 | .207        |        |                    |
|                    | Total      | 76.134         | 99 |             |        |                    |

a. Dependent Variable: Acceptance\_Score

b. Predictors: (Constant), ValueAdded\_Score, Efficiency\_Score, Satisfaction\_Score, Trust\_Score

Source: Authors' own research

The regression model is statistically significant, according to the ANOVA test ( $F(4,95) = 68.33$ ,  $p < .001$ ). This demonstrates the model's robustness by showing that the set of predictors—efficiency, trust, satisfaction, and value added—collectively account for a sizable amount of the variation in AI adoption.

**Table 8:** Regression coefficients for predictors of AI acceptance

| Coefficients <sup>a</sup> |                             |            |                           |       |        |                         |      |       |
|---------------------------|-----------------------------|------------|---------------------------|-------|--------|-------------------------|------|-------|
| Model                     | Unstandardized Coefficients |            | Standardized Coefficients | t     | Sig.   | Collinearity Statistics |      |       |
|                           | B                           | Std. Error | Beta                      |       |        | Tolerance               | VIF  |       |
| 1                         | (Constant)                  | .085       | .296                      | .287  | .775   |                         |      |       |
|                           | Efficiency_Score            | .968       | .075                      | .792  | 12.889 | <.001                   | .719 | 1.391 |
|                           | Trust_Score                 | -.350      | .140                      | -.273 | -2.503 | .014                    | .229 | 4.370 |
|                           | Satisfaction_Score          | .145       | .121                      | .126  | 1.199  | .234                    | .247 | 4.054 |
|                           | ValueAdded_Score            | .205       | .110                      | .154  | 1.863  | .066                    | .399 | 2.505 |

a. Dependent Variable: Acceptance\_Score

Source: Authors' own research

Efficiency was the most powerful positive predictor in terms of coefficients ( $\beta = .792$ ,  $p < .001$ ), whereas Value Added had a marginally smaller impact ( $\beta = .154$ ,  $p = .066$ ). Acceptance was negatively correlated with trust ( $\beta = -.273$ ,  $p = .014$ ), while satisfaction had no discernible impact ( $\beta = .126$ ,  $p = .234$ ). Overall, the findings show that the primary factor influencing the adoption of AI in telecommunications is perceived efficiency, with added value coming in second.

## Conclusion

The study's findings support the notion that efficiency is the primary driver of artificial intelligence (AI) adoption in the telecom industry, showing that consumers' receptivity to these technologies is largely determined by factors like speed, dependability, and AI's capacity to promptly address problems. In addition to the operational benefits, added value—through personalization, wise suggestions, and improved services—also has a favorable impact on customer perceptions. However, despite having less of an immediate impact on the decision to accept, trust and satisfaction are essential for fostering enduring loyalty and preserving a solid rapport between operators and customers. Transparency, data protection, and clear communication are essential components for converting technological advantages into satisfying and memorable customer experiences, as evidenced by the extremely strong correlation between trust and satisfaction..

Customers' cautious openness indicates that in order to overcome initial reluctance, operators must continuously show the worth and dependability of AI-based solutions. The value–trust–satisfaction axis, which represents the perceived and emotional aspect of the interaction, and the efficiency–acceptance axis, which captures operational performance and openness to innovation, are two complementary dimensions that factor analysis reveals underlie user perceptions. This structure emphasizes that the success of implementing AI depends not only on advancements in technology but also on how businesses interact with and develop relationships with their customers.

Furthermore, in order to prevent impressions of a lack of empathy, AI integration should be paired with programs that maintain a human element in consumer interactions, such as hybrid AI–human support. Effective implementation of these strategies can turn AI from a simple operational tool into a strategic driver of customer loyalty and competitiveness.

All things considered, the study shows that artificial intelligence has the potential to completely rethink the telecom industry's customer experience, producing both practical and emotional benefits that improve businesses' interactions with customers. The findings offer managers and decision-makers a strong framework, indicating that implementing AI is not just a technical choice but also a crucial strategic priority for sustained success in a market marked by fierce competition and rising customer expectations. Future research will aim to expand the sample to include a larger and more diverse group of respondents, as well as to integrate a qualitative component—such as interviews or focus groups—to provide deeper insights into the emotional and behavioral dimensions of customer interaction with AI-based services..

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