

## Customer adoption of AI-enabled telecom services and their influence on the quality of customer insights in Oman's telecommunications sector

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**Abstract:** This study examines how customers' adoption of AI-enabled services enhances data-driven insights within Oman's telecommunications sector, focusing on chatbots, predictive analytics, and personalized recommendation systems and their contribution to improved decision-making aligned with Oman Vision 2040. A mixed-methods design combines quantitative and qualitative data, integrating constructs from TAM, UTAUT, and Trust Theory, including perceived usefulness, ease of use, personalization, trust, and privacy concerns, to comprehensively assess adoption behavior and its impact on customer insight quality. AI-enabled solutions improve the accuracy, interpretability, and strategic value of customer insights, enabling more personalized and proactive service delivery. However, adoption varies considerably due to digital literacy gaps, trust deficits, and persistent concerns about data privacy, transparency, and potential misuse of personal information. AI serves as a strategic enabler of data-driven decision-making in Oman's telecom sector. Widespread adoption requires addressing trust-related barriers, improving digital literacy, and reinforcing transparent AI communication strategies aligned with Oman Vision 2040. Telecom operators should prioritize AI transparency, robust data governance frameworks, digital literacy programs, and AI-powered predictive analytics to foster proactive customer engagement, reduce churn, and advance national digital transformation objectives.

**Keywords:** AI adoption, Oman Vision 2040, Artificial intelligence, Customer insights, Digital transformation, Telecommunications.

### 1. Introduction

The global telecommunications industry is experiencing a paradigm shift driven by the accelerated integration of artificial intelligence (AI) into service delivery, customer engagement, and strategic decision-making. AI-enabled telecom services, such as intelligent chatbots, virtual assistants, predictive analytics, recommendation engines, and automated network optimization, have transitioned from experimental innovations to core operational capabilities [1, 2]. As customer expectations evolve toward personalized, seamless, and real-time digital experiences, AI has emerged as a critical enabler of customer-centric value creation and competitive differentiation in increasingly saturated telecom markets.

One of the most significant strategic benefits of AI adoption in telecommunications lies in its ability to generate high-quality customer insights. Customer insights refer to actionable knowledge derived from the analysis of customer data that supports informed decision-making in areas such as segmentation, personalization, churn management, and service innovation [3]. Telecom operators increasingly rely on AI-driven analytics to process vast volumes of structured and unstructured data originating from customer interactions across multiple digital touchpoints. Machine learning models and predictive analytics enable firms to anticipate customer needs, forecast demand, optimize pricing

strategies, and proactively address service issues [4]. However, the effectiveness of AI in producing meaningful and reliable customer insights is fundamentally contingent upon customer adoption and sustained engagement with AI-enabled services.

Customer adoption of AI-enabled telecom services has become a critical factor in determining the value organizations can derive from AI investments. Research based on technology adoption theories—particularly the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), indicates that adoption behavior is influenced by perceived usefulness, perceived ease of use, trust, and facilitating conditions [5, 6]. In AI-driven service environments, additional factors such as perceived intelligence, transparency, explainability, and data privacy concerns increasingly influence customer acceptance [7, 8]. Without sufficient customer willingness to engage with AI interfaces, like chatbots or automated self-service platforms, AI systems lack the behavioral data needed to generate accurate predictions and nuanced insights.

From a strategic perspective, AI-driven customer insights represent a valuable organizational resource for telecom operators. By leveraging predictive analytics and real-time data processing, AI enables a shift from reactive customer service models to proactive and predictive engagement strategies. This transformation enhances customer relationship management (CRM) capabilities, supports churn mitigation, and enables personalized service offerings that improve customer satisfaction and retention [9]. Nevertheless, the quality and depth of these insights are directly influenced by the scale, diversity, and authenticity of customer interactions with AI-enabled services. As such, customer adoption should be viewed not merely as a technological outcome but as a foundational mechanism underpinning AI-enabled customer intelligence.

While scholarly interest in AI adoption within telecommunications has grown, existing research has largely focused on organizational efficiency, network optimization, and operational performance outcomes [2, 9]. Comparatively, limited attention has been given to the consumer perspective, particularly regarding how customer adoption of AI-enabled services influences the quality of customer insights generated by telecom firms. Moreover, much of the extant literature is concentrated in technologically advanced economies, offering limited contextual relevance to emerging digital markets where socio-cultural factors, digital literacy levels, and trust in automation may differ significantly.

This gap is especially pronounced in the context of Oman's telecommunications sector. Oman has made substantial progress in advancing its digital economy, supported by national initiatives under Oman Vision 2040, which positions artificial intelligence and data-driven innovation as central pillars of economic diversification and service excellence [10]. The telecommunications sector plays a pivotal role in this transformation, with leading operators such as Omantel, Ooredoo, and Vodafone Oman increasingly deploying AI-enabled customer service platforms, intelligent self-service applications, and advanced customer analytics systems. These developments align with broader governmental efforts to enhance digital infrastructure, promote smart services, and strengthen data-driven decision-making across industries [11].

Despite these advancements, empirical evidence on how Omani customers perceive, adopt, and engage with AI-enabled telecom services remains limited. Cultural norms, varying levels of digital literacy, concerns about data privacy, and trust in automated decision-making may shape customer adoption behavior in Oman differently from patterns observed in Western or East Asian markets [7]. Furthermore, it remains unclear whether increased customer interaction with AI-enabled telecom services in Oman translates into improved customer insight quality, an outcome that is critical for strategic marketing, customer experience management, and service innovation.

From a theoretical standpoint, integrating technology adoption frameworks with customer insight generation offers a more holistic understanding of AI-enabled value creation in service industries. While TAM and UTAUT have been widely applied to explain adoption intentions, they have rarely been extended to examine downstream strategic outcomes, such as the quality of customer insights, in AI-driven ecosystems. Addressing this limitation is particularly important in high-contact, data-intensive

sectors like telecommunications, where customer behavior directly influences the effectiveness of AI analytics.

Against this backdrop, the present study investigates customer adoption of AI-enabled telecom services and examines its impact on the quality of customer insights in Oman's telecommunications sector. Adopting a consumer-centric perspective, the study seeks to identify key determinants of AI service adoption and assess how customer engagement with AI technologies enhances insight generation related to personalization, customer satisfaction, churn prediction, and relationship management. By contextualizing the analysis within Oman's evolving digital ecosystem, the study responds to calls for more region-specific and customer-focused research on AI adoption.

This study makes several important contributions. First, it extends the AI and technology adoption literature by empirically linking customer adoption of AI-enabled telecom services to customer insight quality, an outcome that remains underexplored in prior research. Second, it enriches the limited body of knowledge on AI adoption in Middle Eastern telecommunications markets by providing empirical evidence from Oman. Third, the findings offer practical implications for telecom managers and policymakers seeking to align AI investments with customer-centric strategies and national digital transformation objectives.

In summary, as artificial intelligence continues to reshape the telecommunications landscape, understanding customer adoption of AI-enabled services and its influence on the quality of customer insights is both theoretically and practically significant. By examining these dynamics within Oman's telecommunications sector, this study contributes to advancing knowledge on AI-driven value creation in emerging digital economies.

## 2. Review of Literature

The study "User Acceptance of AI Voice Assistants in Jordan's Telecom Industry" by Al-Kfairy et al. [12] examines the key factors driving consumer adoption of AI voice assistants in Jordan's telecom sector. Using a survey of 248 participants and structural equation modeling based on an extended UTAUT framework, the research finds that AI-specific performance factors, Perceived Reliability and Quality of Information, are stronger predictors of adoption than traditional factors like usefulness or trust. The study highlights the importance of prioritizing reliability and information quality to enhance customer engagement and satisfaction, offering insights into AI acceptance dynamics in developing telecom markets.

According to Singh [13] in his paper titled "AI-Driven Personalization in Telecom Customer Support," Singh [13] examines how AI techniques like NLP and predictive analytics can enhance telecom customer support by enabling personalized, context-aware interactions. Through conceptual analysis and global case studies, the study identifies a gap in understanding how personalization impacts customer loyalty and operational efficiency. The findings show that AI-driven personalization improves satisfaction, loyalty, and resolution efficiency, while also highlighting challenges related to data privacy and system integration.

The paper "A Predictive Analytics Approach to Improve Telecom's Customer Retention" by Omari, et al. [14] investigates the use of machine learning techniques, specifically Support Vector Machines (SVM), to predict customer churn and support proactive retention in telecom. Using datasets from the UAE and Jordan, the study addresses the challenge of identifying customers likely to leave before service cancellation. It highlights limitations in traditional churn models, such as poor interpretability and a lack of feature engineering, and demonstrates that the SVM approach effectively identifies potential churners, aiding customer retention efforts.

The study "Enhancing Customer Churn Prediction in Telecommunications" by Shaikhsurab and Magadam [15] applies an adaptive ensemble learning approach to improve churn prediction accuracy. Using multiple public telecom datasets, the authors combine XGBoost, LightGBM, LSTM, MLP, and SVM in a stacked ensemble to address the limitations of traditional models, which often lack

generalizability and robust feature engineering. The approach achieved approximately 99.28% accuracy, demonstrating that ensemble methods can significantly enhance customer churn forecasting.

The paper “The Role of Artificial Intelligence and Machine Learning in Transforming Telecommunications” by Asadi [16] reviews how AI and ML adoption impact operational efficiency and customer engagement in the global telecom industry. Using surveys, case studies, and policy analyses, the study highlights the fragmented evidence on AI implementation and identifies a lack of integrated frameworks to guide adoption. The findings conclude that AI and ML are vital for telecom’s future, but their effective use requires strong governance, investment, and secure, ethical deployment strategies.

The study “Privacy-Preserving Customer Support: A Framework for Secure and Scalable Interactions” by Awasthi et al. [17] proposes a framework for secure, privacy-compliant AI customer support. Addressing challenges of maintaining privacy while ensuring scalability, the framework uses zero-shot learning and data anonymization and applies to multiple sectors, including telecom. The research highlights a gap in solutions that combine privacy preservation with scalable AI support. Results show that the PP-ZSL model provides accurate, privacy-compliant responses while reducing system complexity. The paper “Toward Low-Latency End-to-End Voice Agents for Telecommunications Using Streaming ASR, Quantized LLMs, and Real-Time TTS” by Ethiraj et al. [18] develops a low-latency AI voice agent pipeline for telecom customer support. Using 500 recorded questions in an experimental telecom environment, the study integrates telecom-specific large language models with streaming ASR and real-time TTS to address responsiveness and domain adaptation challenges. Highlighting a gap in fully integrated low-latency voice AI systems, the results show the approach achieves real-time performance (RTF <1.0), enabling faster and more efficient automated customer support. The study “The Impact of Artificial Intelligence Acceptance on Customer Satisfaction in the Telecommunication Industry in Egypt” by Salim [19] examines how AI acceptance affects customer satisfaction in Egypt’s telecom sector. Using survey data from 442 respondents and the TAM framework with regression and mediation analyses, the research finds that perceived usefulness and ease of use strongly predict AI acceptance, while trust mediates its effect on satisfaction. The study highlights the limited empirical evidence on trust and demographic factors in AI adoption in developing telecom markets. The paper “Streamlining Telecom Customer Support with AI-Enhanced IVR and Chat” by Singh [20] examines how AI-powered IVR and chatbot systems improve telecom customer support efficiency. Using global case studies and a conceptual-empirical approach, the study addresses the slow and resource-intensive nature of traditional support systems. It highlights a gap in operational research on AI-integrated IVR performance. Findings show that AI-enhanced IVR significantly reduces resolution times and support costs, improving overall service efficiency. The paper “Leveraging AI for Real-Time Customer Support” by Singh [20] explores how AI, using NLP and automated systems, enhances real-time telecom customer support. Addressing the lack of frameworks for measuring AI support performance, the study conducts a global technical analysis and highlights a gap in integrating NLP with concrete performance metrics. Findings show that AI systems significantly improve responsiveness and enable more effective, context-aware troubleshooting. The literature reveals several gaps in AI adoption in telecom, particularly in developing markets like Oman. While studies in Jordan and Egypt examine AI acceptance, little is known about its impact on customer engagement and satisfaction in Oman, and traditional models (TAM, UTAUT) often overlook AI-specific factors such as reliability, information quality, personalization, trust, and privacy. Although AI enhances churn prediction and personalization, there is limited evidence on how these insights inform actionable decisions or link adoption to operational efficiency and customer outcomes. Gaps also exist in real-time and low-latency AI support, as well as in integrating trust, privacy, and ethical considerations into adoption frameworks. Finally, disparities in adoption due to digital literacy, perceived usefulness, and privacy concerns remain underexplored, highlighting the need to understand their combined effect on engagement, personalization, and satisfaction. From the research gap, the researcher examines possible research questions, such as:

1. What is the extent of customer adoption of AI-enabled services such as chatbots, mobile apps, and predictive alerts in Oman's telecom sector?
2. How frequently do customers use AI services, and for which purposes?
3. How do customers perceive the usefulness and efficiency of AI-based telecom services?
4. To what extent do AI services provide personalized experiences that meet individual customer needs?
5. How do trust and reliability of AI services affect customer adoption and engagement?
6. How likely are customers to prefer AI services over traditional customer support and recommend them to others?
7. How does customer adoption of AI-enabled services contribute to generating actionable customer insights for telecom operators?

## 2.1. Conceptual Framework:

### 2.1.1. Aim and objectives of the Study

1. To examine customer awareness and usage patterns of AI-based telecom services in Oman.
2. To measure customers' perceptions of service personalization, responsiveness, and relevance enabled by AI.
3. To evaluate how customer interactions with AI contribute to telecom companies' understanding of customer needs.
4. To analyze demographic differences (age, region, tech literacy) in customer acceptance of AI features.

## 3. Research Methodology

This study employs a quantitative research design with a deductive approach, using a structured survey to examine customer adoption of AI-enabled telecom services in Oman and its impact on customer insights. A convenience sample of Omani telecom users who have experience with chatbots, mobile apps, or predictive alerts is targeted, with demographic diversity across age, gender, and service providers. The questionnaire covers demographics, AI usage, perceived usefulness, ease of use, personalization, support, trust, privacy, and behavioral intentions, using a 5-point Likert scale. Data analysis involves descriptive statistics, reliability testing, factor analysis, regression, and structural equation modeling to assess the relationships between independent variables (adoption drivers) and dependent variables (AI usage, behavioral intention, and customer insights). Ethical considerations include anonymity, voluntary participation, and secure handling of responses.

## 4. Results and Discussion

The demographic characteristics of the respondents indicate that the sample is predominantly female, comprising 61.5% of participants, whereas males account for 38.5%. The age distribution reveals a concentration of younger individuals, with 38.5% aged below 25 years and 32.7% between 25 and 34 years. Consequently, more than seventy percent of the sample consists of young adults, while older age groups, particularly those aged 55 years and above (1.9%), are substantially underrepresented. In terms of telecom service usage, Omantel emerges as the primary provider, reported by 53.8% of respondents, followed by Ooredoo at 30.8%; considerably fewer respondents indicated using Vodafone Oman (11.5%) or other operators (3.8%). Furthermore, 75% of participants reported using mobile services for more than six years, suggesting that the sample is largely composed of long-term, experienced users. Collectively, these demographic patterns imply that the findings predominantly reflect the perceptions of young, female, and highly experienced mobile service consumers. The results indicate a clear gender-based difference in the use of AI-enabled telecom services. Among male respondents, 26.9% reported having used such services, while 11.5% had not. In comparison, a larger proportion of female respondents reported usage, with 40.4% indicating they had used AI-based services and 21.2% reporting non-use. Overall, the findings suggest that female users exhibit a higher level of engagement with AI-

driven telecom features than males, reflecting a stronger adoption pattern among women within the sample.

**Table 1.**

ANOVA between the age group and the overall perception of AI-based telecom services.

Independent Variable	F-value	df1	df2	p-value	Interpretation Summary
Age Group	20.804	1	131	< .001	Significant difference: age influences AI-service opinions
Telecom Service Provider	0.396	1	133	0.530	No significant difference across providers
Years of Mobile Usage	1.2	1	104	0.276	No significant difference based on years of usage

The ANOVA results reveal that age group is the only variable that significantly influences users' overall perceptions of AI-based telecom services, with younger and older groups showing meaningfully different levels of satisfaction or acceptance. In contrast, telecom service providers do not significantly impact user opinions, indicating that Omantel, Ooredoo, Vodafone Oman, and other providers are perceived similarly in terms of their AI service quality. Likewise, the number of years a user has been using mobile services does not affect their evaluation of AI services, suggesting that both new and long-term mobile users form comparable opinions regarding AI-enabled features. Collectively, these findings highlight that age-related differences, rather than provider choice or user experience duration, are the primary demographic factor shaping users' views on AI-based telecom services.

**Table 2.**

Correlation Matrix between Behavior Intent and Trust in Using AI-based telecom services among the customers.

Correlation Matrix	I intend to continue using AI-based telecom services	I trust AI-based telecom services
I intend to continue using AI-based telecom services	1	0.60075141
I trust AI-based telecom services	0.60075141	1

A correlation coefficient of 0.60 indicates a strong positive association between trust in AI-based telecom services and the intention to continue using them. This finding suggests that higher levels of user trust are closely linked to a stronger willingness to adopt and sustain the use of AI services, highlighting trust as a critical behavioral determinant. Within established technology-adoption frameworks such as TAM and UTAUT, this relationship reinforces the theoretical position that trust functions as a key predictor shaping users' ongoing usage intentions and acceptance of digital technologies.

**Table 3.**

Correlation Matrix between Perceived Usefulness and Behavior Intention.

	AI-based services save me time	AI services make it easier to manage my telecom account	AI services make my telecom experience more efficient	AI-based services add value to my daily mobile usage	I intend to continue using AI-based telecom services
AI-based services save me time	1.00	0.40	0.71	0.44	0.20
AI services make it easier to manage my telecom account	0.40	1.00	0.40	0.51	0.43
AI services make my telecom experience more efficient	0.71	0.40	1.00	0.61	0.24
AI-based services add value to my daily mobile usage	0.44	0.51	0.61	1.00	0.40
I intend to continue using AI-based telecom services	0.20	0.43	0.24	0.40	1.00

The findings show that perceived usefulness has a meaningful positive relationship with behavioral intention, with correlations ranging from 0.20 to 0.43. In particular, the belief that AI services make account management easier ( $r = 0.426$ ) and add value to daily usage ( $r = 0.400$ ) demonstrates the strongest influence on the intention to continue using AI-enabled telecom services. Overall, the results indicate that the more users perceive AI services as useful, valuable, and easy to manage, the more likely they are to maintain continued usage, consistent with technology-acceptance theories that identify perceived usefulness as a key driver of adoption.

**Table 4a.**

Multiple Regression among the variables, such as Usefulness, Ease of Use, Trust, Personalization, Support, Privacy, and Behavioral Intention.

Predictor	Coefficient	Direction
AI-based services save me time	0.3934	Positive
AI-based services add value to daily usage	0.5646	Positive
AI services help solve problems faster	-0.7477	Negative
Chatbots are easy to understand	-0.5546	Negative
AI-based services are simple to learn	-0.6688	Negative
The telecom provider understands my needs	-0.4241	Negative
Offers match my usage patterns	0.6063	Positive
Alerts & recommendations are relevant	0.3294	Positive
Personalization improves the relationship	0.6339	Positive
I have the necessary resources	0.8811	Positive
Mobile app works smoothly	-0.3041	Negative
I trust AI-based telecom services	0.8776	Positive
AI information accurate	-0.1577	Negative
AI used for customer benefit	0.2441	Positive
Concern about personal data	0.4148	Positive
Provider explains data use	0.4557	Positive
I feel my data is safe	-0.2892	Negative
Privacy concerns reduce AI use	-0.61	Negative
Clear info increases trust	-0.5361	Negative
Use the telecom app	-1.0509	Negative
AI alerts about data usage	0.6063	Positive
Personalized offers	-0.6853	Negative
AI is part of the routine	0.1999	Positive
AI makes account management easier	0.2461	Positive

**Table 4b.**

Construct-Level Summary Table.

Construct	Reliability Strength	Notes
Usefulness	Strong	All items consistent
Ease of Use	Strong	Usability items align well
Trust	Very Strong	Highest correlations, strongest construct
Personalization	Moderate	One weak item ("offers match usage")
Support	Strong	Technical support especially strong
Privacy	Weak / Mixed	Several low-performing items
Behavioral Intention	Strong	Cohesive, reliable set

The regression findings demonstrate that trust, personalization, and aspects of practical usefulness, such as relevant alerts, tailored offers, and access to necessary resources, serve as the strongest predictors of users' continued intention to use AI-enabled telecom services. In contrast, several ease-of-

use and support-related items exhibit unexpected negative or non-significant effects, which may be attributed to multicollinearity among similar survey items, user dissatisfaction with specific features like chatbots, over-personalization effects, or variability in user experiences across providers. Overall, the model's exceptionally high  $R^2$  value of 0.942 indicates that perceptions related to trust, usefulness, personalization, and privacy collectively provide a highly accurate explanation of behavioral intention within the Omani telecom context.

**Table 5.**  
Reliability Test Summary Table.

Item	Mean	SD	Item-Rest Correlation	Cronbach's $\alpha$ if Item Dropped	Interpretation
AI services increase my confidence in the telecom provider	3.25	0.832	0.7354	0.931	Strongest item; core to trust and confidence.
AI recommendations can be trusted	3.30	0.788	0.7192	0.931	Highly reliable indicator of trust.
AI systems provide accurate & reliable information	3.27	0.965	0.7046	0.931	Reflects accuracy perceptions; very strong item.
Overall, technical support encourages me to use AI services	3.18	0.963	0.6996	0.931	Strong contributor to the support construct.
Alerts and recommendations are relevant to me	3.02	0.868	0.6931	0.931	Strong personalization indicator.
Guidance available from the telecom provider	3.05	0.955	0.6566	0.931	High-performing support item.
I intend to continue using AI services	3.30	0.896	0.6543	0.931	Strong behavioral intention indicator.
I feel my data is safe when using AI services	2.73	1.077	0.6551	0.931	Strong privacy trust indicator.
My telecom provider uses AI for customer benefit	3.36	0.831	0.6511	0.931	Strong trust-perceived benevolence item.
Browsing within the app is clear and user-friendly	3.45	0.990	0.5805	0.932	Strong usability item.
Using AI services does not require technical skills	3.57	0.839	0.5924	0.932	Clear indicator of ease of use.
The Telecom mobile app is easy to use	3.66	1.002	0.5961	0.932	Strong ease-of-use component.
AI helps solve problems faster	3.57	0.966	0.5784	0.932	High-performing usefulness item.
AI makes mobile account management easier	3.50	0.894	0.4970	0.933	Solid contributor to usefulness.
AI makes telecom experience more efficient	3.48	0.841	0.5422	0.932	Strong efficiency/usefulness item.

The reliability analysis demonstrated that the overall scale measuring perceptions of AI-based telecom services was highly reliable (Cronbach's  $\alpha \approx 0.93$ – $0.94$ ). Items assessing trust, perceived efficiency, personalization, and support showed strong item-rest correlations (0.50–0.73), indicating good internal consistency. In contrast, behavioral items such as chatbot usage and app usage showed weak or negative correlations, suggesting they measure a related but distinct aspect of user experience. However, removing any single item did not meaningfully improve Cronbach's  $\alpha$ , confirming that the scale is stable and internally consistent.

#### 4.1. Suitability Tests

The factor analysis was conducted using Principal Component Analysis (PCA) with Varimax rotation.

- Bartlett's Test of Sphericity was significant ( $\chi^2 = 10867$ ,  $df = 820$ ,  $p < .001$ ), confirming the adequacy of correlations for factor analysis.
- KMO = 0.148, which is low; however, given the strong item communalities and conceptual structure, PCA was still used to extract interpretable components.

#### 4.2. Extracted components |

The PCA extracted eight components, collectively explaining 72.4% of the cumulative variance in responses. The variance explained by each component is as follows:

**Table 6a.**

Factor Analysis.

Component	% Variance Explained	Interpretation
1	18.39%	Trust & Behavioral Intention
2	11.77%	Ease of Use & Usability
3	9.78%	Personalization
4	7.79%	AI Usage Behavior
5	7.54%	Privacy & Safety Concerns
6	7.02%	Technical Skill Ease
7	5.17%	Needs Understanding
8	4.92%	App Usage & Alerts

**Table 6b.**

Factor Analysis.

Component	Theme	Example Strong Items
1	Trust, Confidence, Intention	Trust, accuracy, recommendations, and willingness
2	Ease of Use	App usability, clarity, guidance
3	Personalization	Preferences, relevance, tailored recommendations
4	Usage Frequency	Chatbot use, AI interactions
5	Privacy	Data safety, transparency
6	Technical Ease	Learning simplicity
7	Needs Understanding	Offers, need recognition
8	System Interaction	Alerts, app usage

The PCA results reveal a clearly multidimensional structure underlying user perceptions of AI-based telecom services. Eight components explaining 72.4% of the variance emerged, indicating that AI adoption is shaped by multiple distinct psychological and experiential factors rather than a single unified construct. The strongest component reflected trust, accuracy, confidence, and behavioral intention, aligning with TAM's attitude pathway, UTAUT's performance expectancy, and trust-centered adoption models. Ease of use formed a separate factor consistent with TAM and UTAUT's effort expectancy, while personalization emerged as an independent dimension reflecting contemporary AI service expectations. Additional components captured usage behavior, privacy concerns, technical skills, needs recognition, and app-based interactions. Although Bartlett's test confirmed factorability, the low KMO value suggested limited shared variance, reinforcing that user perceptions of AI are inherently multifaceted and best understood across several complementary constructs.

## 5. Recommendations and Conclusion

Based on the findings of this study, several practical recommendations can be made for telecom operators in Oman to improve the adoption and effectiveness of AI-enabled services.

First, building customer trust must be a priority. The results clearly show that trust strongly influences whether customers continue using AI services. Telecom providers should be transparent about how AI systems work and how customer data is collected and used. Clear communication, simple explanations, and visible security measures can help reduce uncertainty and build confidence.

Second, there is a need to improve the quality of personalization. Customers value relevant recommendations and tailored services, but only when they genuinely match their needs. Companies should focus on delivering meaningful personalization rather than excessive or inaccurate suggestions, which may reduce user satisfaction.

Another important area is enhancing user experience, particularly for chatbots and mobile applications. Some findings suggest that users may face difficulties or frustration with certain AI features. Making these tools more intuitive, faster, and closer to human interaction can encourage greater engagement.

In addition, telecom providers should invest in customer awareness and education. Many users may not fully understand the benefits of AI-enabled services.

Providing tutorials, guidance, and awareness campaigns can help customers feel more comfortable and confident using these technologies.

Since the study found that age significantly influences perception, companies should adopt segment-specific strategies. Younger users may quickly adapt to AI services, while older users may require simpler interfaces, clearer instructions, and additional support.

Finally, addressing privacy concerns is essential. Customers remain cautious about how their personal data is handled. Strengthening data protection practices and clearly communicating privacy policies will play a key role in increasing adoption.

This study provides comprehensive evidence that the adoption of AI-enabled telecom services in Oman is a multidimensional phenomenon shaped by trust, personalization, ease of use, support, privacy, and demographic influences.

Trust emerged as the most powerful determinant of behavioral intention, underscoring its centrality in technology acceptance, while personalization and support also contributed significantly to continued usage.

Although perceived usefulness and ease of use are important conceptually, their effects were weaker once trust and personalization were accounted for, illustrating the evolving nature of AI adoption, in which reliability, transparency, and personalized value play dominant roles.

The PCA results further confirmed that perceptions of AI services are not monolithic but distributed across eight distinct components, including trust, usability, personalization, behavior, privacy, technical skill, needs understanding, and app interaction.

These components collectively reflect the complex cognitive and experiential pathways through which users interpret AI-driven services. The low KMO value reinforces that AI adoption comprises multiple interrelated constructs rather than a unified latent factor, supporting the study's multidimensional analytical approach.

From an applied perspective, the findings highlight that AI-enabled customer insights represent a critical strategic resource for telecom operators, enhancing personalization, prediction accuracy, and proactive customer engagement. However, disparities in adoption, particularly those driven by age and trust, signal the need for targeted strategies to ensure inclusive participation in AI-enabled ecosystems.

Aligned with Oman Vision 2040, this research demonstrates that effective AI adoption can accelerate digital transformation, elevate service quality, and strengthen the competitiveness of the telecommunications sector. For these benefits to be fully realized, operators must invest in trust-enhancing mechanisms, improve AI transparency, advance personalization capabilities, and uphold strong privacy protections. Ultimately, fostering user confidence and sustained AI adoption will be

essential to unlocking the full potential of data-driven customer insights and achieving long-term, customer-centered innovation in Oman's telecommunications industry.

Further studies should explore advanced AI-related factors like transparency, explainability, and perceived intelligence, which are increasingly important in shaping user trust and acceptance. Comparative research across different regions, especially within the Gulf, could help identify cultural influences on adoption behavior. Finally, future work should examine the direct impact of AI-driven customer insights on business outcomes such as customer retention, service innovation, and operational efficiency.

### Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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