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# Research on Artificial Intelligence Customer Service on Consumer Attitude and Its Impact during Online Shopping

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# Research on Artificial Intelligence Customer Service on Consumer Attitude and Its Impact during Online Shopping

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**Abstract.** Currently, AI customer service is gaining popularity at a high rate, with over 92% of online shoppers having experience with AI customer service. The question is: what attitudes do consumers have towards AI customer service? A randomly selected sample of 670 consumers was surveyed and the study found that 71.5% of consumers accept or at least do not resist AI customer service. The main reasons AI customer service is so popular are that it is fulltime responsive, absolutely neutral, more objective, and represents a future trend. Nevertheless, 28.5% of consumers are still resistant to AI chatbot, mainly because they are not as relevant, effective, and smooth as a human customer service agent. Besides, there are prevalent obstacles to seamlessly bridge AI chatbots with human agents. In terms of explicitly specified AI chatbots versus concealed AI chatbots, merchants should have them specified since consumers have strong antipathy with AI chatbots disguising as human agents. Furthermore, there are differences in attitudes towards AI customer service across age and educational background. Accordingly, we recommend that, in the context of the overall improvement of service quality, to slow down the pace of AI replacing human agents, to do so in a step-by-step and orderly manner, and to give consumers adequate choice for human agents versus AI chatbots. Finally, to fully promote AI customer service, it is an essential measure to increase its media coverage and publicity.

## 1. Introduction

With the development of science and technology, a variety of new technologies are gradually on the stage of industrial production. As the top-end technology in the 21st century, artificial intelligence has gradually emerged in various industries and appeared as a tendency to replace traditional labor-intensive industries. Telephone and online customer service have long been a labor-intensive industry. Due to the need for one-on-one dialogue between consultants and customers, there is a large demand for labor in such industry. The low transaction rate has led to a disproportionate input and output in this industry, resulting in a great waste of human resources. However, the virtual robot customer service based on artificial intelligence technology provides the solution to solve this contradiction in the industry.

In the "New Generation Artificial Intelligence Development Plan" issued by the State Council of China on July 8, 2017, it is mentioned that “By 2030, China will become the world’s main artificial intelligence innovation center, making artificial intelligence theory, technology and applications generally reach the world’s leading level, boosting the artificial intelligence core industry scale to over

1 trillion and driving the related industry scale to over 10 trillion.” he "Plan" clearly states that China attaches importance to AI-related technologies and industries, and also highly affirms the development prospects of AI-related technologies and industries.

With the extensive applying of artificial intelligence technologies in the field of customer service, the academic community has devoted much effort to the technology and application of artificial intelligence customer service, and the related technical research is also rather profound. However, with our research, we found out that most of the current research is mainly divided into two categories. One is the technology itself, mainly studying the specific implementation of artificial intelligence customer service technology. The other is mainly about the application and impact of artificial intelligence customer service technology on enterprises. As for the research on the interaction between artificial intelligence customer service and consumers, relevant research is scarce We believe that marketing behavior in business is by no means unilateral, and decisions should be implemented taking consumer as the core guide. At present, although the application of AI in the field of online customer service shows potentials and advantages, how to effectively apply emerging technologies to consumer service and how to seamlessly upgrade technology is the core issue of promoting current artificial intelligence customer service industry to a new phase.

## 2. Literature Review

At present, international research on artificial intelligence technology is very established and mature, and there are many common applications of A.I. technology in the field of marking and customer services, but the current research on A.I. in particular marketing area is not sufficient.

Impact of Artificial Intelligence, Robotics, and Machine Learning on Sales and Marketing: Keng Siau, Yin Yang. According to the application status of AI in sales and marketing, it is noted that the sales and marketing field is influenced by advanced technology and such influence will be greatly enhanced shortly. Artificial Intelligence, robotics, and machine learning will undoubtedly accelerate their impact on the sales and marketing field. Robots will likely to replace salespeople and marketers in the near future. [1]

The rapid development of artificial intelligence customer service and “lack of human touch” bottleneck to breakthrough: Su Muhui. At present, Artificial Intelligence Customer Service is developing rapidly and there is a trend to gradually replace human customer services. In Su’s article “The rapid development of artificial intelligence customer service and ‘lack of human touch’ bottleneck to breakthrough”, it is mentioned that 91.9% of respondents have used AI customer service, and 88.5% of respondents feel that AI customer service is common, of which 13.6% of respondents feel that the application of AI customer service has been very common. The smart customer service industry is currently growing at a compound annual growth rate of 17.4%. [2]

Key technologies of AI in customer service systems: Wang Zheng, Ren Hua, Lu Xuhai. Wang Zheng and other authors believe that artificial intelligence systems currently have advantages such as high efficiency and low cost compared to traditional human customer service in the field of business customer service. But at the same time, it is also said that the current AI customer service systems still have general weaknesses. For example, the response is inflexible, the tone is rigid, the form is single, and the lack of care. Ultimately, there is a high degree of automation on the firm side, but no significant increase in success rates, and a significant downgrade of user experiences on the customer side. [3]

The pandemic is emptying call centers. AI chatbots are swooping in: Karen Hao. The world is currently experiencing an unprecedented COVID-19 pandemic in which various government agencies and business groups have drastically reduced the number of staff working, while a large portion of the population who are quarantined at home has dramatically increased the number of outgoing calls for various online consultations, said Hao. As the pandemic continues, understaffed government agencies, grocery stores, and financial institutes are scrambling to build similar artificial intelligent customer service systems to handle the new influx of calls. From February to April this year, IBM's Watson Assistant's visits have increased by 40%. Although call centers have long been at the forefront of workplace automation, the pandemic has accelerated the automation noticeably. Stressed organizations are more willing to try new tools and solutions to help with the relevant business. [4]

Machines versus Humans: The Impact of AI Chatbot Disclosure on Customer Purchases: Xueming Luo, Siliang Tong, Zheng Fang, Zhe Qu. The author team surveyed 6,200 random customers and showed that a highly structured AI customer service system was as efficient as a senior human customer service agent and had four times the efficiency of a less experienced human agent. However, if the AI chatbot identifies itself as a robot before it starts a conversation, the turnover rate can drop by more than 79.7%. Despite the objective capabilities of AI customer service systems, negative emotions of customers toward an AI chatbot are usually determined by their subjective perceptions rather than based on objective facts that are rational. Besides, the study has found that such a negative impact could be mitigated by strategies of delaying disclosure to customers and using a pre-trained robot. [5] AI-Driven Sales Automation: Using Chatbots to Boost Sales: Christian Hildebrand, Anouk Bergner. Hilderbrand and Bergner argue that AI chatbots will have wider applications as AI technology and particularly the natural language processing (NLP) technology evolve. According to a recent industry study, 80% of online merchants are considering adopting chatbots, but the vast majority of them are doing so for cost-saving reasons, and few realize that more advanced chatbots can go a step further to boost sales. Through a series of filed and lab studies, the author team found that chatbots could indeed alter consumer preferences and purchase decisions. Introducing "optimized" chatbots with "natural conversation" capabilities into the consumer's shopping process is a great way to boost sales by fostering a closer relationship between consumers and brands, and thus increasing consumer trust. [6]

AI Chatbot to Realize Sophistication of Customer Contact Points: Yoichi Kurchi, Shinji Narukawa, Hideki Hara. Kurachi, Narukawa, and Hara introduce the concept of "Marketing 4.0", arguing that in the third decade of the 21st century, modern marketing has become marketing of self-actualization. Businesses should provide emotional value to their customers and further enhance customer engagement, not just logical value. Therefore, companies need to create a virtuous cycle through a positive service user experience, which allows more customers to be emotionally satisfied. Thus, the authors propose the "CHORDSHIP" solution, which enables 24/7, fast, and accurate customer problem handling through AI chatbots and multichannel linkage technology. [7]

## 3. Research Methods

### *3.1. Basic Information on Survey Respondents*

In this study, we selected people who have had experiences with artificial intelligent customer service in more than 30 provinces and cities, especially in Sichuan and Chongqing. The research team used the survey method of the Questionnaire Star online platform, and WeChat push. A total of 751 questionnaires were returned, 670 of which were valid. Basic information on the samples is shown in Table 1:

**Table 1.** Basic Information on respondents

| Age | | Gender | | Education Background | | | |
|---|---|---|---|---|---|---|---|
| Age Distribution (By 5 years) | Count (%) | Male (%) | Female (%) | High School (%) | Associate (%) | College (%) | Graduate (%) |
| Below 16 | 0(0%) | 0(0.00%) | 0(0.00%) | 0(0.00%) | 0(0.00%) | 0(0.00%) | 0(0.00%) |
| 16-22 | 58(8.66%) | 19(7.51%) | 39(9.35%) | 3(5.17%) | 4(6.90%) | 50(86.21%) | 1(1.72%) |
| 22-30 | 180(26.87%) | 51(20.16%) | 129(30.94%) | 7(3.89%) | 29(16.11%) | 109(60.56%) | 35(19.44%) |
| 30--40 | 228(34.03%) | 92(36.36%) | 136(32.61%) | 14(6.14%) | 29(12.72%) | 116(50.88%) | 69(30.26%) |
| 40-50 | 103(15.37%) | 41(16.21%) | 62(14.87%) | 12(11.65%) | 24(23.30%) | 37(35.92%) | 30(29.13%) |
| 50-60 | 91(13.58%) | 41(16.21%) | 50(11.99%) | 11(12.09%) | 13(14.29%) | 47(51.65%) | 20(21.98%) |
| Above 60 | 10(1.49%) | 9(3.56%) | 1(0.24%) | 0(0.00%) | 3(30%) | 6(60%) | 1(10%) |
| Total | 670 | 253(37.6%) | 417(62.4%) | 47(7.01%) | 102(15.22%) | 365(54.48%) | 156(23.28%) |

From the basic information on respondents, we found that the majority of the respondents are

female. However, we found that gender did not reflect significant differences in our main research questions through the significance test of difference. Therefore, the discrepancy between male and female respondents does not affect the findings.

### *3.2. Questionnaire Design*

After establishing the research topic, a basic questionnaire was developed through literature research, subject interviews, expert colloquia, and theoretical analysis.

### *3.3. Pilot Survey*

Before the formal survey, we conducted a small-scale pilot survey of the target audience, modified, merged, deleted, and optimized the questions, and then obtained a relatively satisfactory questionnaire. The result of the pilot survey is not included in the formal research.

### *3.4. Formal Survey*

Given the widespread presence of AI customer service, we did not particularly set a sample range and therefore did not conduct sample screening. There were no specific research subjects to be eliminated. Since the subjects of our study are all online shoppers and all online people, we took the appropriate online platform survey route and randomly conducted a national-wide formal questionnaire throughout China.

### *3.5. Data Analysis*

We used SPSS software for statistical processing and data analysis.

#### *3.5.1. Reliability analysis*

The study used Cronbach's α to analyze the reliability of the four parts of the questionnaire. The result indicates that the Cronbach's α of the consumer's basic attitude towards artificial intelligence customer service is 0.822, and the reliability coefficient of the reason for the consumer's resistance to the artificial intelligence customer service is 0.862. The Cronbach's α of the reason for consumer willing to accept the artificial intelligence customer service is 0.912 , and Cronbach's α of consumers' explicit and hidden attitudes towards artificial intelligence is 0.826. In all, the overall questionnaire has good reliability and stability.

#### *3.5.2. Validity analysis*

The study used the Bartlett test of sphericity O analyze the validity of the questionnaire. The test found that the validity of the consumer's basic attitude towards artificial intelligence customer service is 0.815, and the validity of the reason for consumers' resistance to artificial intelligence customer service is 0.851. The validity that consumers are willing to accept that the artificial intelligence customer service is 0.897, and the validity of consumer ’s explicit and hidden for artificial intelligence customer service is 0.701. In summary, the reliability and validity of the questionnaire are good, and the data can be formally tested to verify the relevant research assumptions.

## 4. Results

### *4.1. Consumers' Basic Attitude towards Artificial Intelligence Customer Service*

Given the current situation of consumers in contact with artificial intelligence customer service, we randomly selected 670 consumers to conduct a questionnaire survey, statistically obtained data, and concluded the following results.

**Table 2.** Consumers' Basic Attitude towards Artificial Intelligence Customer Service

| | Interaction Frequency Degree | Pragmatism Preference Degree | A.I. Customer Service Preference Degree | Human Customer Service Preference Degree | Human-A.I. Collaborative Customer Service Preference Degree |
|---|---|---|---|---|---|
| Option | Subtotal (Proportion %) | Subtotal (Proportion %) | Subtotal (Proportion %) | Subtotal (Proportion %) | Subtotal (Proportion %) |
| Strongly Disagree | 17(2.54%) | 12(1.79%) | 82(12.24%) | 9(1.34%) | 13(1.94%) |
| Disagree | 34(5.07%) | 11(1.64%) | 289(43.13%) | 35(5.22%) | 17(2.54%) |
| Neutral | 150(22.39%) | 78(11.64%) | 213(31.79%) | 138(20.6%) | 70(10.45%) |
| Agree | 383(57.16%) | 378(56.42%) | 62(9.25%) | 348(51.94%) | 330(49.25%) |
| Strongly Agree | 86(12.78%) | 191(28.38%) | 24(3.58%) | 140(20.9%) | 240(35.82%) |
| Answers Quantity | 670 | | | | |

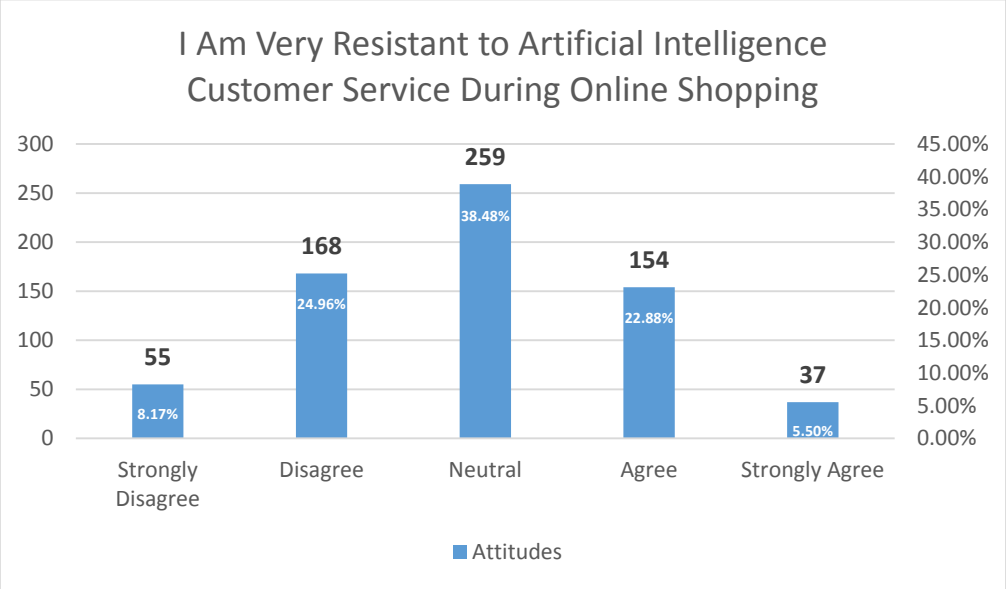


**Figure 1.** Consumers' Resistant Emotion towards Artificial Intelligence Customer Service

According to the survey results, no more than 7.6% of consumers reported that they did not often receive services from artificial intelligence customer service during online shopping or online consultation in their daily lives. This shows that the current market share of automatic response customer service based on artificial intelligence technology is increasing significantly, and there is a clear trend of replacing traditional manual customer service. Our survey on the attitude of general consumers regarding AI customer service has a normal distribution trend. This result shows that most consumers do not have a specific attitude towards artificial intelligence customer service itself. At the same time, through the Pragmatism Preference Degree section in our survey data, we found that more than 84.8% of users indicated that they could accept any kind of customer service as long as the customer service can solve their problems. Combining the data in the above two tables, we believe that consumers have a clear goal when receiving customer service. Consumers are more concerned with problem-solving than with forms of service. However, in the two sections about User Preference Degree, we found out that consumers are more inclined to communicate with real-human customer service rather than A.I. customer service. Through the previous data, we know that consumers have no obvious preference for which service method. But when they are facing the actual service, consumers' choices have significant preferences. We believe that the reason for this phenomenon is due to the imperfect function of artificial intelligence customer service, which results in the inability to properly resolve consumer needs. At the same time, in the Human-A.I. Collaborative Customer Service

Preference Degree section of our survey, we also found that more than 85% of consumers recognized the service method switched to manual one when artificial intelligence cannot solve the problem. This proves that the current consumers' resistance does not originate from the artificial intelligence customer service itself, but from the AI service's incompetence of solving problem Concerning specific consumers' dissatisfaction with artificial intelligence customer service, we conducted a further detailed investigation below.

*4.2. Reasons for Consumers Accepting Artificial Intelligence Customer Service*

By recovering the results of a total of 670 questionnaires (380 recipients chose "I can accept AI customer service"), the following data was obtained regarding the reasons why consumers accept AI customer service.

**Table 3.** Reasons for Consumers Accepting Artificial Intelligence Customer Service

| Reasons/Options | Strongly Disagree =1(%) | Disagree =2(%) | Neural =3(%) | Agree =4(%) | Strongly Agree =5(%) | Average (1~5) |
|---|---|---|---|---|---|---|
| Rigor | 7(1.87%) | 45(12.03%) | 159(42.51%) | 139(37.17%) | 24(6.42%) | 3.34 |
| Privacy | 10(2.65%) | 79(21.01%) | 144(38.30%) | 124(32.98%) | 20(5.32%) | 3.18 |
| Comprehensiveness | 12(3.19%) | 90(23.94%) | 144(38.30%) | 97(25.80%) | 33(8.78%) | 3.13 |
| Accuracy | 15(4.00%) | 76(20.27%) | 149(39.73%) | 109(29.07%) | 26(6.93%) | 3.15 |
| Trendiness | 6(1.58%) | 16(4.21%) | 103(27.11%) | 190(50.00%) | 65(17.11%) | 3.77 |
| Responsiveness | 7(1.85%) | 26(6.86%) | 79(20.84%) | 196(51.72%) | 72(18.73%) | 3.79 |
| Selectivity | 10(2.65%) | 29(7.69%) | 125(33.16%) | 270(45.09%) | 43(11.41%) | 3.55 |
| Neutrality | 8(2.13%) | 42(11.17%) | 137(36.44%) | 152(40.43%) | 37(9.84%) | 3.45 |

By analyzing the data, we found that there are two main categories of reasons that prompt consumers to actively accept AI customer service, namely, the inherent advantages of AI customer service and the development trend. The category of inherent advantages can be further subdivided into Responsiveness and Selectivity. Data shows that more than 70% of consumers believe that AI customer service has the advantage of being able to respond to consumer needs 24 hours a day, 7 days a week compared to human service. There are also 56.5% of consumers who believe that AI customer service will be more objective and neutral in the choice of information and will not deliberately choose the information that consumers like to boost sales. At the same time, we found that even without these advantages, more than 67% of consumers agree that AI customer service is the future trend, and thus are willing to actively accept AI chatbots.

However, only about 35% of costumers agree that AI customer service has an advantage over human in terms of comprehensiveness and accuracy, i.e. a majority of respondents do not agree that the information provided by AI customer service is more accurate and comprehensive, while 40% of respondents are neutral about it. Therefore, we believe that these two aspects are not the main factors that drive consumers to embrace AI customer service. This is also in line with our previous survey on consumer attitudes towards human customer service and AI customer service, which showed that 72% of consumers prefer human customer service, but 84.9% of consumers are open to any form of customer service as long as it addresses their own needs.

In summary, AI customer service to replace human customer service is the general trend of social development. While it has not yet been able to beat human customer service in terms of accuracy and comprehensiveness, the always-on features and impartiality in the selection of information seem to be inherent advantages. From a cost-saving perspective, merchants prefer to use AI customer service completely to replace human customer service, but they need to continue optimizing the AI algorithm in the actual application so that it can progress in comprehensiveness, accuracy, rigor, and more. This is the only way to alter the long-term habits of consumers and make them more proactive in choosing AI customer service.

*4.3. Reasons for Consumers Resisting Artificial Intelligence Customer Service*

Through the results of 670 questionnaires, 447 consumers expressed resistance or neutrality to artificial intelligence customer service. Regarding the reasons why such consumers are in a negative attitude with artificial intelligence customer service, we have obtained the following data.

**Table 4.** Reasons for Consumers Resisting Artificial Intelligence Customer Service

| reason\option | Strongly Disagree=1(%) | Disagree=2(%) | Neutral=3(%) | Agree=4(%) | Strongly Agree=5(%) | Average(1~5) |
|---|---|---|---|---|---|---|
| Interactive respect | 17(3.8%) | 167(37.4%) | 143(32.0%) | 99(22.1%) | 21(0.05%) | 2.8658 |
| Interactive integrity | 19(4.2%) | 145(32.4%) | 136(30.4%) | 117(26.2%) | 30(6.7%) | 2.9866 |
| Interactive targeting | 4(0.9%) | 18(4.0%) | 70(15.6%) | 230(51.5%) | 125(28.0%) | 4.0156 |
| Interactive effectiveness | 4(0.9%) | 17(3.8%) | 66(14.8%) | 246(55.0%) | 114(25.5%) | 4.0045 |
| Interactive Smoothness | 6(1.3%) | 31(6.9%) | 90(20.1%) | 248(55.5%) | 72(16.1%) | 3.7808 |
| Interactive altruism | 14(3.1%) | 116(25.9%) | 161(36.0%) | 125(28.0%) | 31(6.9%) | 3.0962 |
| Communication is mandatory | 3(0.7%) | 23(5.1%) | 77(17.2%) | 250(55.9%) | 94(21.0%) | 3.9150 |

By analyzing the data, we found that the biggest incentive for consumers to resist artificial intelligence customer service is that consumers cannot establish good communication with artificial intelligence customer service. We attribute the problems of human-computer communication tointeractive targeting, interactive effectiveness, and interactive smoothness. More than 79.5% of consumers believe that artificial intelligence customer service cannot answer their questions in a targeted manner, more than 80.5% of consumers believe that there is too much invalid communication information during human-machine interaction, and more than 71.6% of consumers think artificial intelligence is difficult to understand their language in natural form and multiple adjustments of their expression is needed to make the artificial intelligence understand them correctly. And another big incentive for consumers to resist artificial intelligence customer service is that consumers have lost the right of choosing artificial intelligence customer services or not. More than 76.9% of consumers indicated they encountered difficulties in getting in touch with actual human customer service when only artificial intelligence customer services was provided.

At the same time, we also found in the data about the interactive respect, interactive integrity, and interactive altruism in the self-concept aspect. Users who indicate clear aversion with these reasons are 22.6%, 32.9%, and 34.9% respectively. Therefore, we believe that consumer self-concept is not the major reason for consumer resistance to artificial intelligence customer service.

Through comprehensive analysis, it can be seen that consumers pay more attention to the effectiveness of objective communication than subjective emotional aspects such as respect, integrity, and altruism. This proves that the consumer's purpose is dominant in the process of receiving customer service. As long as the artificial intelligence customer service can establish effective, accurate, and smooth communication with consumers, consumers' current resistance to it could significantly drop. This conclusion is also consistent with our previous survey, where more than 84.9% of consumers indicate that "no matter what form of customer service, as long as it can solve the problem, they can accept it." While whether there is any relationship between the current status of poor human-computer communication, and consumer's resistance emotion due to the lack of choices on artificial intelligence customer service, we will further study and analysis in future researches.

*4.4. Consumers' Attitude towards Artificial Intelligence Customer Service with Different Identities*

By recovering the results of a total of 670 questionnaires, the following data was obtained regarding the altitudes consumers having towards explicit and hidden AI customer service.

**Table 5.** Consumers' Attitude towards Artificial Intelligence Customer Service with Different Identities

| Reasons\ Altitudes | Strongly Disagree = 1(%) | Disagree =2(%) | Neutral =3 (%) | Agree = 4(%) | Strongly Agree =5(%) | Average (1~5) |
|---|---|---|---|---|---|---|
| Explicitly Specified | 45(6.69%) | 239(35.51%) | 233(34.92%) | 129(19.32%) | 24(3.57%) | 2.776 |
| Concealed | 30(4.46%) | 242(36.36%) | 204(30.46%) | 204(24.22%) | 163(4.61%) | 2.8849 |
| Deceptive | 15(2.23%) | 102(15.30%) | 148(22.29%) | 285(42.35%) | 120(17.83%) | 3.5825 |
| Altitudes Towards Concealed Type | 40(5.94%) | 234(35.07%) | 210(31.35%) | 149(22.14%) | 37(5.50%) | 2.8619 |
| Altitude Towards Deceptive Type | 17(2.53%) | 97(14.71%) | 153(22.88%) | 284(42.20%) | 119(17.68%) | 3.5779 |

Through data analysis, we found that only a small number of consumers have a preconceived resistance to AI customer service, i.e., when they see an explicit specified AI customer service logo, they will directly choose to cease communication. This part of consumers only accounts for 23.91% of the survey, and more than 70 percent of consumers are neutral about AI customer service or at least will not actively decline communication. Even if a merchant does not explicitly identify itself using an AI customer service, more than 70% of consumers typically do not cease communicating when they find out, and only 27.6% of customers choose to do so.

However, as soon as consumers found out that a merchant purposely disguised an AI chat bot as a human service agent, 60.18% of consumers chose to terminate the conversation and 59.88% of consumers felt deceived and generated antipathy towards such merchant.

From the above two points of analysis, we can see that costumers do not care whether or not merchants use AI customer service, even if they encounter the concealed AI chatbot that is not identified, they will generally not develop negative emotions, which indicates that consumers are very tolerant of AI customer service and its hidden behavior. Consumers care more about whether the customer service can meet their needs than about the approach taken. Nevertheless, it should be noted that the consumer's tolerance for deceptive behavior is low. If a merchant indicates himself (herself) a human agent, but is found to be AI chatbots, it will significantly reduce the consumer's willingness to the inquiry and trigger antipathy.

*4.5. Differences in Attitudes towards Artificial Intelligence Customer Service by Different Age Groups*

The data analysis above has proved that there is no difference in attitudes towards artificial intelligence customer service by different genders. But do people of different ages have differences in artificial intelligence customer service?

By recovering the results of 670 valid questionnaires and cross-analyzing the distribution of attitudes of consumers of different ages towards artificial intelligence customer service, we obtained the following result.

**Table 6.** Consumers Agree Be Resistant to Artificial Intelligence Customer Service

| Attitude / Age | Strongly Disagree =1(%) | Disagree =2(%) | Neutral =3(%) | Agree =4(%) | Strongly Agree =5(%) | Average(1~5) |
|---|---|---|---|---|---|---|
| 16 - 22 | 6(10.34%) | 20(34.48%) | 17(29.31%) | 10(17.24%) | 5(8.62%) | 2.7929 |
| 22 - 30 | 13(7.22%) | 50(27.78%) | 67(37.22%) | 39(21.67%) | 11(6.11%) | 2.9167 |
| 30 - 40 | 22(9.65%) | 64(28.07%) | 74(32.46%) | 54(23.68%) | 14(6.14%) | 2.8859 |
| 40 - 50 | 7(6.80%) | 16(15.53%) | 51(49.51%) | 25(24.27%) | 4(3.88%) | 3.0287 |
| 50 - 60 | 7(7.69%) | 15(16.48%) | 42(46.15%) | 25(27.47%) | 2(2.20%) | 2.9998 |
| Above 60 | 0(0.00%) | 2(20%) | 6(60%) | 1(10%) | 1(10%) | 3.1 |

Through the above data, we find that the proportion of different age levels holding Non-resistance attitudes toward artificial intelligence customer service, according to the distribution of age from young to old is: 44.82%, 35%, 37.72%, 22%, 24.17%, and 20%. From the data, we can see that consumers' acceptance of artificial intelligence customer service decreases with age. For young people who are more exposed to modern technology, they are relatively more willing to try the new service method of artificial intelligence customer service, while older consumers are less accepting of this emerging service method. At the same time, we found that according to the distribution of age from young to old, the proportions of different age groups who have clear resistance attitude toward artificial intelligence customer service are: 25.86%, 27.78%, 29.82%, 28.15%, 29.67%, and 20%. This set of data shows that although consumer groups' acceptance of artificial intelligence customer service decreases with age, there is no significant difference in the distribution of consumers who have a clear resistance to artificial intelligence customer service in various age classes. For this phenomenon, we conducted the following cross-analysis again.

**Table 7.** Pragmatism Preference Analysis

| Attitude / Age | Strongly Disagree =1(%) | Disagree =2(%) | Neutral =3(%) | Agree =4(%) | Strongly Agree =5(%) | Average(1~5) |
|---|---|---|---|---|---|---|
| 16 - 22 | 1(1.72%) | 0(0.00%) | 10(17.24%) | 23(39.66%) | 24(41.38%) | 4.1898 |
| 22 - 30 | 3(1.67%) | 4(2.22%) | 19(10.56%) | 99(55%) | 55(30.56%) | 4.1059 |
| 30 - 40 | 4(1.75%) | 3(1.32%) | 26(11.40%) | 129(56.58%) | 66(28.95%) | 4.0966 |
| 40 - 50 | 4(3.88%) | 3(2.91%) | 11(10.68%) | 56(54.37%) | 29(28.16%) | 4.0002 |
| 50 - 60 | 0(0.00%) | 1(1.10%) | 10(10.99%) | 64(70.33%) | 16(17.58%) | 4.0439 |
| Above 60 | 0(0.00%) | 0(0.00%) | 2(20%) | 7(70%) | 1(10%) | 3.9 |

**Table 8.** Human-A.I. Collaborative Services Preference Analysis

| Attitude / Age | Strongly Disagree =1(%) | Disagree =2(%) | Neutral =3(%) | Agree =4(%) | Strongly Agree =5(%) | Average(1~5) |
|---|---|---|---|---|---|---|
| 16 - 22 | 0(0.00%) | 1(1.72%) | 7(12.07%) | 29(50%) | 21(36.21%) | 4.2070 |
| 22 - 30 | 3(1.67%) | 4(2.22%) | 20(11.11%) | 78(43.33%) | 75(41.67%) | 4.2111 |
| 30 - 40 | 7(3.07%) | 7(3.07%) | 18(7.89%) | 114(50%) | 82(35.96%) | 4.1268 |
| 40 - 50 | 1(0.97%) | 3(2.91%) | 12(11.65%) | 59(57.28%) | 28(27.18%) | 4.0676 |
| 50 - 60 | 2(2.20%) | 2(2.20%) | 9(9.89%) | 46(50.55%) | 32(35.16%) | 4.1427 |
| Above 60 | 0(0.00%) | 0(0.00%) | 4(40%) | 4(40%) | 2(20%) | 3.8 |

Through the analysis of the above data, we found that no matter in which age level, more than 80% of the group believe that as long as their needs can be met, any kind of customer service could be accepted. At the same time, for all age groups, only no more than 6.2% of the groups expressed resistance to the service method that automatically switched to real-human customer service when the artificial intelligence customer service could not solve their problems. This indicates that users of older age groups may have lower acceptance of artificial intelligence customer service, but they are not holding resistant emotion toward it. If merchants could meet consumers' needs through real person service as soon as the artificial intelligence customer service fails to solve consumers' problems effectively and conveniently, the AI service could be accepted by users of all ages.

### *4.6. Differences in Attitudes towards Artificial Intelligence Customer Service by Different Educational Levels*

Do consumers from different educational backgrounds have different attitudes toward merchant AI customer service? A cross-sectional analysis of 670 questionnaires resulted in the following data.

**Table 9.** Differences in consumers' attitudes towards AI chatbots' concealed behavior across education background

| Education Level/Attitudes | Strongly Disagree =1(%) | Disagree =2(%) | Neutral =3(%) | Agree =4(%) | Strongly Agree =5(%) | Average(1~5) |
|---|---|---|---|---|---|---|
| High School | 1(2.13%) | 9(19.15%) | 18(38.30%) | 13(27.66%) | 6(12.77%) | 3.2982 |
| Associate | 3(2.94%) | 34(33.33%) | 37(36.27%) | 25(24.51%) | 3(2.94%) | 2.9026 |
| Bachelor | 21(5.75%) | 131(35.89%) | 111(30.41%) | 88(24.11%) | 14(3.84%) | 2.8418 |
| Graduate | 5(3.21%) | 68(43.59%) | 38(24.36%) | 37(23.72%) | 8(5.13%) | 2.84 |

Table 9 is collected in a set-up scenario when merchants do not explicitly specify that they are using AI chatbots for customer service, but the customer found out during the communication. Will there be differences in the attitudes of consumers with different educational backgrounds?

From the data above, we noticed that the lower the level of education received, the more the respondents likely to cease the communication. That is, people with low education backgrounds are significantly less tolerant of AI chatbots' concealed behavior than those with higher education backgrounds. 40% of consumers with a high school degree will stop communicating directly because the other party is an AI chatbot, compared to 28 percent of consumers with a graduate degree. This shows that higher educated consumers are relatively more concerned with problem-solving and less

concerned with the form of customer service, which means both AI chatbots and human customer service agents are acceptable to them.

**Table 10.** Differences in consumers' attitudes towards AI chatbots' deceptive behavior across education background

| Education Level/Attitudes | Strongly Disagree =1(%) | Disagree =2(%) | Neutral =3(%) | Agree =4(%) | Strongly Agree =5(%) | Average(1~5) |
|---|---|---|---|---|---|---|
| High School | 2(4.26%) | 8(17.02%) | 14(29.79%) | 17(36.17%) | 6(12.77%) | 3.362 |
| Associate | 1(0.98%) | 21(20.59%) | 28(27.45%) | 36(35.29%) | 16(15.69%) | 3.4268 |
| Bachelor | 10(2.74%) | 47(12.88%) | 76(20.82%) | 154(42.19%) | 78(21.37%) | 3.664 |
| Graduate | 2(1.28%) | 26(16.67%) | 30(19.23%) | 78(50%) | 20(12.82%) | 3.5641 |

**Table 11.** Differences in consumers' emotional reactions towards AI chatbots' deceptive behavior across education background

| Education Level/Attitudes | Strongly Disagree =1(%) | Disagree =2(%) | Neutral =3(%) | Agree =4(%) | Strongly Agree =5(%) | Average(1~5) |
|---|---|---|---|---|---|---|
| High School | 1(2.13%) | 9(19.15%) | 19(40.43%) | 11(23.40%) | 7(14.89%) | 3.362 |
| Associate | 2(1.96%) | 21(20.59%) | 31(30.39%) | 31(30.39%) | 17(16.67%) | 3.4268 |
| Bachelor | 11(3.01%) | 46(12.60%) | 74(20.27%) | 160(43.84%) | 74(20.27%) | 3.664 |
| Graduate | 3(1.92%) | 21(13.46%) | 29(18.59%) | 82(52.56%) | 21(13.46%) | 3.5641 |

From tables 10 and 11, it is found that consumers' tolerance for AI chatbot’s deceptive behavior is gradually decreasing as their educational background increases. About 63% of consumers with bachelor’s and graduate degrees would directly terminate communication because they were deceived, compared to less than 50% of consumers with high school and associate degrees. At the same time, consumers with bachelor’s and graduate degrees are also more likely to develop antipathy towards merchants because of merchants’ deceiving behavior. It can be seen that higher educated consumers, who can accept AI chatbots’ concealed behavior, resent disguised communication.

**Table 12.** Differences in consumers' resistant attitudes towards AI customer service across education background

| Education Level/Attitudes | Strongly Disagree =1(%) | Disagree =2(%) | Neutral =3(%) | Agree =4(%) | Strongly Agree =5(%) | Average(1~5) |
|---|---|---|---|---|---|---|
| High School | 7(14.89%) | 9(19.15%) | 18(38.30%) | 11(23.40%) | 2(4.26%) | 2.8299 |
| Associate | 3(2.94%) | 23(22.55%) | 48(47.06%) | 24(23.53%) | 4(3.92%) | 3.0288 |
| Bachelor | 37(10.14%) | 98(26.85%) | 128(35.07%) | 80(21.92%) | 22(6.03%) | 2.8661 |
| Graduate | 8(5.13%) | 37(23.72%) | 63(40.38%) | 39(25%) | 9(5.77%) | 3.0256 |

**Table 13.** Differences in consumers' attitudes towards "acceptance of any kind of customer service as long as it can handle my needs" across education background

| Education Level/Attitudes | Strongly Disagree =1(%) | Disagree =2(%) | Neutral =3(%) | Agree =4(%) | Strongly Agree =5(%) | Average(1~5) |
|---|---|---|---|---|---|---|
| High School | 1(2.13%) | 1(2.13%) | 7(14.89%) | 29(61.70%) | 9(19.15%) | 3.9361 |
| Associate | 1(0.98%) | 3(2.94%) | 14(13.73%) | 58(56.86%) | 26(25.49%) | 4.0288 |
| Bachelor | 7(1.92%) | 3(0.82%) | 42(11.51%) | 196(53.70%) | 117(32.05%) | 4.1316 |
| Graduate | 3(1.92%) | 4(2.56%) | 15(9.62%) | 95(60.90%) | 39(25%) | 4.045 |

From the analysis of the above data, consumers of all educational backgrounds have a relatively neutral attitude towards AI customer service chatbots (Likert score $\leq$ 3). Relatively speaking, consumers with graduate degrees are more resistant, at 28%, but this difference is not significant. And for any educational background, more than 80% of consumers feel that any customer service form is acceptable as long as it addresses their needs. Therefore, in speaking of only AI customer service, the differences in educational attainment towards consumer attitudes are not significant. Nevertheless, consumers from different educational backgrounds have a significant gap in their acceptance of the concealed/deceptive behaviors of AI chatbots.

## 5. Conclusion

In summary, we can conclude the following main research conclusions:

At present, artificial intelligence customer service has been widely used in the industry and widely accepted by the public. Customers' interaction frequency degree on A.I. customer service has been greater than 92.3%.

Among the consumers who have been in contact with artificial intelligence customer service, only 28.5% of consumers showed obvious resistance, while the remaining 71.5% of consumers are willing to accept artificial intelligence customer service or at least maintain a neutral attitude, which shows Artificial intelligence customer service has been widely accepted by society.

At present, consumers generally accept artificial intelligence customer service because of its 24-hour service capabilities, more neutral and objective positions, and the future development trends that it represents.

The main reason why consumers are resistant to artificial intelligence customer service is the service quality provided by artificial intelligence customer service, especially in the targeted, effective and smooth aspects, are far behind manual customer service. And once the artificial intelligence customer service cannot fulfill the consumer demand, it is difficult to seamlessly connect the real-human customer service.

Consumers do not care whether merchants use artificial intelligence customer service, even if they encounter hidden customer service with unclear logos. They will not produce negative emotions. In general, consumers are more concerned about whether customer service can solve their problems, rather than the form of customer service. However, it should be noted that consumers' tolerance for disguised manual services is very low. If the merchant indicated that it was real-human customer service, while consumers found out it was the artificial intelligence customer service, such fact will significantly reduce consumers' willingness to continue to communicate and trigger consumers' strong negative emotions towards businesses.

Consumers' acceptance of artificial intelligence customer service decreases with age, but older consumers do not show more negative emotions than younger consumers. This shows that although the seniors are relatively resistant to artificial intelligence customer service, they can also effectively control their own emotions.

Consumers of different educational backgrounds have a relatively neutral attitude towards artificial intelligence customer service, but consumers of different educational backgrounds have a large gap in the acceptance of the concealment and disguise of artificial intelligence customer service. Consumers

with low education levels have a low tolerance to hidden AI customer service, while consumers with high education levels have a low tolerance to camouflage AI customer service.

## 6. Suggestions

Based on the above research, we make the following suggestions for the comprehensive development and promotion of new technologies for artificial intelligence customer service:

Comprehensively improve the service quality of artificial intelligence customer service. At present, consumers do not have resistant emotion toward the artificial intelligence customer service itself, while the root cause of the consumer's resistance is that the current quality of the artificial intelligence customer service is not as good as the traditional real-human customer service. Therefore, it is an inevitable demand and direction for the industry to comprehensively upgrade related technologies and improve service quality.

Gradually and orderly use artificial intelligence customer service to replace traditional real-human services. With the development and widespread promotion of artificial intelligence customer service technology, a large number of businesses have chosen to use artificial intelligence customer service to replace their traditional real-human customer service. In this process, the merchant might be too hasty and directly replaced the original real-human customer service with artificial intelligence customer service. However, due to the current poor quality of artificial intelligence customer service and the lack of traditional real-human customer service as a support, it is difficult for consumers to meet their needs. We recommend that merchants gradually and orderly iteratively advance in the process of replacing traditional customer service with artificial intelligence customer service. First of all, let artificial intelligence become an important supplement to traditional real-human customer service, and then gradually make traditional real-human customer service as a supplement to artificial intelligence customer service, and finally achieve the complete replacement of traditional real-human customer service by artificial intelligence customer service. The current artificial intelligence technology can only partially replace real-human service.

Merchants should take the initiative to disclose that they are using artificial intelligence customer service. From the effect point of view, most consumers will not give up communication because of artificial intelligence customer service, but some consumers will give up communication and generate aversion because the merchant does not identify the customer service. From the perspective of improving the user experience, merchants should try the collaborative service of artificial customer service and artificial intelligence customer service, and proactively indicate the time of when manual customer service involved, and give the choice to consumers.

To promote artificial intelligence customer service in an all-round way, we must increase the promotion of commercial applications of artificial intelligence customer service. As an emerging technology in the 21st century, artificial intelligence is also the inevitable direction of future technological development. The development of the industry is inseparable from the cooperation of the public. The development of artificial intelligence customer service also requires consumers' understanding and cooperation. By popularizing the application scenarios of artificial intelligence, the development and inevitable trend of popular science artificial intelligence to the public will help the public understand the use of artificial intelligence customer service and reduce public resistance to artificial intelligence customer service.

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