

How Can Digital Voice Assistant Impact Consumers' Experience in E-Commerce?

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ABSTRACT

Digital Voice Assistant (VA in short) is intelligence software that responds to voice commands and can run on any device. It enables functions such as chatting, operating devices, task ranging, and controlling smart home appliance. The well-known VA on market include Alexa (Amazon), SIRI (Apple), Google Assistant (Google), XiaoAi (XiaoMi), Tmall Genies (Alibaba), etc. With the development of VA, it eventually becomes an innovative channel in e-commerce, who enables users to accomplish shopping-related missions and uses natural language as an interface. This dissertation aims to study consumers' user experience while shopping through Voice Assistants. The method to collect data is by questionnaire, therefore achieve a quantitatively analysis. This dissertation answers three research questions in order to further understand the object: 1). VA shopping's characteristic: How VA shopping differs from traditional e-commerce channels through user-experience? 2) What is the consumers' attitude for shopping through voice assistant? 3) What is consumers' attendance on voice assistant as a shopping channel? Regarding the customer journey of VA shopping and traditional ways, there didn't show a huge difference between them. The most different point between VA shopping and traditional e-commerce shopping channel is that VA uses the natural language as interface while traditional ways using picture-text (visually). So that the information present by VA is less complex and hard to make an intuitive impression of articles as the traditional channels. It consequences that VA relies more on the intelligence of its AI algorithm. As the result of survey, users' attitude toward experience on VA shopping is rather positive. Most of the users are satisfied with it and are willing to share this channel to others. However, those potential users remain an uncertain attitude. They all agree that as advantages, shopping through VA is more time-saving, easy to operate, and enable users to multi-tasks that frees their hands. But as for disadvantages, the article list is too short to making a compare, it couldn't make an intuitive impression, and the recommendations are not accurate enough. Potential users also concern the payment security. The market forecast for Voice Assistant shows a steady raising trend, which guarantees the user base for VA shopping. While users show their positive point of views about VA shopping, the future of VA has a large potential of development. Among the respondents' suggestions for improving VA shopping, I summarize their opinions in the following points: 1) Some of AI's behaviors are very stupid. 2) Speech recognition is not accurate enough; keyword capture is not accurate enough. 3) Simplify the purchase process, order confirmation is too cumbersome. 4) Optimize the personalized recommendation system. 5) Improves the privacy in public. 6) Protect user privacy and payment security. 7) Added child protection. 8) The recommendation system should avoid to be affected by advertising and sponsorship (Ensure the authenticity of the recommendation). This dissertation tends to provide a theoretical help for merchants and stakeholders on developing VA shopping, and hoping to provide a reference for other researchers. After a study of users' point of view on user experience, I make a several recommendations on VA's development, marketing strategy and UX design in VA shopping.

KEYWORDS

Digital Voice Assistant; User experience; E-commerce; Shopping channel; Marketing

1. INTRODUCTION

1.1. Introduction of Digital Voice Assistant

Digital Voice Assistant (Also called Voice Assistant or Digital Assistant, VA in short) is intelligent software that responds to voice commands and can run on any device (such as smartphones, tablets, game consoles, TV consoles, wearable devices, etc.) [5]. It enables users to use natural language for conversational interaction to enable functions such as chatting, operating devices, task ranging, and controlling smart home appliances. The well-known voice assistant devices on the market include Amazon's Alexa, Apple's Siri, Google Assistant, Microsoft's Cortana, Xiaomi's Xiaoai, Baidu's Xiaodu, and Alibaba's Tmall Genies.

With the continuous improvement of voice assistant software and the popularity of voice assistant products on markets, the markets have gradually expanded and then make the Voice Assistants become the new shopping channel and part of the e-commerce space.

In this context, my study will focus on the consumer experience of shopping with voice assistant channel. It aims to study whether voice assistants will become a mainstream shopping channel and help merchants improve user experience design for this new shopping channel.

1.2. Research Objectives

User experience is such an important topic in the marketing domain. Therefore, while a new shopping channel emerges, it is a crucial point for merchants to improve the user experience according to their new needs, therefore to achieve the purpose of increasing willingness of consumption and customers' loyalty.

As in the context that Digital Voice Assistants become an emerging shopping channel in e-commerce who allows consumers using natural language as interactive. Consumers could command Voice Assistants to complete shopping-related tasks (such as browsing for products, personalized recommendation, purchasing) simply by voice. My study aims to conduct research on consumers' shopping experience with Voice Assistants (VA) by studying the customer persona, customer journey and UX design. My study aims to clarify consumers' experience and attitude to this new channel in e-commerce, therefore to review the future perspective and trend of Voice Assistants.

In summary, this dissertation focuses on the topic of "How can Digital Voice Assistant impact consumers' experience in e-commerce", and having the intention to make theoretical basis for merchants in the field of digital marketing and inspire them on developing the UX design on VA shopping.

1.3. Research Questions

How can digital voice assistant impact consumers' experience in e-commerce?

In order to explore the study on this topic, I separate it into three subdivision questions:

- 1) VA shopping's characteristic: How VA shopping differs from traditional e-commerce channels through user-experience?
- 2) What is the consumers' attitude for shopping through voice assistant?
- 3) What is consumers' attendance on voice assistant as a shopping channel?

1.4. Dissertation Structure

The dissertation consists six parts: 1) Introduction that is an overall of the topic. 2) Literature Review that reviews the existed studies of VA shopping. 3) Methodology of my study and research. 4) Result

and Analysis for data processing. 5) Discussions in which part I answer my research questions and give my opinions. 6) Conclusion that include the summary of my study and my recommendations about VA's development, VA's marketing and VA's UX design.

2. LITERATURE REVIEW

Among previous study concerns Voice Assistants, voice commerce and user experience, I have reviewed a several dissertations that could guide my study on the topic of user experiences on shopping with VA.

In the study of The Effect of Voice AI on Digital Commerce (2019) by SUN&SHI&LIU&GHOSE&LI&XIONG [10] who used a large-scale archive data set from Alibaba, and obtained user persona, the impact of Voice AI to e-commerce platform and the tendance of VA development through big data analysis.

Schrotenboer focused on the concept of "servitization" in his research of The Impact of Artificial Intelligence along the Customer Journey (2019) [9]. His research focuses on the impact of AI on consumer psychology and consumer behavior.

In Kraus&Reibenspiess&Eckhardt's study of How Voice Can Change Customer Satisfaction: A Comparative Analysis between E-Commerce and Voice Commerce (2019), they focused on consumers' consumption behavior preferences in Voice Commerce [6].

With Mari&Alex's views on customers' shopping preferences in Voice Commerce: Understanding Shopping-Related Voice Assistants and their Effect on Brands (2019) supported by data [8].

3. METHODOLOGY

3.1. Research Design

I focus on two main points in the research design in order to get the data for further research: consumers' point of view on VA and consumers' shopping experience through VA.

In order to collect consumers' feedback and costumer behavior from a macro perspective, I choose quantitative analysis and questionnaire as method.

3.2. Data Collection Method

(see Figure 1-6) The questionnaire consists 4 parts:

Part I - Consumers' general impressions of voice assistants

This part aims to understand consumers' familiarity with the voice assistant product itself, so as to obtain a more accurate sample base.

The questions include:

- (1) Which of the following voice assistants (VA) have you used?
- (2) Which features of VA do you use?
- (3) How long have you been using a VA?
- (4) How would you rate your overall familiarity with VA?
- (5) Have you ever used a VA for shopping-related tasks (searching for products information, ordering product, etc.)?

(6) If no, please answer the following questions based on your expectations for the shopping experience with voice assistants.

Part II – User Experience of Voice Assistant shopping

This part is the main part of this questionnaire. It aims to understand the user experience of consumers when performing shopping tasks through voice assistants, which is directly related to the research topic of this paper.

Questions include:

- (7) Which VA do you typically use for shopping-related tasks?
- (8) What product would you purchase with VA?
- (9) How often do you use your VA for shopping-related tasks?
- (10) Which types of products do you prefer to purchase on VA?
- (11) According to your user experience, which are the advantages of VA shopping?
- (12) How much do you trust digital voice assistants to provide advice and information in shopping scenarios?
- (13) According to your user experience, which are the disadvantages of VA shopping?
- (14) How satisfied are you with your overall shopping experience on VA?

Part III: Consumers' attitude expectations for VA shopping

This part is an extension of part II, which aims to understand consumers' attitudes towards shopping with voice assistants and analyze the future development trend of shopping channels with voice assistants.

Questions include:

- (15) Will you continue to shopping on VA?
- (16) Would you recommend shopping on VA to others?
- (17) What are your expectations and suggestions for improving the user experience of shopping on VA?

Part IV: Consumers' personal information

This part aims to having a basic knowledge of participants, so as to analysis target users' persona.

Questions include:

- (18) Your age is:
- (19) Your gender is:
- (20) Your professional is:

User Experience for shopping with Digital Voice Assistants (VA)

Thank you for answering this User Experience questionnaire for digital voice assistants shopping, it will take you 2 minutes.

A digital voice assistant (VA) is an AI system that uses voice as an interaction, built on devices such as mobile phones, computers, or smart speakers. For example: SIRI, Alexa, Google Assistant, XiaoAi, Tmall Genie, etc.

*1. Which of the following voice assistants (VA) have you used?

☐ SIRI (Apple)
☐ Alexa (Amazon)
☐ Google Assistant (Google)
☐ Cortana (Microsoft)
☐ AliGenie/Tmall Genie (Alibaba)
☐ XiaoAi (Xaomi)
☐ Others
☐ Never used

*2. Which features of VA do you use?

☐ Answer calls
☐ Listen to music
☐ Shopping
☐ Control smart homes
☐ Make alarms, write calendars
☐ Others

*3. How long have you been using a VA?

☐ < 6 months
☐ 6 months - 1 year
☐ 1-2 years
☐ > 2 years

*4. How would you rate your overall familiarity with VA?

1	2	3	4	5	6	7	8	9	10
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*5. Have you ever used a VA for shopping-related tasks (searching for products information, ordering product, etc.)?

☐ Yes
☐ No

6. If no, please answer the following questions based on your expectations for the shopping experience with voice assistants.

☐ OK

*7. Which VA do you typically use for shopping-related tasks?

☐ SIRI (Apple)
☐ Alexa (Amazon)
☐ Google Assistant (Google)
☐ Cortana (Microsoft)
☐ AliGenie/Tmall Genie (Alibaba)
☐ XiaoAi (Xaomi)
☐ Others

* 8. What product would you purchase with VA?

☐ Cultural and entertainment products (movies, music, books, audiobooks)
☐ Household, Furniture, Electrical Appliances
☐ Electronic devices (phones, tablets, computer, etc.)
☐ Electronic devices accessories (earphones, chargers, powerbank, etc.)
☐ clothing and accessories
☐ Beauty and Personal Care Products
☐ food and drinks
☐ Other

* 9. How often do you use your VA for shopping-related tasks?

☐ Very often
☐ Often
☐ Occasionally
☐ Rarely or never

* 10. You prefer to purchase on VA:

☐ Products that have been purchased before
☐ Personalized product recommendations for you
☐ Products that never been purchased before
☐ other

* 11. According to your user experience, which are the advantages of VA shopping?

☐ Easy to operate
☐ Simplified shopping steps
☐ Saving time
☐ Could shopping while the hands are occupied (while driving, cleaning the house, etc)
☐ Personalized recommendation system
☐ Improved product search
☐ Improved shopping experience for people with disabilities or vulnerable
☐ Simplifies the information
☐ Interaction by voice bring a more humanity experience
☐ Others

* 12. How much do you trust digital voice assistants to provide advice and information in shopping scenarios?

☐ Completely
☐ Very
☐ Moderate
☐ Not much
☐ Not at all

* 13. According to your user experience, which are the disadvantages of VA shopping?

☐ Unable to form an intuitive impression of the product
☐ few recommended products, lack of optionality and comparison
☐ Recommended products are not accurate
☐ difficult to operate
☐ Payment security concern
☐ Others

* 14. How satisfied are you with your overall shopping experience on VA?

☐ Very satisfied
☐ satisfied
☐ don' t care
☐ dissatisfied
☐ Very dissatisfied

*14. How satisfied are you with your overall shopping experience on VA?

- ☐ Very satisfied
- ☐ satisfied
- ☐ don' t care
- ☐ dissatisfied
- ☐ Very dissatisfied

*15. Will you continue to shopping on VA?

- ☐ Yes, with high frequently
- ☐ Yes, but infrequently
- ☐ Uncertain
- ☐ Probably not
- ☐ Absolutely not

*16. Would you recommend shopping on VA to others?

- ☐ Certainly yes
- ☐ Probably yes
- ☐ Uncertain
- ☐ Probably not
- ☐ Absolutely not

*17. What are your expectations and suggestions for improving the user experience of shopping on VA?

*18. Your age is:

- ☐ <17
- ☐ 18-26
- ☐ 27-35
- ☐ 36-55
- ☐ 56-65
- ☐ >66

*19. Your gender is:

- ☐ Male
- ☐ Female
- ☐ Other

*20. Your professional is:

- ☐ Student
- ☐ Businessman/woman
- ☐ Employee
- ☐ Engineer
- ☐ Farmer/Fisherman/Livestock/Fores try
- ☐ Freelancer
- ☐ Teacher/research staff
- ☐ Housewife/husband
- ☐ Retirees
- ☐ Other

Submit

Figure 1-6. Questionnaire

3.3. Sample Selection

The questionnaire is form in electronic version and handed out by WeChat group and blog. The research target is Chinese market, consists mostly by resistant in China and Chinese origin. (see Figure 7).

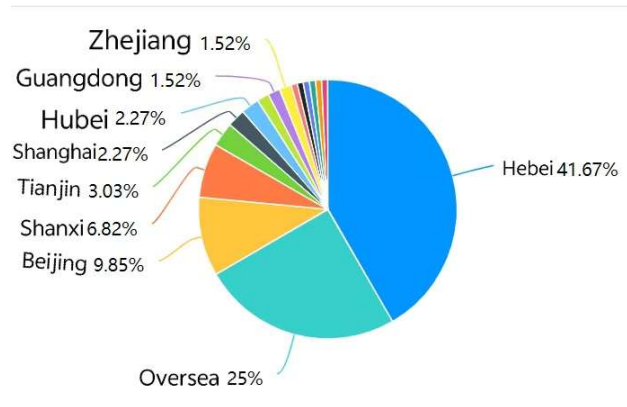


Figure 7. Sample distribution by region

A total of 150 participants have answered the questionnaire. In terms of sample sources, 87.33% of the samples came from WeChat, 8.67% came from PC links, and 4% came from mobile. (see Figure 8).

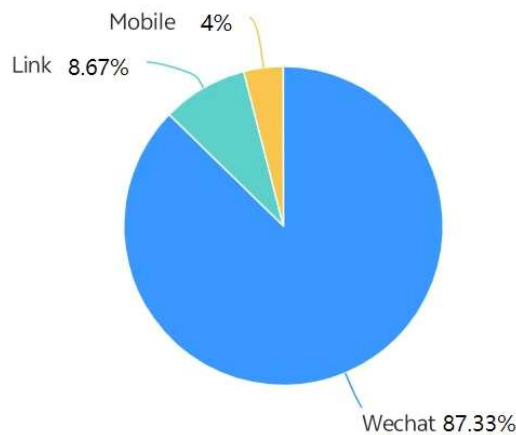


Figure 8. Distribution of Samples' Submission Methods

The proportion of men and women in the survey sample is almost balanced. There are 73 male respondents, accounting for 48.67% of the total number of samples; 75 female respondents, accounting for 50% of the total number of respondents, and 2 respondents of other genders, accounting for 1.33% of the total number. (see Figure 9).

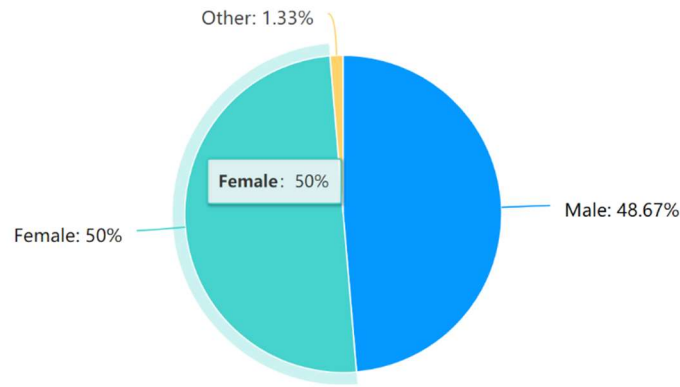


Figure 9. Distribution of Samples' gender

Reviewing age distribution, the age of the respondents is mainly concentrated between 18-55 years old, composed of Gen-Z and mid-aged. There are 40% of mid-aged people (36-55), people in the 27-35 age group account for 34.67% of the total sample proportion, and people in the 18-26 age group account for 24% of the total sample proportion. (see Figure 10).

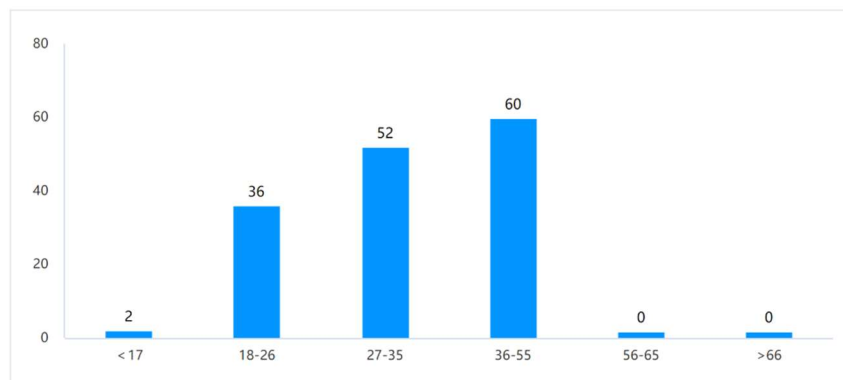


Figure 10. Distribution of Samples' age

Reviewing the profession, the respondents are mainly company employees, a total of 79 people, accounting for 52.67% of the total sample; followed by students, a total of 36 people, accounting for 24% of the total sample. (see Figure 11).

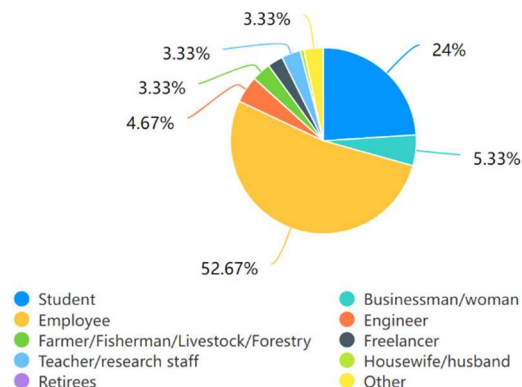


Figure 11. Distribution of Samples' profession

The questionnaire uses a question: “Have you ever used a VA for shopping-related tasks (searching for products information, ordering product, etc.)?” to divide the respondents into existing users and potential users of VA shopping.

When the respondents answer "Yes", the respondents will answer according to their actual experience; when the respondents answer "No", they will be prompted by a notice ("If no, please answer the following questions based on your expectations for the shopping experience with voice assistants.") to answers based on the respondents' expectations for VA shopping. In this way, we can collect the attitudes, opinions and expectations of potential users of VA shopping.

3.4. Ethical Consideration

The research data were collected through public questionnaires. Respondents filled out the questionnaire anonymously to ensure the safety of the private of the respondents. The data collected through the questionnaire will be used for academic research (in the form of dissertation). The data will be anonymous macro-Statistical display in the dissertation to ensure the personal privacy of the respondents.

4. RESULTS AND ANALYSIS

4.1. Voice Assistants’ Market Performance

The global voice assistant application market size grew from \$3.43 billion in 2022 to \$4.52 billion in 2023 at a compound annual growth rate of 32.0% [2].

Voice assistant users are growing at a slow but steady pace. We estimate that 142 million people in the US, or 42.1% of the population, will use a voice assistant [7]. More people will use voice assistants, like Siri and Google Assistant, on smartphones than on smart speakers [7]. In the US market, the most popular Voice Assistant is Google Assistant, followed by SIRI and Alexa.

According to the questionnaire with objective “User Experience for shopping with Digital Voice Assistants (VA)” that I released in June 2023, among the 150 samples received, only 9 persons have never had the experience of using a VA, makes 6% of the total sample size. Most of the respondents have more than 1 year of experience in using VA: 50% of respondents have used VA for more than 2 years, 18.67% have 1-2 years experiences, only 20% have less than 6 months experience on voice assistants. (see Figure 12).

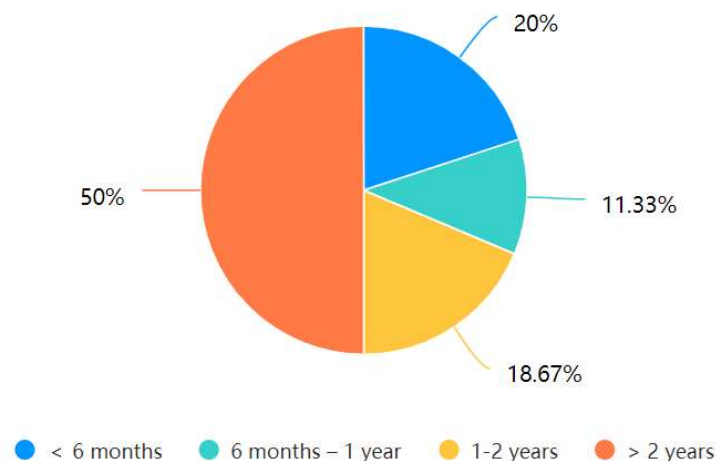


Figure 12. Age distribution of the sample

According to the survey, in the Chinese market, the most popular VA is Apple's SIRI (57.33%), followed by Xiaomi's XiaoAi (35.33%), Google's Google Assistant (25.33%), and Alibaba's Tmall Genie (also called AliGenie). (22%) and Amazon's Alexa (14%). Among those products, XiaoAi and Tmall Genie are local brands in China. Unlike the US market, those 2 local products are having more competitiveness than Google Assistant and Alexa in China. (see Figure 13).

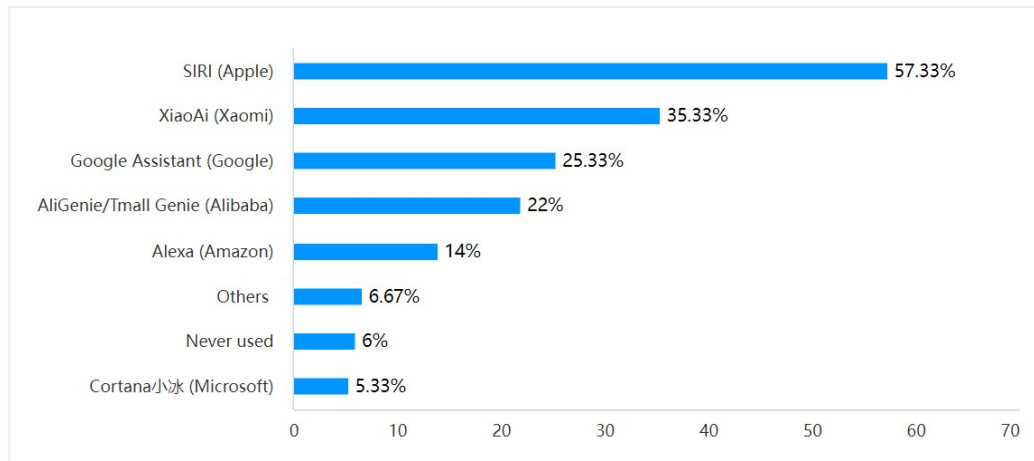


Figure 13. VA Type Preferences Among Consumers

The respondents are required to self-evaluate their familiarity with Voice Assistant between 1 to 10, the average score is 5.73. Regarding the line chart of consumers' familiarity of VA, the distribution of scores is concentrated in the interval of 5-8 points. It concludes the result that consumers are generally familiar with Voice Assistants. (see Figure 14).

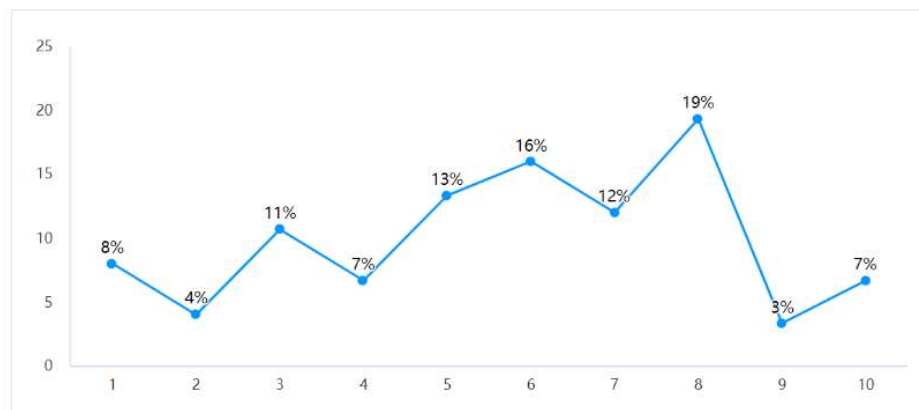


Figure 14. Consumers' familiarity of VA

According to a survey by Insider Intelligence in July 2022, Gen-Z is the important target of VA. There are 65.8% of people between 25-34 years old are using the VA, then the popularity of VA declines while the age grows. The percentage among people between 18-24 years is 59.6%, and 23.7% among people more than 65 years old. (see Figure 15).

The popularity of VA shows a positive result for younger consumers and less favorable for elder consumers; the effects did not differ significantly by gender [10].

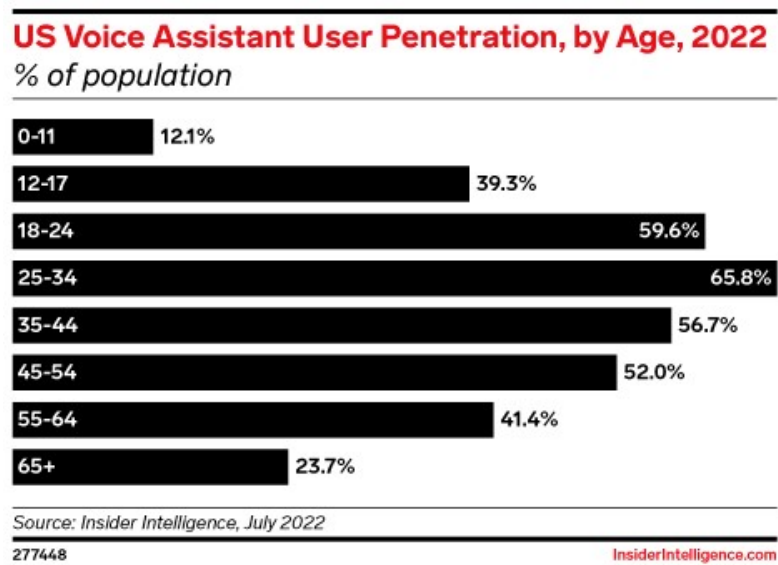


Figure 15. US VA user penetration by age (survey by Insider Intelligence, 2022)

According to my survey, respondents use most frequently the function of VA as listening to music (56%). Followed by answer calls (41.33%), make alarms and calendars (37.33%), control smart home (36.67%) and shopping (18%). The other functions been used included chatting, setting navigation and language translation. (see Figure 16).

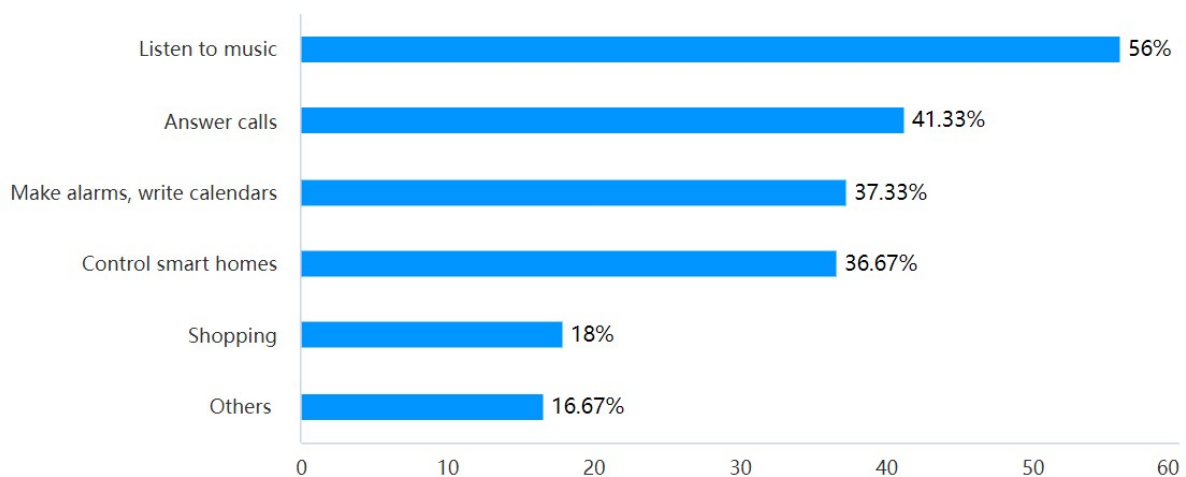


Figure 16. Functions Frequently Used by VA users

4.2. Adopt Voice Assistants in shopping

A survey by Adobe has exposed, 22% of home smart box owners report using their devices in shopping [1].

In my survey on 2023, 44% reported using VA in shopping. And by answering the question “Have you ever used a VA for shopping-related tasks?”, 38.67% of the respondents answered “yes”. (see Figure 17).

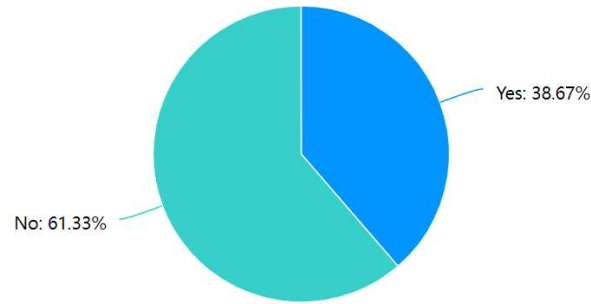


Figure 17. VA shopping task adoption

Consumers spend on Alibaba has increased an average of 15.9% per week (Alibaba's annual sales revenue has increased by \$406 million) due to the adoption of Tmall Genie [10]. The term "servitization" is gaining popularity. Online companies can use AI to enhance user experience and help companies adapt to "servification" [9].

According to my survey, users prefer the following VA in shopping: Google Assistant (41.38%), XiaoAi (36.21%), Siri (36.21%), Tmall Genie (27.59%), Alexa (22.41%). (see Figure 18).

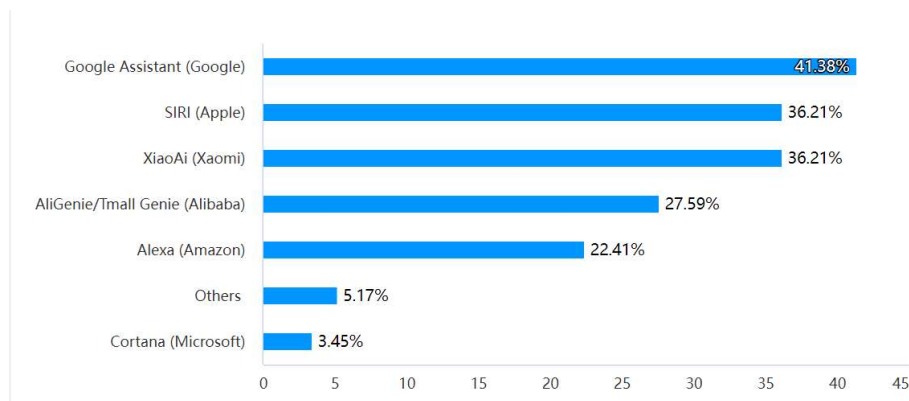


Figure 18. Preferred VA for shopping

In terms of frequency, 43.1% of the respondents occasionally use VA to perform shopping tasks, 32.76% use it with a higher frequency, and 17.24% use VA to perform shopping tasks very frequently. (see Figure 19).

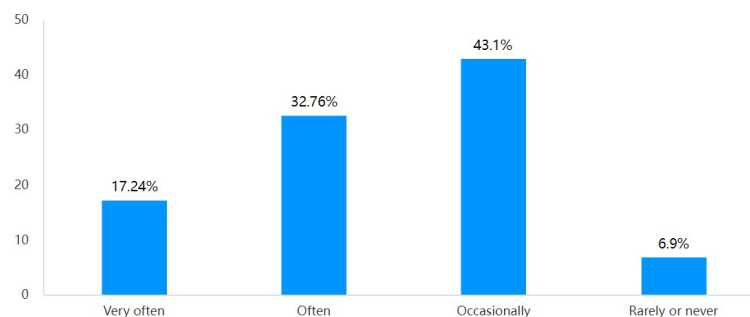


Figure 19. frequency of using VA for shopping

Regarding the age distribution, on the section of age between 27-35 years old, 44.23% of population has using VA for shopping; the percentage makes 40.54% between 18-26 years old, and 30% between 36-55 years old. Resulting that Gen-Z is more aggressive in VA shopping.

4.3. Customer Journey and User Experience on VA shopping

In the traditional e-commerce channel, the shopping platform interacts with consumers in the form of pictures and texts that interfacing with users by visual. However, as VA software uses natural language for interactive, it could not show an intuitive impression through visual. It makes the primary difference between VA shopping channel and traditional e-commerce channel.

The customer journey on traditional e-commerce channel is:

1) Search for the articles. 2) Browse articles on the browser or e-commerce platform / browse recommended articles on the homepage of platform. 3) Select an article to view the detailed information (picture-text). 4) Add the article to the shopping cart. 5) Fill in the delivery address and choose the delivery method. 6) Select the payment method and achieve the payment. 7) Receive the article.

In traditional e-commerce, users are mainly concentrated on large e-commerce platforms (such as Alibaba, Jingdong, Pinduoduo, Amazon, Google shopping, etc.). Users usually will be required to register an account on the platform in order to simplify the further shopping process by memorizing the delivery method and payment method. Plus, the consumers will get personalized recommendations according to their history actions. With the help of AI algorithm, shopping platform could generate several recommendations as “articles that you could be of interest”, “similar products” and “related products”. It further enhances users’ shopping experience.

As for VA shopping channel, the shopping process and customer journey is quite similar to the traditional ways:

1) User tell VA to buy an article. 2) VA lists the suitable articles and broadcast to user. 3) User chooses the article and tell VA to make order. 4) VA confirms the demand. 5) User confirms the order. 6) VA execute the purchase. 7) User receives the article [3].

For example, the Youtuber GregglesTV showed a process to shopping through VA in his video in 2016 “Amazon Voice Shopping with Alexa” [4].

It appears that the VA channel does not have a large difference than the traditional channels in e-commerce. All of those channels have the function to search, introduction, select and purchase. And they are all relaying on AI to accurate the searching list and recommendation. The most obvious difference is that VA use natural language as interface while the traditional way relays on visual. In this context, limited by the complexity of information, users’ action will be limited. Therefore, during the VA shopping, the information that been shown is limited by the information carrying capability of natural language, cause the consequence that the complexity and quantity level of information must be reduce. Users are required to make decisions without an intuitionistic impression [8].

At the same time, limited by language, the operable will also be limited by accuracy. For example, when users fill in address or payment information, enter with the text will of cause be more accurate and easier to verify. However, if users are required to fill in that information by language, it comes up the risk of mistake and unclear of verification. During this process, there could be lots of destructions by noise or AI capacity.

To make a better user experience by VA shopping, on the one hand, VA should be able to access users account on shopping platforms therefore to simplify shopping process and guarantee the accurate of information. In the video from GregglesTV on YouTube [4], after Alexa places an order according to the user's command, it reminds the user to check the details on the Amazon APP. In this case, the simplify of shopping is guaranteed by the link between VA (Alexa) and e-commerce

platform (Amazon). On the other hand, it requires a smarter AI algorithm to improve the accurate of search and personalized recommendations. Each smart object has the ability to collect relevant information to help identify consumption patterns and predict future individual behaviors [8].

4.4. Consumer Behavior and Perceptions

The survey shows that consumer's perfection to purchase difference catachrestic articles is difference while shopping through VA. Electronic devices and cultural/entertainment products have been purchased in a high frequency which exceed 50%. Followed by Household product (39.66%), Electronic devices accessories (32.76%), food and drinks (29.31%), clothing and accessories (17.24%) and Beauty and Care (15.52%). (see Figure 20).

Electronic devices (phones, tablets, computer, etc.)	33	56.9%
Cultural and entertainment products (movies, music, books, audiobooks)	29	50%
Household, Furniture, Electrical Appliances	23	39.66%
Electronic devices accessories (earphones, chargers, powerbank, etc.)	19	32.76%
food and drinks	17	29.31%
clothing and accessories	10	17.24%
Beauty and Personal Care Products	9	15.52%
Other (in detail)	2	3.45%

Figure 20. Consumer Preferences for VA Shopping Categories

63.79% respondents of the questionnaire tend to repurchase articles that they have bought before; 51.72% tend to purchase the recommended articles by VA; and only 18.97% of respondents are willing to buy articles that they are not familiar with. (see Figure 21) VA's personalized recommendation algorithm is a key point to build and improve user experience. Consumers have a higher expectation for the ease of operation. The recommendation accuracy is positively correlated with customer satisfaction [6].

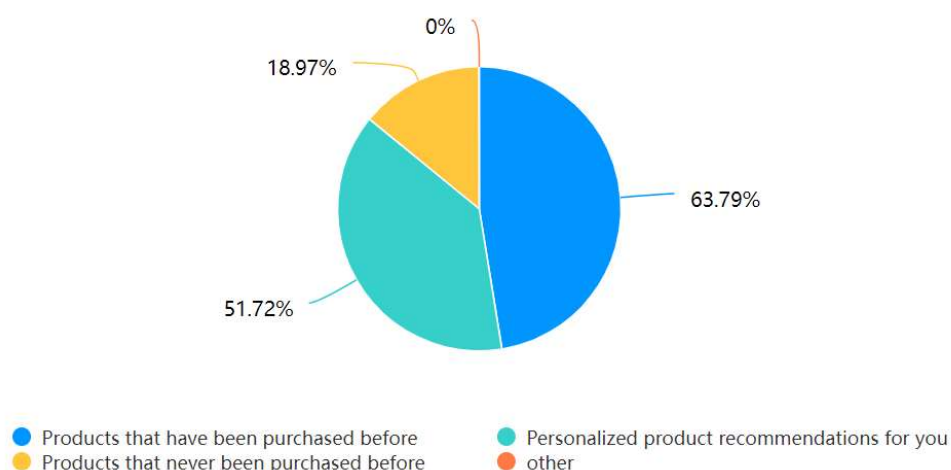


Figure 21. Consumer Repurchase Preferences in VA Shopping

Among the advantages of VA shopping, users value the most are saving time (60.34%), easy to operate (50%) and enables to multi-tasks (ex. While driving, house cleaning) (37.93%). About 25% think that the advantages of VA shopping include simplified shopping steps and the smart personalized recommendation system. (see Figure 22).

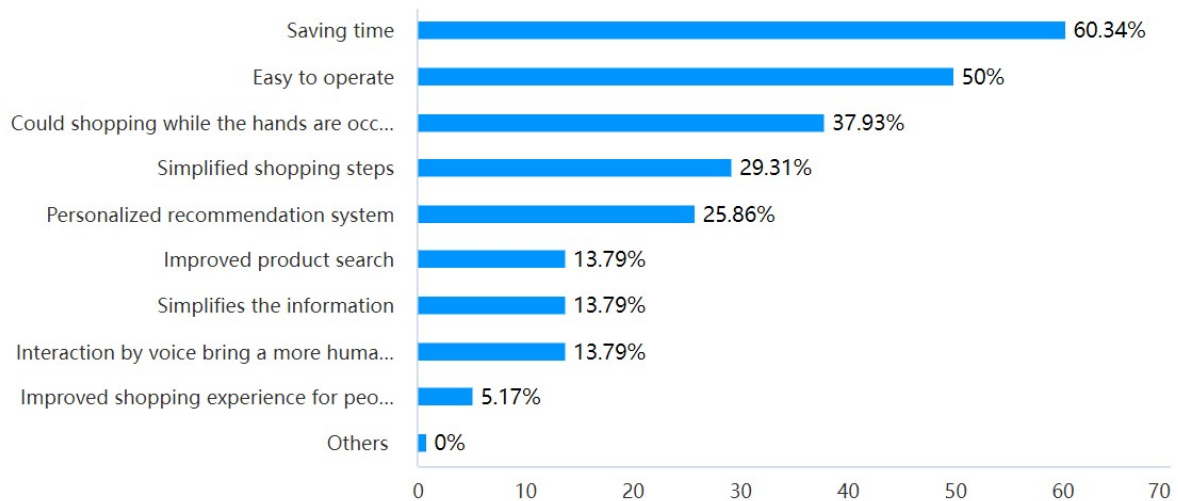


Figure 22. advantages of VA shopping

As for the disadvantages of VA shopping, 50% respondents agree that the list of articles are too shot and it lack of optionality and comparison; 39.66% feel it unable to form an intuitive impression of the article and the recommendation is not accurate. 31.03% of users concerns the payment security, only 6.9% think it's hard to operate. (see Figure 23).

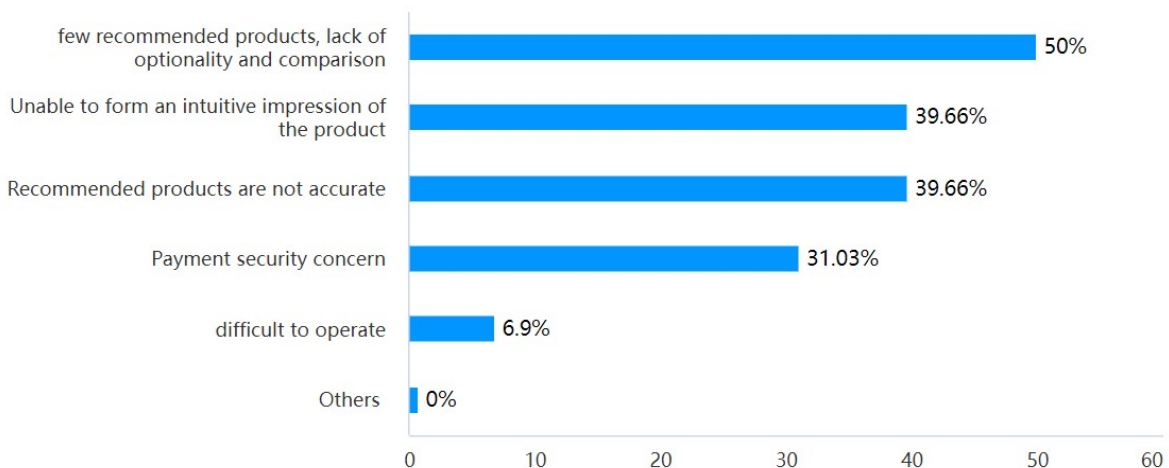


Figure 23. disadvantages of VA shopping

4.5. Attitude and Perspective

From a holistic point of view, consumers' attitude to Voice Assistants shopping is more positive. But it shouldn't be ignored that there is a large uncertain attitude to VA shopping. People generally have a basic understanding and familiarity with VA that the majority of people have more than one year's

experience on using VA, and the shows a certain interest in VA as a new shopping channel, but the consumers have not yet formed enough loyalty and stickiness to VA shopping.

Among the respondents who have used VA to perform shopping tasks, about 45% of them maintain a neutral attitude towards the information provided by Voice Assistants in shopping scenarios; 43.1% of users trust it, 10.34% of users doesn't show much trust on it while the only 1.72% don't trust the information provide by VA at all. It can be seen that although the vast majority of users maintain a neutral state of trust in information, users who trust VA are far greater than those who do not. Users tend to trust the information provided by VA in shopping scenarios, and the large number of neutral attitudes shows a potential for Voice Assistant to gain the users' loyalty. (see Figure 24).

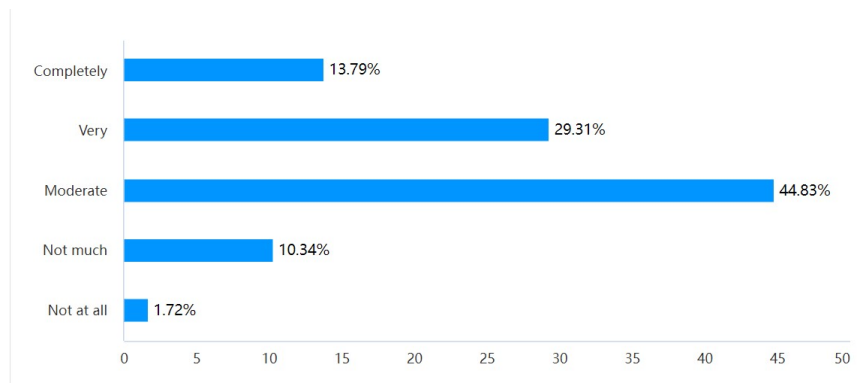


Figure 24. attitude towards the information provided by VA

More than 60% of users are satisfied with the user experience of VA shopping, formed by 53.45% who are satisfied with user experience, and 13.79% of them are very satisfied. In addition, 29.31% of people do not care about user experience, and only 3.44% of people are dissatisfied with the user experience of shopping through VA. (see Figure 25).

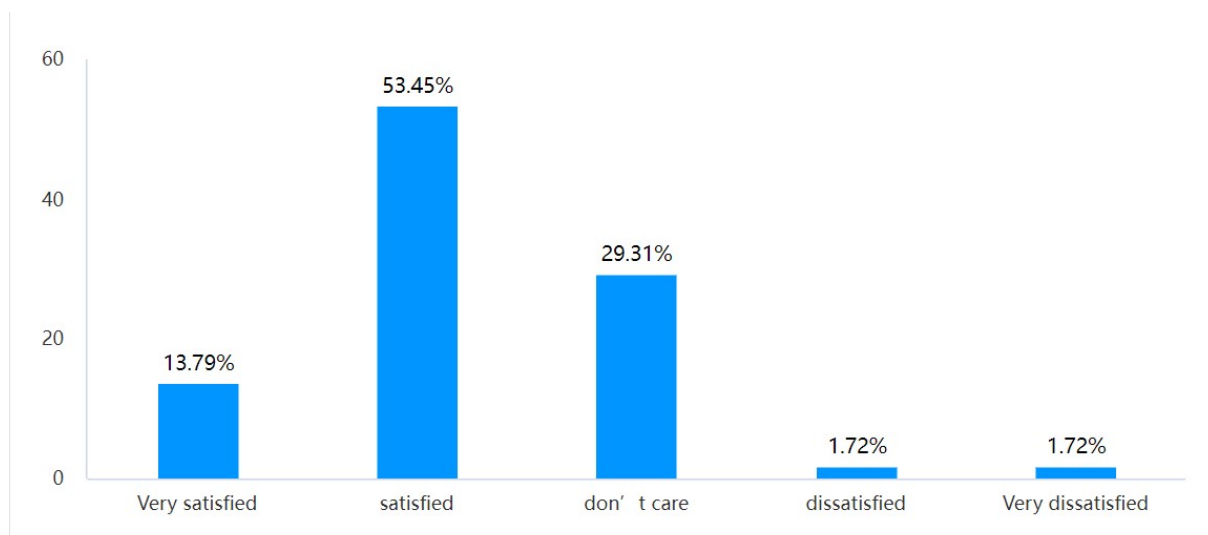


Figure 25. User's satisfaction with the user experience of VA shopping

The vast majority (more than 70%) among the actual users are willing to continue shopping with Voice Assistant, and half among them will stay with a high frequency. 24.14% of users maintain

uncertain. only 5.17% of users may not continue to use VA for shopping, but nobody maintains an absolute deny. (see Figure 26).

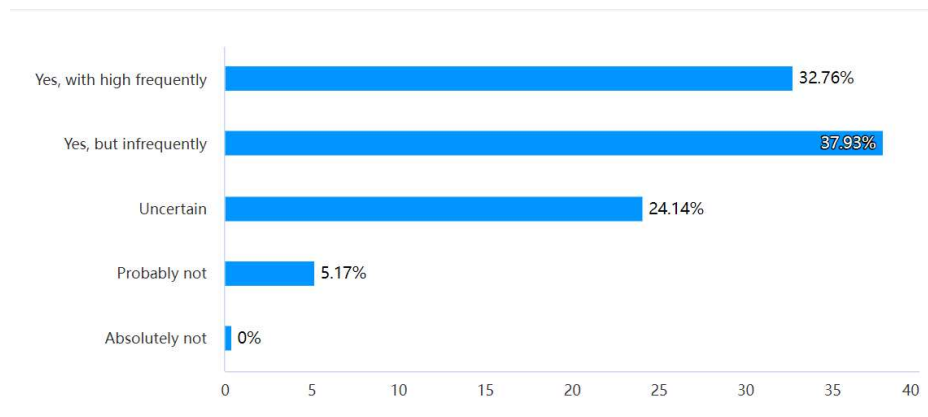


Figure 26. users' willingness to continue shopping with VA

More than 60% of actual users show their willingness to recommend VA shopping to others; another 31.03% hold an uncertain attitude, and only 5% are unwilling to recommend it.

Among those actual users of VA shopping, most of them show trust and recognition. They show the intention on this channel and willingness to recommend. It results a basic loyalty and a positive perspective to it, and shows a future stable of this channel. (see Figure 27).

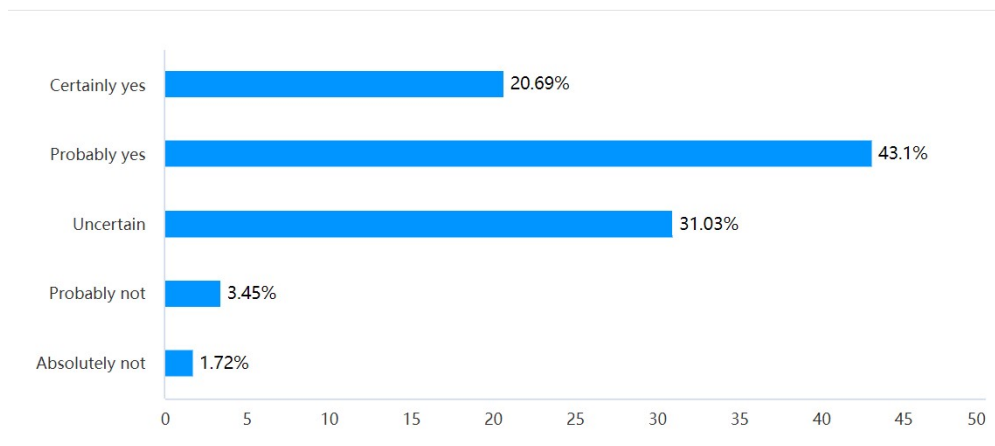


Figure 27. users' willingness to recommend VA shopping to others

The respondents of questionnaire, those who have not yet used VA to perform shopping tasks expressed their expectations for VA's functions, advantages and reliability when filling out the questionnaire. They are considered as potential users.

Among potential users, the most preferred article characteristics are food and drinks (39.13%) and cultural and entertainment products (35.87%). Potential users' purchase propensity for other articles below 20%. (see Figure 28).

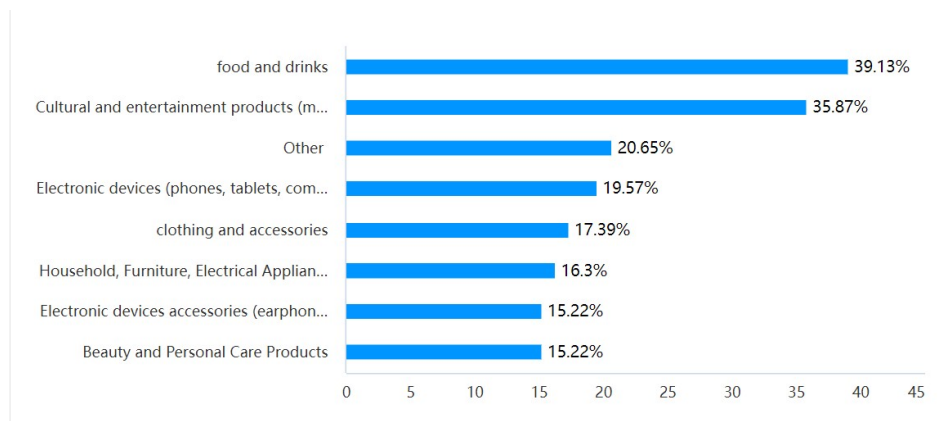


Figure 28. potential users' preference of article characteristics in VA shopping

Potential users are more inclined to repurchase (58.7%); then 29.45% shows their interest on personalized recommendations by VA; besides 25% are willing to purchase those articles that they are not familiar with. Compared to actual users in VA shopping, potential users show less interest on personalized recommendation. (see Figure 29).

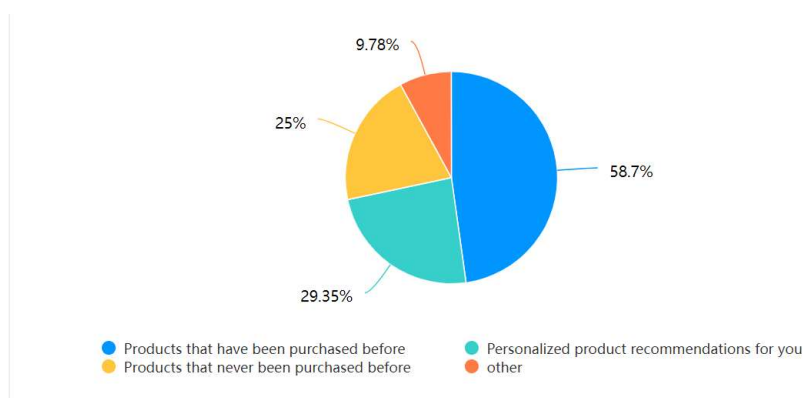


Figure 29. Potential users repurchase preferences in VA shopping

Among all the advantages of VA shopping, the most recognized by potential users is saving time (50%), followed by enable of multi-tasks (41.3%), and easy to operate (39.13%). The result is quite similar to the point of view of actual users. (see Figure 30)

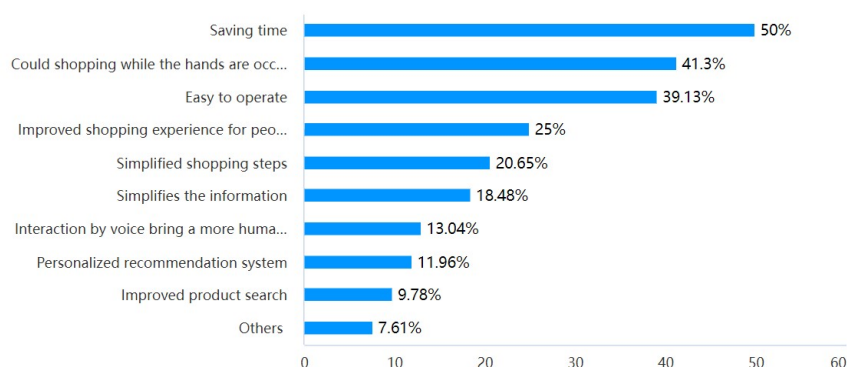


Figure 30. estimate advantages of VA shopping according to potential users

But as for disadvantage of VA shopping, the opinions of potential users are different that actual users. The most important disadvantage of VA shopping according to potential users is the payment security concern (28.91%), and the VA is unable to form an intuitive impression of articles (47.83%) shares the same value. Then, potential users think the recommendation system is not accurate (38.04%) and there are few articles on the list (30.43%). (see Figure 31).

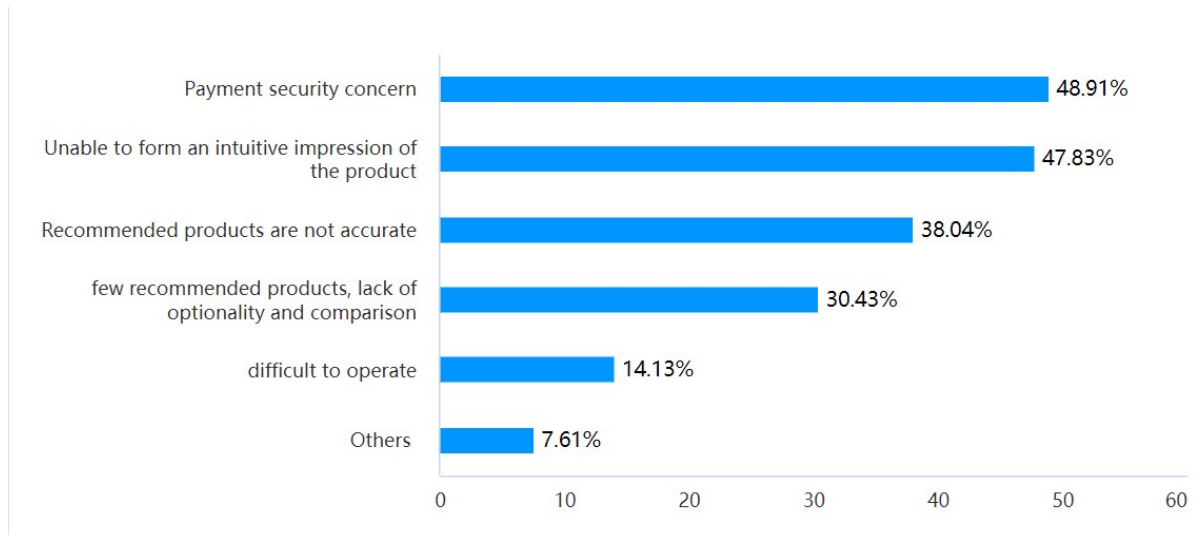


Figure 31. estimate disadvantages of VA shopping according to potential users

Most of potential users hold an uncertain attitude on the information given by Voice Assistant. Only 13.05% trust VA, but most potential users are having a negative attitude on trusting VA. (see Figure 32).

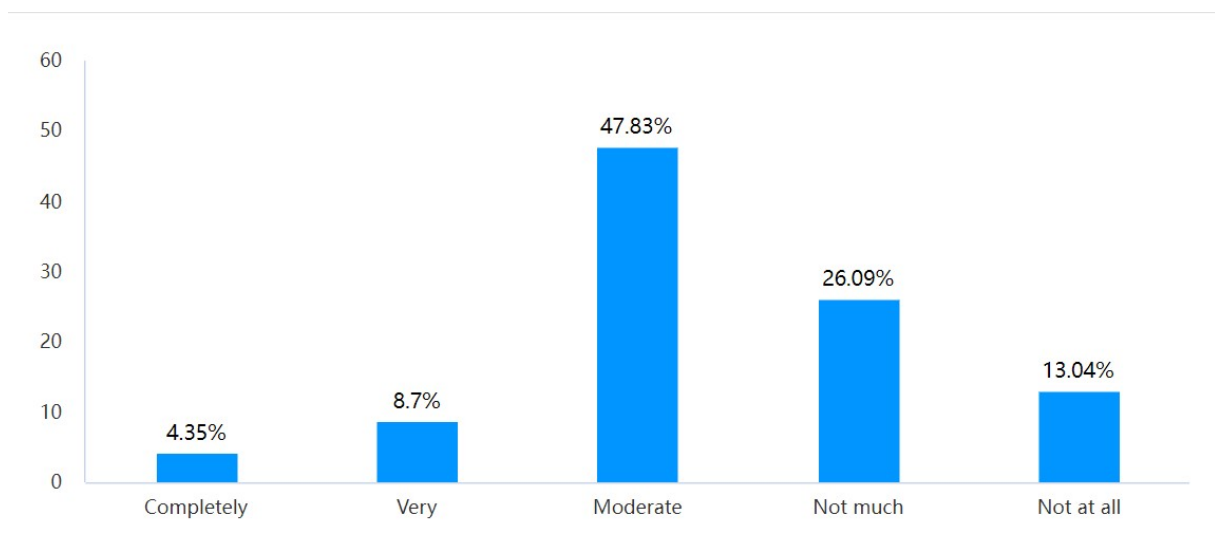


Figure 32. potential users' attitude on the information given by Voice Assistant

Potential users' opinions on whether to start using VA shopping are normally distributed: most potential users are concentrated in the uncertain state, and the proportion of positive and negative states is very likely. Nearly 50% are uncertain about shopping on VA, while 28.25% of them wish to start using VA, and 22.83% tend to not use it. The data show that potential users remain on the fence

about VA shopping. VA shopping is not attracted enough for the market, but there is still a decent opportunity. (see Figure 33).

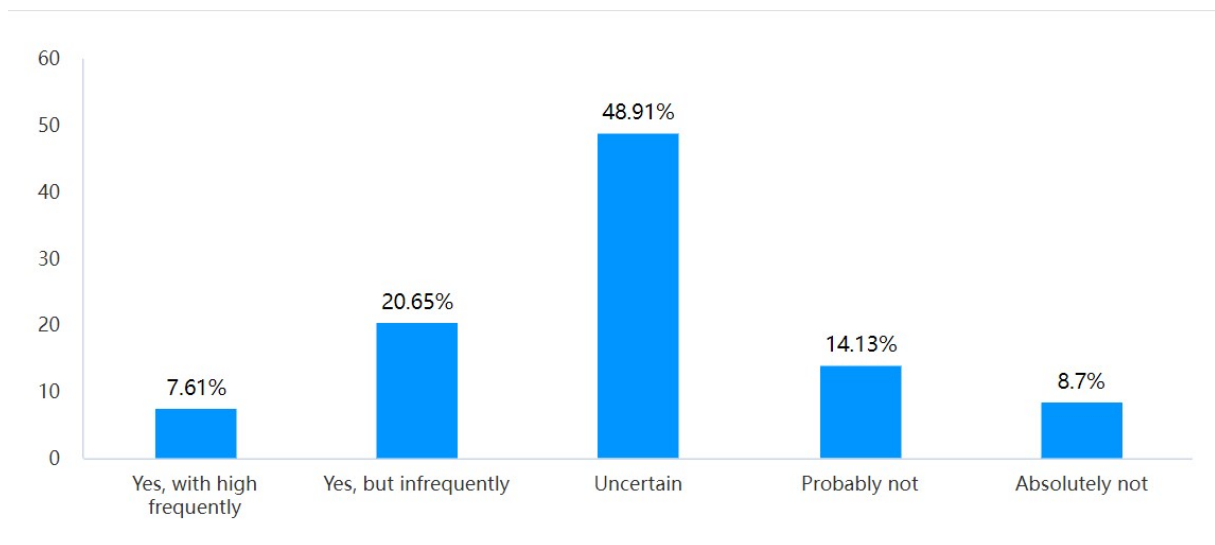


Figure 33. Potential users' willingness on using VA shopping

5. DISCUSSION

5.1. Characteristic of VA as Channel in E-commerce

Voice Assistants as a channel for online shopping, the essential difference between VA and the traditional channels is that VA uses natural language as the interface rather than visual information (picture and text) for traditional channels. It has greatly changed the way information is disseminated; it is an interaction method based on auditory rather than vision. In consequence, while traditional e-commerce channels can list a large number of articles at the same time to bring clear visual comparison, VA is only allowed to present one single article at a time. Therefore, in the same interval, the information that can be presented by VA is much lower than that which can be presented by images from traditional channels.

It points at the simplicity and accuracy of information delivered by VA. Compared with traditional channels, VA get a higher requirement for personalization recommendation system and interaction efficiency.

From the perspective of customer journey, there is no subversive difference between the routes of VA channels and traditional channels. They all follow the process of searching, selecting, verifying and payment.

As an innovative shopping channel, VA shopping has its unique advantages, but at the same time it also has disadvantages that cannot be ignored.

VA shopping's most advantage is time-saving. It enables users to carry out multi-tasks, and it is easy to operate. It simplifies the process of shopping, especially while repurchasing an article.

However, its disadvantages include that it's not accurate enough for voice recognition and articles searching. Besides, the articles on the list are too short and therefore couldn't allow consumers to compare the articles. Consumers wish the AI could be more intelligent and making a more matching recommendation. The potential users also have the concern about payment security and privacy security.

Voice Assistant, as an invention of information age with the high popularity of smart devices, the core of Voice Assistant is software built with Artificial Intelligence algorithms. The advantage of VA depends mostly on its AI algorithm. It relies heavily on personalized recommendation algorithm and high intelligence user interaction (include voice recognition and semantic understanding) to optimize its advantage of time-saving and simplifying process. In term of ethics, in order to guarantee payment security and information security, VA could realize it through cooperation with large e-commerce platforms, or directly rely on the shopping channels developed by the mother company.

5.2. Consumers' Experience and Attitude of VA Shopping

According to the results of the questionnaire, more than 60% of existing users are satisfied with the user experience of VA shopping, 29.31% of users don't care, and only 3.44% are dissatisfied with the user experience. Most of them tend to continue to complete shopping tasks on VA with a certain frequency, and more than 60% of existing users are willing to recommend VA shopping to others.

VA shopping brings users a convenient and efficient experience. The emergence of VA shopping allows consumers to perform shopping processes while doing other work. For example, consumers can demand VA to execute shopping programs or browse while cleaning the house or while driving, VA can perform shopping tasks autonomously without disturbing the user's progress on other affairs.

More than 60% of users tend to purchase repeatedly through VA, more than 50% of users tend to purchase according to recommendation by VA, and users are less willing to purchase articles that have never been purchased before (20%). Such a result is closely related to the way VA presents information: VA cannot allow users to form an intuitive impression of the article, leading to a few of uncertainty and distrust in the information. In fact, 45% of users maintain an uncertain attitude towards the information provided by VA in shopping, which is higher than those who trust VA to provide information (43.1%). That means VA shopping has a lot of potential for improvement.

At the same time, those potential users who have not yet used VA shopping overwhelmingly have a neutral attitude towards it. They recognize the advantages of VA shopping, such as saving time, freeing hands, and being easy to operate, but they concern about payment security, information credibility (unable to form an intuitive impression of the article) and inaccurate recommendation systems (inaccurate personalized recommendations, few articles on the list, lack of comparison). Among the potential users, 39.13% of them do not trust the information provided by VA, while 50% keep a wait-and-see attitude.

In summary, consumers' experience of VA shopping shows generally positive, but a lot of people stay an uncertain position, keep wait-and-see. All means VA shopping still have the room to improve. It could attract and make loyal to more users through optimize algorithms and marketing.

5.3. Perspective and Forecast of VA Shopping

The Global Voice Assistants Market is projected to reach a value of USD 22.2 Billion by 2030 at a CAGR (Compound Annual Growth Rate) of 33.5% over the forecast period 2022-2028 [11]. The market forecast for Voice Assistant shows a steady raising trend, and the amount of VA users is increasing year by year, so the user base of VA shopping is constantly increasing.

Among VA shopping users, Gen-Z and millennial take a large part on it, means that VA has great market potential in the future. With the growth age of Gen-Z, they will gradually become a main force of purchasing power.

Even though from an overall viewing, consumers' attitude to VA shopping is rather positive, but a lot of them still hold a lot of uncertain to this innovative shopping channel. Regarding the forecast of VA shopping, its future presents a positive trend, and a large potential for development.

As for the future development direction of Voice Assistant, in order to make loyal the existing users, VA should enhance the accuracy of search and recommendation, at the same time further simplify the steps of shopping and verify process. To attract potential users, VA should enhance the accuracy of voice recognition, enhance payment security protection and enhance child protection as well.

Among the respondents' suggestions for improving VA shopping, I summarize their opinions in the following points:

- Some of AI's behaviors are very stupid.
- Speech recognition is not accurate enough; keyword capture is not accurate enough.
- Simplify the purchase process, order confirmation is too cumbersome.
- Optimize the personalized recommendation system.
- Improves the privacy in public.
- Protect user privacy and payment security.
- Added child protection.
- The recommendation system should avoid to be affected by advertising and sponsorship (Ensure the authenticity of the recommendation).

5.4. Limitations of Study

The sample size of questionnaire is a limitation of my study that the result would be more accurate if there are more respondents.

Besides, my sample of study stay at the age between 18-55, it lacks of respondents under the age of 17 years old (underage) or more than 55 years old. The reason causes this shortage of sample could be that the questionnaire is mostly handing out through electronic channels and the topic is target to those who are more familiar with information technology. It is a limitation for my study as the opinion of those untargeted people is also valued.

Further thinking, the main object of my study are consumers, it lacks direct data from VA products and e-commerce platforms; and it lacks point of view from merchants in this research.

5.5. Directions for Future Research

This research on user experience will point to the optimization of VA shopping. At the same time, the collection of user opinions can also be used for guidance in marketing. And provide theoretical support for the merchant's UX design.

6. CONCLUSION

6.1. Summary of the Study

This dissertation conducts research on consumers' experience of adoption of Voice Assistant in e-commerce (shopping through VA channel), and further expands it into three main questions:

- (1) VA shopping's characteristic: How VA shopping differs from traditional e-commerce channels through user-experience?
- (2) What is the consumers' attitude for shopping through voice assistant?
- (3) What are consumers' attendance on voice assistant as a shopping channel?

My research uses questionnaire as the method of data collection, I designed my survey follow the 4 parts: Consumers' general impressions of voice assistants, User Experience of Voice Assistant shopping, Consumers' attitude expectations for VA shopping, and Consumers' personal information to achieve a quantity analysis.

The biggest difference between the VA shopping channel and the traditional e-commerce channels is that VA shopping relies on natural language as an interactive, which makes it more dependent on the intelligence of AI algorithms. The accuracy of voice recognition and keyword capture is a key point that affects user experience. Thereby affecting the market performance of VA.

Through literature review and questionnaire survey, market forecast of VA shows an overall raising trend. Most users are satisfied with the user experience of VA shopping, but most potential users remain in an uncertain state. Users are satisfied with VA shopping's time-saving, easy-to-operate and multi-tasking enabled advantages, but users think that VA's product description is not intuitive enough, and its personalized recommendation system is not accurate enough. Potential users have security concerns (payment and privacy) when using VA shopping. These deficiencies are exactly the user pain points that VA needs to solve in the future development.

6.2. Recommendations

6.2.1. VA's Development and Improvement

- VA should strengthen the AI algorithm that to improve the accuracy of voice recognition and keyword capture.
- VA should further simplify the shopping process, there are too many verification steps in purchasing steps.
- VA should strengthen its personalized recommendation system.
- VA should further guarantee the user protection agreement to dispel users' concerns about payment security and privacy security. At the same time, VA should carefully consider the child protection function.

6.2.2. Marketing Strategy

Reviewing the result of questionnaire, there are differences in the views of actual users and potential users. Actual users generally have higher trust and satisfaction with VA shopping, while potential users show more distrust and uncertainty about VA shopping.

Such a difference means that the function of VA can basically make users satisfied, but there is an information gap between potential users and actual users. In this case, proper marketing should accommodate such differences.

Here are some of my marketing suggestions:

- Influencer marketing: Since Gen-Z and millennial account for a large proportion of VA shopping's audience, influencer marketing is an efficiency to attract young people. VA companies can cooperate with influencers in technology districts or cultural districts, asking them to demonstrate the shopping process on VA, then attracting new users with its novelty and simplicity.
- Add shopping to VA's function tips.
- Cooperate with large e-commerce platforms to recommend VA voice shopping channel during the purchasing process.
- The company can use questionnaires to getting close between VA products and consumers, and attract more potential customers to pay attention to this innovative shopping channel.

6.2.3. UX Design in VA Shopping

In the future, with the continuous popularization and development of VA, in order to adapt to this unique interaction mode of VA shopping channels, merchants may be required to design UX specifically for VA, just like when smartphones became popular.

- The product information displayed through VA should be simplified enough. The product introduction should contain the most critical information, such as core functions, parameters, usage scenarios and prices.

- Merchants can set keywords for VA's intelligent recommendation algorithm to capture, then to increase the exposure and accuracy of products.

- At this moment, VA shopping are mostly combined with large e-commerce platforms (such as Alibaba, Amazon, etc.). If an independent brand wants to enter this business, it first needs to link the VA shopping function with its own website/APP. It should allow customers to access shopping information on their mobile phones or computers to ensure the safety of shopping and avoid mistakes.

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