

ENHANCING CUSTOMER SATISFACTION THROUGH VOICE COMMERCE: A UX DESIGN PERSPECTIVE

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ABSTRACT

The convenience brought to customers by voice commerce during the purchase of products comes in handy, especially with the advancement in artificial intelligence (AI) and natural language processing (NLP). The study is set to establish the aspects of user experience (UX) design elements that influence customer satisfaction in connection with voice commerce. This paper aims to explicate how key UX components driving customer satisfaction in the realm of voice commerce come into play: usability, accuracy in Natural Language Processing, personalization, contextual understanding, and integration with other services.

This has been conducted using a mixed-method approach, including a systematic literature review from 2014 to 2024, case studies of top-of-the-line voice commerce platforms, and interviews with 20 experts. Expertise is required either in UX design or voice commerce. The sample of potential co-interviewees was chosen based on extended experience and experience-based expertise. It means that UX design has a very important role in the shaping of user experiences and satisfactions for voice commerce. Concretely, practical recommendations for e-commerce firms to optimize their voice UX design are pointed out, and several special areas are exposed for future research above the integration of augmented and virtual reality, advancements of AI-driven NLP,

and the use of voice biometrics for improving security and engendering trust.

1.0. BACKGROUND OF THE STUDY

The advent of e-commerce has transformed consumer shopping with an incomparable amount of convenience, variety, and competitive pricing. As the digital marketplace grows, so does the importance of fashioning an engaging, satisfying UX. It means the overall experience that a user has while working with any website or application, and it refers to different aspects of usability, aesthetics, and interaction design. Effective UX design is the main determinant of customer perception and creation of loyalty, and then sales, among e-commerce customers.

In the past decade, e-commerce has grown significantly. Global e-commerce sales amounted to \$4.28 trillion in 2020, and this figure is projected to reach \$6.38 trillion by 2024 (Statista, 2021). Amidst this growth, voice commerce has been a significant trend changing how consumers are now discovering, selecting, and purchasing products online. Voice-based shopping is increasingly gaining traction because of the convenience and ease involved, mainly within hands-free activities and multitasking environments. However, moving from the traditional graphic user interface (GUI) to voice user interface (VUI) poses some unique challenges and opportunities in the domain of UX design.

Factors affecting customer satisfaction in e-commerce include ease of use, efficiency, and personalization of the shopping experience. Voice commerce adds a new dimension to these factors, one in which the UX design strategies of e-commerce platforms must be revamped. Effective voice commerce has huge potential for improvising customer satisfaction with its natural and intuitive way of engaging users on the platform. On the other hand, poor voice UX design increases user frustration and dial tone disappointment—not good for customer retention or sales.

1.1. OBJECTIVE AND PROBLEM

Despite the fast-growing adoption of voice commerce, it is coupled with an overall lack of proper understanding regarding how UX design for voice interactions impacts customer satisfaction. This paper seeks to fill this research gap and provides an exploration into the relationship between voice UX design and customer satisfaction in e-commerce platforms. This study specifically aims to answer if there are principal components of voice UX design, and to assess their collective effect on customer satisfaction. The study hopes to provide actionable insights for e-commerce businesses looking to optimize their voice UX design in driving customer satisfaction through the detailed analysis of these elements.

2.0. VOICE UX DESIGN AND E-COMMERCE

Voice commerce can be defined as the use of voice recognition to conduct any commercial transaction. For instance, this is the role played by voice activation while online shopping, banking, and other e-commerce transactions using a smart speaker or virtual assistant (Lee & Park, 2018). Arguably, it appears that the development of voice commerce began when speech recognition was in its infancy stages. It essentially began with simple execution of commands up to where it has improved to NLP or Natural Language Processing that supports subtle and contextual interaction (Chen & Zhang, 2021).

Voice UX design is an interdisciplinary crossroads of psychology, linguistics, and technology aimed at making interfaces both functional and, controversially, pleasant to use. In this respect, the role of UX design in voice commerce acquires special importance because of its impact that it is going to have on

customers' behavior. A well designed voice commerce platform can lead to higher engagement, increased time spent on the platform, and improved conversion rates (Nielsen, 2020).

2.1. BENEFITS OF VOICE UX DESIGN IN E-COMMERCE

Voice UX design in e-commerce offers the following benefits, increasing user experience and, thereby, contributing to overall customer satisfaction:

a. **User-Friendly and Accessible:** Voice commerce defers to hands-free shopping. Using this technology, users can search for products using voice lookups, add items to their carts, and complete transactions. This responsiveness is best enjoyed during multitasking and in those conditions where manual input is out of place, such as when driving or cooking.

b. **Natural Interaction:** Voice interfaces emulate natural human conversation, so interactions are more intuitive and user-friendly. This kind of natural interaction reduces the learning curve of the user and makes for an almost seamless shopping experience, particularly for those not very familiar with traditional GUI-based interfaces.

c. **Increased Efficiency:** Voice can ease tasks such as search and ordering much more quickly than traditional browsing and typing methods. Users can browse through product categories, inquire about details about some product, and place orders without having to go through a series of screens.

d. **Personalization:** The voice-enabled platforms can provide a user with suggestions and responses based on their preferences and past interaction. All this supports the benefits that it helps in achieving a higher level of satisfaction and engagement on the user's side with more personalized content and suggestions that meet individual needs.

e. **Accessibility for General Audiences:** Voice interfaces are universal and critical because they target a broader audience, whereas sometimes it may be hard to use a visual interface for the visually impaired. The universality ensures that the audience is maximized

and allows for better compliance to requirements on accessibility.

2.2. CHALLENGES OF VOICE UX DESIGN IN E-COMMERCE

Despite its benefits, voice UX design in e-commerce also presents several challenges that need to be addressed:

a. Accuracy of NLP: On this front, deciphering the voice remains a very accurate exercise. Errors in NLP confuse, result in wrong ordering, and frustrate customers, therefore directly impacting customer satisfaction negatively.

b. Complexity of Commands and Queries: There is complexity and therefore context in the case of voice commands that makes it hard to develop a system which can correctly interpret and respond to the vast queries of different users. Designing systems handling fine language and user intent requires advanced NLP capabilities.

c. Security and Privacy Concerns: Voice interactions are very sensitive and contain personal information, such as payment details and personal preference information. Therefore, the security and privacy of user data in voice transactions become very important, which will instill trust and decrease the potential risks of data breaches or unauthorized access.

d. Integration with Existing Systems: This means technical challenges to integrate voice UX design with e-commerce platforms and other backend systems. Compatibility, scalability, and UX consistency between different devices and platforms, therefore, require careful planning and execution.

e. User Adoption and Behavior Changes: Cultural, generational, and technological aspects might lead to differences in the adoption of voice commerce by users. It requires winning over the sceptics and educating users on the benefits and reliability of the voice-enabled systems—what it takes to get the users to trust and adopt the voice interfaces for sensitive transactions and complex interactions.

2.3. IMPORTANCE OF VOICE UX DESIGN IN E-COMMERCE

In voice commerce, UX design is very instrumental to customer satisfaction and can drive high adoption rates within e-commerce platforms. Multiple factors have a critical role in ensuring the effectiveness of a voice interface to offer a seamless and engaging user experience. These factors include:

1. Ease of use: Easy to get around and intuitive, this is one of the easiest fundamentals in voice UX design. Voice interfaces must be intuitive and easy to navigate, minimizing user effort and frustration (Zhao & Wang, 2017). This simply means that command structures are clear and what prompts for these commands should be intuitive enough to take users through seamlessly.

2. Accuracy refers to the correctness of voice recognition and processing, which is highly important in ensuring good user experience. The system's ability to accurately recognize and process spoken commands is paramount to a positive experience (Anderson & Brown, 2022). The systems have to understand, at a high degree of reliability, what is being said for it to perform the right actions. High accuracy reduces frustration among users as a result of misinterpretations and increases the usability of voice-enabled interfaces.

3. Response Timing: In intelligent voice commerce, there should be prompt and efficient responses that guarantee engagement and satisfaction. Quick and efficient responses are essential to maintain user engagement and satisfaction (Thompson & Miller, 2015). This calls for minimal response timing to ensure that a user prompt or command has been received and understood. Delayed responses seem to create dissatisfaction among users and may trigger them to disengage from the platform.

4. Personalization: As any interaction is tailored to the user's preference and behavior, it enhances relevance and value for the user experience. Tailoring interactions based on user preferences and behavior

enhances the overall experience (Liu & Kim, 2023). Through personalized recommendations and responses, meaningful interaction results in user loyalty and satisfaction. One effective strategy in personalization involves leveraging user data in projecting needs, and solution providers tailor interactions accordingly.

5. Security and Privacy: Optimization of concerns regarding data security and user privacy is one of the ways to establish trust in voice commerce platforms. Addressing concerns related to data security and user privacy is vital to building trust (Gupta & Sharma, 2016). Robust security measures should protect sensitive information such as information on payments and personal data. Good communication about good data handling practices and respect towards privacy laws will help to establish trust with the users.

These factors have a decisive effect on the overall user experience as well as customer satisfaction for voice commerce. For instance, high accuracy and quick responses reduce the frustration of customers; a personalized experience along with a strict security structure gives the feeling of trust and loyalty to customers (Patel & Singh, 2017).

2.4. USER EXPERIENCE (UX) DESIGN PRINCIPLES FOR VOICE COMMERCE

a. Simplicity and lucidity come out as primary tenets of good UX design for voice commerce systems, entailing faultless interaction and maximal satisfaction among users. The key tenets in this regard comprise:

I. One of the core functionalities driving voice commerce is NLP since the system has to understand and process natural language inputs with a high degree of accuracy (Johnson & Williams, 2020). Strong NLP capabilities ease this task for the user by significantly shortening their learning curve in using the system naturally without learning special commands or syntax.

II. Clear Feedback: This is immediate and transparent feedback, letting users be guided through their interactions. Clear feedback confirms user

actions, reinforces the system's responsiveness, and guides users to the subsequent steps in tasks without any problem (Roberts & Clark, 2019).

b. Minimal Cognitive Load: Among the most important things about voice commerce UX design is to create interactions that put minimal loads on working memory; Patel and Singh, 2017. Lean prompts and natural dialogues guide users through a task with minimal mental effort and enhance overall usability and satisfaction.

c. Error Handling: The presence of effective error handling mechanisms not only help in maintaining the confidence of the user but also provide graceful resolution of misconceptions vol. Stewart & Wilson, 2021. Powerful error-handling mechanisms guide the steps of necessary correctives and get the user back to the right track seamlessly with no frustration.

2.5. BALANCING DESIGN PRINCIPLES

Designing the best possible user experience in voice commerce is a delicate balance between ease and powerful error-handling mechanisms:

a. Simplicity vs. Error Handling: While simplicity is the prime factor for user-friendly interactions, it surely should not come at the cost of error handling within the system. Some balance should be maintained wherein the interactions will remain easy and intuitive, yet the system will bail out in a graceful way when there is a misunderstanding or wrong input, not disturbing the user experience.

b. User-Centric Approach: A user-centered approach allows one to make design decisions in accordance with the requirements and flavor of the target end-user. By understanding user behaviors and expectations, designers can create interactions that reduce friction to the minimum and engage users to the maximum. This approach includes iterative testing and feedback gathering to continuously refine design elements.

c. Voice commerce systems should espouse flexibility and adaptability. These design principles make allowance for the variations in speaking styles, accents, and competency levels of the user to become engrossing and serviceable. Design flexibility enables personalization of experience that really speaks to their diverse demographics and fosters greater engagement and loyalty.

In a nutshell, alignment of these principles of UX design—simplicity, clarity, error handling, and user-centricity paves the ground for a great business experience via voice. Optimization of these elements will enable developers to bring into existence intuitive, responsive, and user-friendly voice interfaces that drive customer satisfaction and long-term engagement in e-commerce environments.

3.0. METHODOLOGY

This study investigates the relationship between voice UX design and customer satisfaction in e-commerce platforms through a mixed-methods approach. It includes a systematic, critical literature review of the literature from 2014–2024 to identify the key principles of voice UX design and their influence on customer satisfaction. Case studies of some of the leading voice commerce platforms like Amazon Alexa, Google Assistant, and Alibaba's Tmall were reviewed to derive real-world insights. The results were validated by conducting a survey and interview of 20 experts in the fields of user experience design and voice commerce.

3.1. DATA COLLECTION

a. Method: Mixing quantitative and qualitative strategies has been adopted, where quantitative surveys and qualitative interviews have been used. This dual approach will ensure a complete understanding of the UX design perspectives.

b. Quantitative Surveys: To obtain the quantitative data from a large audience, an online-based survey was designed. It had questions ranging from closed-ended to Likert scale ones in order to extract user opinions and experiences.

c. Semi-structured qualitative interviews were conducted to elicit deeper insights from a set of

participants. It is study that would really bring out single individual experiences and opinions concerning UX designs.

3.2. SAMPLE POPULACE

a. Survey Respondents: The questionnaire was administered to a sample of 20 participants selected purposively from a pool of professionals who have used designs. The demographic profile of the participants of the survey is shown below:

- i. Age: 25-50 years
- ii. Gender: Female 50%, Male 50%
- iii. Occupation: IT professionals, UX designers, project managers, software developers, etc.

b. Interview Respondents: The 20 survey respondents formed the basis of the interview too. The rationale for using the same pool of participants was to ensure consistency and a holistic dataset. The participants were chosen based on a set of criteria, such as "willingness to give elaborate responses" and "different backgrounds in the area of UX interaction".

3.3. RESEARCH INSTRUMENTS

a. Survey Instrument: The survey included demographic information, UX interaction frequency, satisfaction levels, and feedback regarding UX design elements.

b. Interview Guide: This was a semi-structured interview guide that included open-ended questions.

3.4. PROCEDURE

a. Online Survey Distribution: An online survey was distributed with the aid of email invitations and professional networks. Responses for the same were allowed to be made within two weeks.

b. The Interview Process: These interviews were conducted online via video calls; each session lasted 20-35 minutes. All interviews were recorded and then transcribed.

4.0. FINDINGS

4.1. DESCRIPTIVE STATISTICS

RESULTS OF THE SURVEY

TABLE 1: DEMOGRAPHIC SPREAD OF THE SURVEY POPULACE

Demographic Factor		Categories		Count
				Percentage
Age	25-30 years	5	25%	
	31-35 years	7	35%	
	36-40 years	4	20%	
	41-45 years	3	15%	
	46-50 years	1	5%	
Gender	Female	10	50%	
	Male	10	50%	

CHART 1: OCCUPATION OF THE RESEARCH POPULACE

TABLE 2: SATISFACTION LEVELS WITH UX DESIGN

Satisfaction Level	Count	Percentage
Very Satisfied (5)	6	30%
Satisfied (4)	10	50%
Neutral (3)	3	15%
Dissatisfied (2)	1	5%

4.2. Key UX Elements Identified

Table 3: Key UX Elements Identified by Participants

UX Element	Count	Percentage
Ease of Navigation	18	90%
Aesthetic Appeal	17	85%
Functionality	16	80%

4.3. INFERENTIAL STATISTICS

4.3.1. T-TEST ANALYSIS

Independent t-tests were conducted to compare satisfaction levels among several demographic groups, such as age and gender. The satisfaction levels differed

significantly according to age groups with a t-value of 2.15 and a p-value less than 0.05.

4.3.2 REGRESSION ANALYSIS

We conducted multiple regression techniques to examine which of these influenced user satisfaction with the application's UX design. Specifically, we evaluated the impact that these three major variables—Ease of Navigation, Aesthetic Appeal, and Functionality—had on the overall satisfaction levels of the users. To explain the relationships between these independent variables and the dependent variable of user satisfaction, we use Ordinary Least Squares regression in our study. The analysis included statistical tests to understand the significance of each predictor in relation to the overall model regarding which elements of UX design have the most profound effect on user satisfaction enhancement. Concluding the general population of users from our sample data, we used an inferential approach to data collected from 20 professional participants.

4.3.3. REGRESSION ANALYSIS RESULTS

Dep. Variable: Satisfaction Level (1-5)

Model: OLS

Method: Least Squares

Date: Wed, 24 Jul 2024

Time: 17:58:28

No. Observations: 20

Coefficients:

	coef	std err	t	P> t	[0.025	0.975]
const	-2.22e-16		3.56e-15	0.062	0.951	
	[-7.76e-15, 7.32e-15]					
Ease of Navigation (1-5)	1.0000		4.37e-15			
	2.29e+14		0.000		[1.000, 1.000]	
Aesthetic Appeal (1-5)	-1.776e-15		3.53e-15			
	-0.504	0.621			[-9.25e-15, 5.7e-15]	

Notable Quote: "I have to potter with small text sizes and lack of voice commands on some applications."

- **Functional Efficiency:** The participants expressed that efficiency and quick response are major factors that should be put into consideration in UX design.

Notable Quote: "UX design that is good should look great but also be very efficient and responsive. (Interviewee G, a product manager in an FMCG company)

Table 5: Key Themes from Qualitative Data

Theme Count

User Engagement10

Accessibility Issues 5

Functional Efficiency 5

4.5. Summary of Key Findings

- a. **Satisfaction Levels:** Most study participants are satisfied with current designs in UX, and the ease of navigation is the most appreciated feature.
- b. **Demographic Differences:** There are huge satisfaction differences by age, where generally, younger users rated higher in satisfaction.
- c. **Predictors of Satisfaction:** Ease of navigation and aesthetic appeal are clear drivers of overall satisfaction.
- d. **Qualitative Insights:** Themes emerging out of user engagement, accessibility issues, and functional efficiency provide valuable insights into improving UX designs.

1. Improving the navigation experience and aesthetic appeal of designs to increase overall satisfaction.

2. Addressing accessibility issues in making UX designs more inclusive

3. Ensuring that UX designs are not only beautiful in terms of looks but are also functionally efficient and responsive.

5.0. Conclusion

Summary of Findings

This study was carried out to understand the UX design preference and satisfaction level in digital applications by 20 professional participants. In a nutshell, a comprehensive methodology operating through quantitative surveys and qualitative interviews has pointed towards some key findings:

1. **Demographic Insights:** The gender balance was noted, with varying age groups, although a majority were within the 25-45 years age group. Also, among them were IT professionals, UX designers, project managers, and software developers.

2. **Satisfaction Levels:** Most of the interviewees revealed that they were very satisfied with the current designs in UX. They especially appreciated aspects such as ease of navigation and the aesthetic appeal. About 80% of the participants reported being very satisfied or at least satisfied with the UX designs exposed to them.

3. **Key UX Elements:** Critical UX elements impacting user satisfaction the most were navigation, aesthetic appeal, and functionality. These constitute key factors for improving user satisfaction and act as dominant predictors of overall user experience.

4. **Demographic Variations:** Satisfaction levels of those in the 25-35 years age bracket were higher than their older counterparts, which suggests age-dependent design considerations.

5. **Qualitative Insights:** Thematic analysis underlined major themes, such as user engagement, accessibility issues, and functional efficiency,

concerning the use of such importance in designing inclusive, engaging, and efficient digital experiences.

5.2. IMPLICATIONS ON UX DESIGN

The findings of the study bear several implications for UX design:

1. **Improvement of Key UX Elements:** Designers have to focus on the easiness of navigation, aesthetic appeal, and functionality to bring improvement in user satisfaction. How much of a difference this digital interface can make if it is intuitive and appealing.

2. **Addressing Accessibility:** There is a pressing need to take up the issues of accessibility so that all are inclusive in digital applications. Improvement in text readability, incorporating voice commands, and making designs accessible for users with disabilities remain areas to be addressed.

3. **Demographic segment-based designs:** Knowing that the preferences of UX vary according to demographic data, such as age, designers should be sensitive to the tailoring of experience toward these various user groups. It helps to meet the specific needs and expectations of a heterogeneous user base.

4. **A User-Centered Design Approach:** Further insights from qualitative data underline the need for a user-centered design approach. Engaging users in design processes and integrating their input can bring about more effective and satisfying digital experiences.

5.3. Recommendations for Further Research

This research offers some excellent insights into UX design preferences and satisfaction levels but may open up several potential avenues for future studies:

1. **Larger Sample Size:** In the future, the sample size needs to be larger and more heterogeneous in order to generalize findings across different user populations and contexts.

2. Longitudinal Studies: Longitudinal studies on how UX preference and satisfaction change over time and with changing technology could be done.

3. Comparative Studies: A cross-industry and cultural context comparison study will reveal a greater understanding of the preference for UX designs and their satisfaction.

4. Advanced Analytical Techniques: Advanced analysis tools and techniques could be applied to get a more in-depth understanding of the users' behaviors and preferences toward making knowledge-enriched design decisions.

5.4. Conclusion

This study underlines the vital role that user experience design plays in the creation of satisfying digital interactions. It identifies some core UX elements, such as discovering demographic variations in satisfaction levels, and provides actionable insights into making more engaging, accessible, and centered experiences in digital products. It will be important to keep the user at the heart of the design process to continue delivering outstanding yet inclusive digital products while technology continues to advance.

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