

# Literature Review

## 2.1 Introduction

This chapter will provide current relevant theories and previous studies that are used for the foundation of the development of bidding application with AI chatbots. The materials include online bidding systems, more studies about technology that are used like Kotlin for application development, firebase for database management, and AI chatbot for enhancing user customer service experience.

## 2.2 Previous Studies

To get more understanding about development of online bidding application, the following tables summarizes several relevant studies:

| No | Researcher                       | Year | Method                                             | Findings                                                                                                                                                                                                                              | Strengths                                                                                                                                                                                           | Weaknesses                                                                                                               |
|----|----------------------------------|------|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 1  | Mohanraj S.,<br>Subhasheni<br>A. | 2024 | Literature<br>Review,<br>Bibliometri<br>c Analysis | AI is revolutionizing e-commerce by enhancing customer experiences, optimizing supply chain, and preventing fraud. However, challenges such as data privacy, job displacement, and bias must be addressed for successful AI adoption. | Comprehensive overview of AI's influence in e-commerce. Highlights both benefits and challenges of AI in this field. Emphasizes the need for transparency and strategic AI adoption for businesses. | Lacks primary data or case studies. Limited in-depth analysis of the technical aspects of AI applications in e-commerce. |
| 2  | Varnika<br>Tyagi,                | 2020 | Experiment<br>al analysis                          | The proposed<br>Partial Quick Sort                                                                                                                                                                                                    | Innovative<br>sorting                                                                                                                                                                               | Limited to the<br>comparison with                                                                                        |

|   |                                                        |      |                                                                                                  |                                                                                                                                                                                      |                                                                                                                                          |                                                                                                                                    |
|---|--------------------------------------------------------|------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
|   | Taruna Chopra, Tanya Aneja, Vidhi Jain, Chhavi Sharma  |      | of Partial Quick Sort algorithm for live auction bidding system                                  | algorithm sorts large datasets in less time compared to conventional sorting algorithms. It efficiently handles live auction bids and reduces execution time.                        | technique that enhances the efficiency of online auctions. Efficient use of resources and reduced time complexity.                       | traditional sorting techniques, and does not address potential challenges in extremely large-scale auction systems.                |
| 3 | Saani Solomon, Majji Lokesh, Jayaprakash Lamoriya      | 2023 | Quantitative Research (Survey & Literature Review)                                               | Internet customer trust and perceived risk significantly influence purchasing decisions. Privacy concerns and security issues remain key challenges.                                 | Provides empirical data on Indian consumer behavior. Explores future trends in online shopping.                                          | Limited to the Indian market, reducing global applicability. Does not include in-depth qualitative insights.                       |
| 4 | Alexander Rossmann, Alfred Zimmermann, Dieter Hertweck | 2023 | Conceptual Model Development, Quantitative Research (Six Independent Studies, n=480), Multigroup | Service quality in chatbots is influenced by four key dimensions: customer effort, procedural justice, interactional justice, and service solution quality. Chatbots have a stronger | Provides empirical evidence on chatbot service performance. Identifies key service quality dimensions specific to chatbots. Demonstrates | Limited to chatbot vs. hotline comparison, excluding other service channels. Does not explore long-term customer behavior changes. |

|   |                                    |      |                                                                                                                     |                                                                                                                                                                                                                                                                                           |                                                                                                                                                    |                                                                                                                                                                                   |
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|   |                                    |      | Analysis (Chatbot vs. Hotline)                                                                                      | impact on word-of-mouth (.46) and intention to reuse (.69), whereas hotlines have a stronger effect on customer loyalty (.59). Customer satisfaction fully mediates the effect of service quality on customer relationship metrics.                                                       | the mediating role of customer satisfaction.                                                                                                       |                                                                                                                                                                                   |
| 5 | Bruno Gois Mateus, Matias Martinez | 2020 | Empirical Study, Dataset Mining (F-Droid, AndroidTi meMachine , AndroZoo), Code Analysis, Heuristic Classificati on | Kotlin adoption in Android applications has been increasing, with 25.8% of studied apps fully replacing Java with Kotlin. The introduction of Kotlin led to improved code quality in at least 50% of cases. However, 3 out of 4 object-oriented (OO) code smells (LM, CC, BLOB) were more | Large dataset (2,167 apps, 19,838 APKs). Provides a detailed comparison between Java and Kotlin. Highlights the quality impact of Kotlin adoption. | Limited to open-source applications. Does not analyze long-term performance or energy consumption. Only considers certain code smells, excluding other potential quality factors. |

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|  |  |  |  | frequent in Kotlin applications. Java applications had more entities affected by 5 out of 10 code smells. |  |  |
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**Table 2.1** above presents a comparison of several literatures relevant to the research topic.

## 2.3 Theoretical Framework

This study aims to design a bidding application enhanced by an AI chatbot. The theoretical framework delves into essential theories related to online bidding systems, artificial intelligence (AI), and human-computer interaction. These concepts provide insight into how an AI chatbot can improve the user experience and the overall efficiency of the bidding process. The key theories and concepts that inform this research are outlined below:

### 2.3.1 Online Bidding Systems

Online bidding platforms enable users to participate in auctions for products or services in real time. In the proposed system, the auction process follows the principles of an English Auction, where participants place bids that must be higher than the current highest bid. The auction begins with a predefined starting price and continues until the countdown timer reaches zero.

During the auction period, users can see the current highest bid and submit their offers accordingly. All bids are updated and displayed in real time to ensure transparency and competitiveness. When the timer expires, no further bids can be placed, and the user with the highest bid at that moment is automatically declared the winner of the auction.

This time-based bidding mechanism ensures fairness, encourages active participation, and reflects real-world auction dynamics. The system is designed to provide a secure and transparent environment for both bidders and sellers [19], ensuring that the auction outcome is determined solely by user activity within the allotted time.

### 2.3.2 Artificial Intelligence in Chatbots

Artificial intelligence refers to the ability of machines to simulate human-like intelligence, such as learning, problem-solving, reasoning, and decision-making. AI is about creating systems that can perform tasks requiring human intelligence, including language understanding, pattern recognition, and decision-making [13] [18]. In this research, AI is used to power the chatbot, which will assist users by answering questions and guiding them through the bidding process. The chatbot will utilize natural language processing (NLP) and machine learning to improve its performance over time.

### 2.3.3 Customer Experience and Service Automation Theory

AI-powered chatbots are increasingly used in service-based applications to enhance customer interactions. Service automation via AI can improve service quality, customer satisfaction, and efficiency. This theory supports the idea that integrating an AI chatbot into the bidding application will automate and personalize user interactions, providing real-time assistance, answering queries, and improving the overall user experience.

### 2.3.4 Trust in Online Systems Theory

Trust is a critical factor for the success of online platforms, particularly those handling financial transactions, like bidding applications. Trust consists of three components: ability, benevolence, and integrity [14]. In a bidding application, users must trust the platform and its AI chatbot to ensure accurate information and secure transactions. This theory underscores the importance of designing transparent AI systems that build trust by adhering to ethical standards and prioritizing user privacy and data security [20].

### 2.3.5 Frameworks and Supporting Technologies

To develop a bidding application with an AI chatbot, the following technologies can be utilized:

- Kotlin: Technology for application development
- Gemini: Pre-trained AI models for chatbot intelligence.
- Firebase: Database for storing bids and user data [6].

This research integrates theories on online bidding systems, AI, service automation, trust, and technology acceptance to form a comprehensive understanding of how an AI chatbot can improve both the functionality and user experience of a bidding application. By addressing issues related to user interaction, service automation, and trust, this framework lays the foundation for developing a bidding system that leverages AI to enhance user engagement and operational efficiency.

## 2.4 Conceptual Framework

This study aims to design a bidding application enhanced by an AI chatbot. The theoretical framework delves into essential theories related to online bidding systems and artificial intelligence (AI). These concepts provide insight into how an AI chatbot can improve the user experience and the overall efficiency of the bidding process. The key theories and concepts that inform this research are outlined below:

### 2.4.1. System Components

The application consists of several primary components:

- **Bidding Interface:** The user interface (UI) where participants place bids. This will include product listings, auction deadlines, and current bid amounts. The interface should be intuitive, user-friendly, and accessible across devices.
- **AI Chatbot:** An AI-powered assistant integrated into the application that interacts with users, answering their queries and providing personalized suggestions. The AI chatbot uses a pre-trained Gemini chatbot.
- **Bidding Mechanism:** The core function of the app is where users can bid on listed products. The bidding mechanism will be designed to handle real-time updates, ensure secure transactions, and maintain the integrity of the auction process. The app uses a highest bid system within a certain time limit to decide who will win the bidding process.
- **User Profiles and Authentication:** Users will have personal accounts with authentication methods to ensure secure participation. Profiles will store bidding history, current bids, and preferences.

### 2.4.2. Key Processes in the Conceptual Framework

The development of the bidding application with AI chatbot functionality follows the flow of the key processes listed below:

- **User Registration and Login:** Users must register and authenticate their accounts before they can participate in auctions. This process ensures that the platform can track bids and maintain a secure environment.
- **Bidding Process:** After logging in, users can browse the products listed for auction. The system displays the current highest bid and other details. Users can place a bid, and the system will update the current bid amount immediately. The app uses the highest price system within a certain time limit for the bidding process. An AI chatbot assists users by providing the latest information and updates regarding the auction.
- **AI Chatbot Assistance:** Chatbots will be available to answer user questions regarding bidding rules and product information to be used as consideration for users in conducting the auction process. Chatbots will provide guidance, ensure clarity, and increase user satisfaction.
- **Transactions and Payments:** If the auction has not ended, the current highest bid price will be displayed and the user can continue the auction. Once the auction ends, the highest bidder wins the product. The app does not have a feature to display the final bid price when the auction time ends, but the auction winner can be viewed directly in the database with the user system with the highest bid. Although online payment integration is not included, transaction details are stored securely in the system.

### 2.4.3. Interactions and Relationships

The key relationships in the framework are as follows:

- **User and Bidding Interface:** The user interacts directly with the bidding interface to place bids and monitor auction status. This interface should be intuitive, allowing for seamless navigation.
- **AI Chatbot and User:** The AI chatbot interacts with the user by answering questions, providing assistance, and offering information about the products. The chatbot enhances the user experience by offering personalized responses and support.

- **Bidding Interface:** The Bidding interface provides real-time updates, current bid status, and auction details.
- **User and System Security:** User profiles are protected through secure authentication methods. The system ensures data privacy and security, particularly during payment transactions.

#### 2.4.4. Expected Outcomes

The conceptual framework expects the following outcomes:

- **Enhanced User Experience:** Through a user-friendly interface and AI-powered chatbot, users will have a smooth and engaging experience throughout the bidding process.
- **Efficient Bidding Process:** The integration of AI allows for faster responses, automated assistance, and personalized interactions, making the bidding process more efficient.
- **Increased User Satisfaction:** By providing real-time assistance and minimizing the complexity of the bidding process, users will have a more satisfying experience, which may lead to greater retention and engagement.
- **Higher Trust and Security:** The system will ensure that transactions are secure and that user data is protected, building trust in the platform and its AI chatbot.

This conceptual framework outlines how the different components of the bidding application interact and work together to enhance the user experience. It highlights the role of the AI chatbot in supporting users throughout the process, ensuring a smooth and secure auction environment.

## 2.5 Summary

This chapter has provided an in-depth review of relevant literature and theoretical foundations for developing an AI-powered bidding application. It examined previous studies on online bidding systems, artificial intelligence, chatbot service quality, and supporting technologies such as Kotlin, Firebase, and Gemini AI. These studies offer valuable insights into the advantages and challenges of integrating AI into online marketplaces.

The theoretical framework introduced key concepts, including bidding mechanisms, AI chatbot functionality, and trust in digital platforms. It highlighted how AI-driven automation can enhance user experience, streamline the bidding process, and improve overall service quality. Meanwhile, the conceptual framework outlined the system's core components, essential processes, and anticipated outcomes, emphasizing the interaction between users, the AI chatbot, and the bidding platform.

In summary, this literature review provides a strong foundation for designing an AI-enhanced bidding system that prioritizes user engagement, operational efficiency, and security. The insights gained will serve as a guide for the development and implementation of the proposed application, addressing both technical aspects and user experience considerations.

