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The Potential of Utilizing Chatbots to Improve Customer Experience of Public Services

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ABSTRACT:

Digitalization has transformed organizational service environments by making customer experience a strategic priority. Traditional service models are evolving into digital formats that facilitate real-time, user-friendly, and time- and location-independent interactions. In this context, chatbot technology presents a promising avenue for innovation by efficiently managing high customer demand and allowing service personnel to focus on more complex and advanced issues.

The rapid adoption of chatbots across private and public sectors has revolutionized service delivery and customer experience. As self-service options expand, customers have become active participants in service interactions, empowering them to choose the most suitable communication channels. Consequently, the integration of chatbots increasingly facilitates value creation in digital interactions between organizations and their customers.

This study investigates the role of chatbots in enhancing public service delivery. By integrating theories of customer experience and value creation into a comprehensive analytical framework, the research examines the opportunities and challenges associated with adopting chatbot technology in the public sector. Employing a case study methodology, the study draws on semi-structured interviews with organizational representatives to capture practical insights into chatbot utilization in public services.

The study's findings suggest that chatbots can significantly improve public service accessibility, efficiency, and cost-effectiveness. However, as current chatbot solutions primarily rely on providing general advice through predefined responses, it limits their ability to handle complex inquiries. Although advanced chatbots can leverage extensive datasets, the accuracy of their responses is not entirely guaranteed, which is a crucial factor in advisory of public services. The study indicates that future advancements should focus on optimizing user data utilization and enhancing the accuracy of chatbot-generated responses, while ensuring compliance with legal standards for accuracy, reliability, and security. These improvements will help align chatbot-driven customer experiences with established service objectives and support the holistic development of public services.

KEYWORDS: chatbot, digital customer experience, value creation, public service

VAASAN YLIOPISTO
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TIIVISTELMÄ:
Digitalisaatio on tuonut merkittäviä muutoksia organisaatioiden palveluympäristöihin ja nostanut asiakaskokemuksen keskeiseksi strategiseksi tekijäksi. Perinteiset asiakaspalvelun vuorovaikutusmallit ovat digitalisoituneet ja teknologinen kehitys avaa uusia mahdollisuuksia palveluiden kehittämiselle. Yksi keino uudistaa asiakaspalvelua on chatbot-teknologia, joka mahdollistaa reaaliaikaisen, helpon ja paikasta riippumattoman palvelukokemuksen. Lisäksi chatbotit edistävät organisaatioiden resurssi- ja kustannustehokkuutta, sillä ne kykenemään hallitsemaan suurta asiakaskysyntää ja siten vapauttamaan asiakaspalveluhenkilöstöä muihin tehtäviin.

Viime vuosina chatbottien yleistyminen niin yksityisillä kuin julkisillakin sektoreilla on muuttanut asiakaspalvelun toteutustapaa ja asiakaskokemuksen muodostumista. Erilaisten itsepalvelukanavien lisääntyessä asiakkaan rooli palvelutilanteissa on kasvamassa: asiakas ei enää ole passiivinen vastaanottaja, vaan aktiivinen toimija, jolla on valta valita itselleen parhaiten sopivan vuorovaikutuskanavan. Näin ollen palvelujen arvonluonti jakautuu vuorovaikutustilanteessa entistä enemmän organisaation ja asiakkaan kesken.

Tutkielman tavoitteena on selvittää, miten chatbotit voivat kehittää julkisten palvelujen asiakaskokemusta ja edistää vuorovaikutustilanteiden arvonluontia. Tutkimus tarkastelee chatbottien käyttöönoton mahdollisuuksia ja haasteita julkisessa palvelukontekstissa siten, että asiakaskokemuksen ja arvonluonnin teoriat yhdistetään analyysia varten toimivaksi viitekehykseksi. Tapaustutkimuksena toteutettu tutkimus yhdistää teoreettisen viitekehyksen empiirisiin havaintoihin puolistrukturoitujen teemahaastattelujen avulla, jotka kartoittavat kohdeorganisaation edustajien kokemuksia ja näkemyksiä chatbottien hyödyntämisestä asiakaspalvelussa.

Tutkimuksen tulokset osoittavat, että chatbotit voivat merkittävästi parantaa julkisten palvelujen saavutettavuutta sekä palvelun nopeutta ja helppoutta. Ne tekevät asiakaspalvelusta tehokkaampaa ja automatisoidumpaa, mikä johtaa merkittäviin kustannus- ja resurssisäästöihin. Nykyisten chatbottien toiminta rajoittuu kuitenkin pääosin yleisneuvontaan ennalta määriteltyjen vastausten avulla, mikä heikentää niiden soveltuvuutta monimutkaisempien kysymysten hoitamiseen. Haasteena kehittyneimmille chatbot-sovelluksille on asiakastietojen ja chatbot-järjestelmän integrointi toimivaksi kokonaisuudeksi sekä chatbotin luomien generoitujen vastausten oikeellisuuden varmistaminen. Vaikka edistyneet chatbotit kykenevät hyödyntämään laajempaa tietomäärää neuvonnassaan, niiden tuottamien vastausten paikkansapitävyyttä ei aina voida täysin taata. Siten uusinta teknologiaa hyödyntäessä on olennaista varmistaa, että chattibottien neuvonta täyttää julkisille palveluille asetetut lainsäädännölliset vaatimukset oikeellisuuden, luotettavuuden ja turvallisuuden osalta. Vain tällöin voidaan saavuttaa se, että chattibottien käytöstä muodostuva asiakaskokemus sekä vuorovaikutustilanteissa syntyvä arvonluonti vastaavat asetettuja tavoitteita ja tukevat kokonaisvaltaista palvelujen kehittämistä.

AVAINSANAT: chatbot, digitaalinen asiakaskokemus, arvonluonti, julkinen palvelu

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1 Introduction

Digitalization and technological advancements have strongly impacted organizations, particularly in the evolution of their service offerings. As Kim (2023) suggests, technological advancements transform service characteristics, enhance customer experience, redefine service provider functions, and shift the dynamics between customers and organizations. Kim (2023) further contends that the emergence of artificial intelligence (AI) has driven innovation and initiated a transformative shift within the service industry. Consequently, rapid technological advancements compel organizations to adapt and enhance their operations to remain aligned with an increasingly dynamic environment. In this context, Eskola (2018) emphasizes the vital importance of agility and adaptability, arguing that organizations must proactively respond to industry disruptions and global changes, as responsiveness is crucial for sustained success in a continuously evolving landscape.

Digital transformation has significantly revised many daily routines, progressively shifting service interactions between organizations and customers to digital platforms. As a result, organizations are increasingly enabling service experiences across omnichannel platforms. Alongside traditional service encounters, digital customer interactions have experienced significant growth. This shift has led to what is known as the 'immediacy crisis,' marked by customers' heightened expectations for instant access to information and support at any time and from any location (Parise et al., 2016). As people spend more time online, their demand for organizations to be accessible through digital channels has grown substantially. Consequently, the nature of interactions between organizations and customers has undergone a fundamental transformation (Parasuraman & Grewal, 2000), with traditional face-to-face encounters being progressively replaced by self-service interactions in online environments.

As digital technologies continue to evolve, they have profoundly transformed service dynamics, particularly in the interactions between organizations and customers. Despite these advancements, research highlights the ongoing difficulty of translating traditional

service attributes such as personalization and social presence into digital environments (Verhagen et al., 2014). As a result, organizations frequently face challenges in effectively engaging customers through emerging digital service channels (Zeithaml et al., 2022). Autor and Dorn (2013) argue that the automation of customer service has historically been considered complex, largely because it requires human-like capabilities such as flexible interpersonal communication and physical proximity. However, recent technological developments have raised customer expectations for seamless and intuitive digital service experience. In turn, organizations must continuously adapt to changing customer needs, with an increased focus on improving digital engagement and the overall quality of the customer experience.

The rapid advancement of digital transformation has significantly accelerated the integration of AI into service production by enhancing operational frameworks and improving service efficiency. The rapid advancement of AI models and applications has become one of the most prominent global megatrends in recent years (Närhi, 2024). This progress has opened numerous opportunities and benefits for organizations to facilitate virtual interactions in customer service, particularly through chatbot applications. Chatbots, also known as conversational agents, are computer programs designed to process and understand language in both text and speech formats and generate appropriate responses (van Noordt & Misuraca, 2019, p. 51). Fundamentally, chatbots analyze user inputs and generate contextually relevant responses by retrieving information from their underlying databases (Zumstein & Hundertmark, 2017).

Voutilainen (2018, p. 907) emphasizes that recent advancements in chatbot technology, driven by AI, enable these systems to expand their knowledge base through user interactions and apply the acquired insights to future applications. He further notes that chatbot technology has significantly improved in simulating natural human language, making interactions between users and chatbots increasingly resemble human-to-human communication in digital environments. As people spend more time on messaging platforms,

chatbots have become a vital and easily adoptable tool for organizations to enhance customer engagement (Brandtzaeg & Følstad, 2018).

Chatbots can enhance organizational efficiency by facilitating interactive customer engagement, thereby reducing the strain on human resources in customer service operations. Simultaneously, this shift in service interactions opens new avenues for organizations to co-create value with their customers. For instance, chatbot technology facilitates automated service encounters, ensuring customers receive prompt and real-time responses to their inquiries, while allowing organizations to allocate human resources to more complex tasks (Brill et al., 2019). Furthermore, digital technologies offer organizations valuable insights into customer needs during service interactions, ultimately contributing to enhanced customer experience (Westerman et al., 2011).

Organizations have increasingly recognized the strategic opportunities presented by chatbot technology. Some studies indicate that organizations have a strong interest in chatbots, as their use has proven highly beneficial in enhancing customer service. According to Gartner (2022), by 2027, chatbots are projected to become the primary customer service channel for approximately 25 percent of organizations, highlighting their increasing prominence. Similarly, a study by IBM (2021) underscores the substantial benefits of AI-driven virtual agents across various sectors, reporting that 99 percent of organizations using these technologies experienced enhanced customer satisfaction, while 96 percent of early adopters achieved or exceeded their anticipated return on investment.

While chatbots have been widely adopted to enhance customer service in the private sector (Chen et al., 2023), public organizations are increasingly exploring their potential to improve service delivery (van Noordt & Misuraca, 2019, p. 52). Consequently, chatbots are playing an expanding role in public sector processes and functions (Cortés-Cediel et al., 2023). They are now recognized as one of the most prominent applications

of AI in the public sector (van Noordt & Misuraca, 2022) and are anticipated to become a transformative force in public service delivery in the coming years (Moore, 2019).

The adoption of chatbots has already demonstrated significant potential in enhancing the efficiency and accessibility of public services worldwide. For instance, Tolentino (2024) reports that the chatbot used by U.S. Citizenship and Immigration Services processes over one million inquiries per month, generating annual savings exceeding $12 million by automating routine requests. Similarly, Singapore's government chatbot, launched in 2019 across more than 20 government agencies, handled over three million citizen inquiries within its first two years (Tolentino, 2024). These examples highlight how chatbot integration can optimize operations while improving public access to essential services and information. Although chatbots are generally implemented as complementary service delivery channels, their growing adoption suggests they have the potential to fundamentally reshape how public organizations interact with citizens and manage service delivery (Vassilakopoulou et al., 2022).

Therefore, the increasing importance of chatbots in public services is particularly evident, as public organizations are often legally obligated to provide advisory services within their respective domains. This requirement demands both effective customer support and the efficient fulfillment of advisory responsibilities. As a result, chatbots in public services serve as supplementary tools for creating public value, with significant implications for service quality and the interactions between customers and public organizations (Larsen & Følstad, 2024).

As digital interactions between public organizations and citizens continue to expand, it is essential to examine value creation from a perspective that integrates both human and technological elements (Kaartemo & Helkkula, 2018). However, some studies indicate that many public organizations remain unfamiliar with best practices for chatbot implementation or have yet to fully leverage their potential in service delivery (e.g., Alila et al., 2022). As a result, there is a growing need to develop new insights into the role of

chatbots in value creation, particularly in supporting various value-creating processes within public services (Riikkinen et al., 2018, p. 1146).

1.1 Purpose and objectives of the study

In recent years, public organizations have strategically invested resources in adopting emerging AI technologies for their operations (de Sousa et al., 2019). However, Wirtz et al. (2019, p. 597) argue that despite growing investments and research in AI, its application in the public sector is still emerging and lacks comprehensive analysis of its benefits and challenges. While some studies have examined AI adoption in public services, most research has primarily focused on private-sector implementations. Sun and Medaglia (2019, p. 369) emphasize that although discussions on the potential and challenges of adopting AI in public services are increasing, empirical research validating these concerns or providing sector-specific guidelines have remained limited.

Sun and Medaglia (2019, p. 369) further emphasize that research interest has predominantly been directed toward the commercial applications of AI. They note that AI's impact has primarily been examined in industries such as high technology, automotive, financial services, retail, media, education, and travel. Although AI-driven initiatives are increasingly being implemented in public services, including healthcare, law enforcement, and tax administration, empirical research on AI applications in the public sector remains relatively limited (Sun & Medaglia (2019, p. 369). Given that the nature of the public sector directly influences service delivery, this study aims to contribute a new perspective to AI research by examining how AI is perceived from the perspective of customer experience and value creation in public services.

The digital customer experience is shaped by multiple factors at various levels. As previously discussed, AI is playing an increasingly significant role in modern service interactions. Therefore, this study examines the role of artificial intelligence in customer interactions, focusing on how public organizations can enhance value creation and improve

the overall customer experience in digital services. It explores the key factors that define a distinctive digital service experience in public services. Specifically, it analyzes chatbots as a key AI application, examining their opportunities for service delivery, their impact on customer experience and value creation, and the challenges of their implementation from a service provider's perspective.

The research questions addressed in this thesis are as follows:

1. What are the unique elements of digital customer experience and perceived value in public services, and how can AI enhance this experience?
2. From the perspective of public service providers, what are the potential benefits and challenges of implementing chatbots to enhance customer experience and facilitate value creation?

Building on this, the study further explores the role of chatbots, as a key AI-driven technology, in value creation within public services from the perspective of service providers. It examines the AI attributes that enable organizations to enhance customer experience and assesses how these technologies are utilized to optimize service interactions. Additionally, the study investigates the opportunities and challenges associated with AI-driven service delivery. By deepening the understanding of chatbot capabilities, this study aims to provide valuable insights to help public organizations design AI-powered services that promote value creation and strengthen customer engagement.

1.2 Research Approach, Study Structure and Limitations

In line with the objectives of this thesis, the study aims to deepen the understanding of how public organizations can enhance customer experience and value creation in digital services, particularly through the utilization of chatbots. It explores the key factors that influence customer interactions with these technologies, emphasizing an organizational perspective. To capture these insights, a qualitative research approach is adopted to

examine how public organizations perceive, implement, and optimize chatbot-driven customer interactions.

A qualitative approach is particularly well-suited for this study, as it facilitates an in-depth exploration of organizational viewpoints, decision-making processes, and strategic considerations related to chatbot adoption from the perspectives of organizational representatives. As Puusa et al. (2020) highlight, qualitative research focuses on individuals' subjective experiences and interpretations. In this context, it provides a deeper understanding of how public sector organizations navigate the opportunities and challenges associated with digital service transformation.

From an empirical research perspective, this study adopts a hermeneutic approach to explore research participants' experiences, emphasizing the significance of interpretation and understanding in the research process (Eriksson & Kovalainen, 2016, pp. 21–22). The research follows an explanatory case study methodology, which aims to uncover the reasons behind the current state of AI adoption in public services. In this approach, the study focuses on analyzing the interconnections and mechanisms (Eriksson & Koistinen, 2014, p. 13) that shape AI-driven service delivery. To gain a deeper understanding of how chatbots can enhance public service delivery, this case study examines the Finnish Tax Administration's integration of chatbots into its service offerings as an illustrative example.

The empirical data for this thesis is collected through thematic interviews. In this method, participants are presumed to have relevant experience with the subject matter. A defining characteristic of thematic interviews is the establishment of predetermined themes that guide the conversation while allowing for flexibility in discussion (Puusa et al., 2020). In this study, chatbot specialists are interviewed to provide insights into their perspectives, challenges, and experiences regarding AI in public service interactions. To ensure high-quality interviews, the researcher must possess a thorough understanding of the subject, enabling meaningful engagement and the extraction of valuable insights.

This thesis is structured into five distinct chapters. The first chapter serves as an introduction, outlining the purpose and objectives of the study, the chosen research methodology and approach, key concepts, and the study's framework and limitations. Additionally, this section highlights the rationale for the study and its significance. The second chapter presents the theoretical framework, structured around the study's research objectives. The literature review begins with an exploration of digital customer service and value creation in public services, providing a comprehensive understanding of their significance and discussing the associated benefits from an organizational perspective. Specifically, the study focuses on the role of digitalization and chatbot utilization through the lens of value creation. The theoretical foundation is grounded in literature related to customer experience, value creation, and the strategic management of AI applications within public services.

Following the theoretical background, the third chapter focuses on the research methodology, discussing the study's approach, design, and strategy. It details the data collection process and addresses the validity and reliability of the research. This chapter also explains how the research material was gathered and analyzed. The fourth chapter presents the empirical findings of the study and offers a comprehensive analysis of the collected data. The final chapter integrates the insights gained from the preceding chapters, providing a comprehensive review of the research objectives and their conclusions. It provides final conclusions based on both theoretical and empirical findings and discusses their implications. This chapter also outlines managerial implications, acknowledges the study's limitations and suggests directions for future research.

This study specifically examines the application of AI in public services, ensuring a focused and in-depth analysis of the case organization while contextualizing the role of AI within the public sector. The research explores customer experience, value creation, and AI development from the perspective of public service delivery. Given that the empirical

study is based on a single case organization, the findings and insights presented in this thesis are inherently limited to that specific entity.

1.3 Definitions of focal concepts of the study

This thesis focuses on the following key concepts: customer experience, digital customer experience, service, artificial intelligence, and chatbots. The following section provides detailed definitions of these concepts, drawing on a range of academic sources to establish a foundational understanding for the reader. These concepts are also intended to provide an introductory framework for the thesis topic.

Customer experience is broadly defined as the "set of interactions between a customer and an organization" (LaSalle & Britton, 2003) and is shaped by an "individual interpretation of events" (Pine & Gilmore, 1999). Ahvenainen et al. (2017) further characterize customer experience as the perceptions and emotions that customers form when engaging with an organization through different touchpoints. Lemon and Verhoef (2016) highlight its multidimensional nature, encompassing cognitive, emotional, behavioral, sensory, and social components. Johnston and Kong (2011, p. 7) assert that every service interaction results in an experience—whether positive, negative, or neutral—providing opportunities for emotional engagement, regardless of the routine nature of the service.

Löytänä and Kortesuo (2011) emphasize that customer experience is primarily shaped by emotions and perceptions, highlighting that it is not solely a rational decision-making process but rather an experiential phenomenon. The objective of customer experience management is to generate added value for customers while simultaneously cultivating a competitive advantage for organizations. In the digital age, customers possess greater influence and are increasingly inclined to engage with organizations that offer exceptional experiences and provide services regardless of time or location (Ahvenainen et al., 2017).

Digitalization has transformed and broadened the scope of customer experience. Jehanne (2023) defines the **digital customer experience** as the integration of digital technologies and data-driven insights to enhance customer interactions. Alamir (2025) and Jehanne (2023) describe it as the cumulative effect of all online interactions a customer has with an organization. Jehanne (2023) further stresses that digital customer experience extends beyond technology, encompassing a deep understanding of customer needs, preferences, and behaviors in a digital environment. She underscores the importance of developing a customer-centric digital strategy that aligns with business objectives while delivering value to customers. Additionally, Jehanne (2023) highlights the necessity of an omnichannel approach in today's digital landscape, ensuring a seamless and personalized experience across all digital platforms.

Johnston and Kong (2011, p. 7) define **services** as processes in which organizations create and implement activities that require customer input and participation. In this sense, services are co-created or co-produced through customer involvement. Grönroos (2019, p. 778) argues that the primary purpose of service is to assist individuals in achieving their objectives in a way that adds value. Similarly, Grönroos (2006, p. 324) describes services as processes where a set of an organization's resources interact with customers to facilitate value creation within the customers' processes. This definition underscores the idea that value is not merely produced and delivered by organizations but emerges through an understanding of customer needs and experiences, leading to the development of services that support their value creation activities (Grönroos, 2011).

Boucher (2020) references the European Commission's definition of **artificial intelligence**, describing it as a system capable of exhibiting intelligent behavior by analyzing its environment and making autonomous decisions to achieve specific objectives. He further emphasizes that AI encompasses a wide range of technologies and applications, unified by their perceived intelligence, which remains a highly subjective and open to interpretation concept. Russell and Norvig (2016) expand on this characterization by defining AI in terms of its operational attributes, describing it as the capacity of machines,

devices, systems, and services to perform tasks, learn, infer, and make predictions in ways that appear intelligent across various contexts.

Criddle (2023) defines AI as the capability of machines to perform tasks traditionally carried out by humans. She notes that AI leverages computing power to replicate or enhance human abilities, often surpassing previous levels of speed and precision. Furthermore, she explains that AI integrates computer science and data analysis to solve problems and make predictions. A distinguishing characteristic of AI systems is their reliance on algorithms, which are structured sets of rules embedded in computer code that enable automated decision-making (Criddle, 2023). Similarly, Cao (2021) describes AI as a system's capacity to continuously learn from and adapt to new challenges in a dynamic environment. Through ongoing data accumulation, AI systems refine their capabilities to achieve specific objectives.

According to the Oxford Dictionary (2023), a **chatbo**t is "a computer program designed to simulate conversation with a human user, usually over the internet, especially as part of an automated service providing information or assistance." Makasi et al. (2022, p. 2334) define chatbots as computer programs that utilize natural language processing to replicate human conversations, generating text- or voice-based responses based on user inquiries and previously gathered data. Følstad and Mærøe (2022) identify chatbots as a technological innovation capable of driving incremental improvements, such as responding to frequently asked questions. Additionally, they highlight the potential of chatbots to deliver disruptive or transformative service experiences to customers, particularly through the provision of personalized services or the facilitation of seamless information retrieval across multiple sources.

2 Digital customer service and value creation in public services

This chapter examines the role of AI, with a particular focus on chatbots, in the context of customer service. It begins by discussing the transformative impact of chatbots within public services, highlighting key disruptions and technological advancements. The chapter then analyzes the ways in which chatbots can enhance public service delivery. Following this, it explores the concept of value creation in public services and emphasizes its significance. Finally, the chapter offers an evaluation of chatbots as tools for facilitating value creation, addressing both their potential benefits and the challenges they entail.

2.1 Chatbots in public services

AI is increasingly recognized as a transformative influence in public service delivery, driving significant improvements in efficiency, accessibility, and citizen engagement. Among AI applications, chatbots are particularly deployed in customer service to automate routine inquiries, provide real-time assistance, and streamline administrative processes (van Noordt & Misuraca, 2019; Cortés-Cediel et al., 2023). In an environment of limited resources and rising service demands, these systems enable public organizations to ensure continuous service availability while allowing human resources to devote their expertise to tasks that require critical judgment and evaluation (Brill et al., 2019).

The primary motivation for integrating AI into public services is to optimize service operations and enhance responsiveness. Chatbots allow public organizations to manage high volumes of service requests and deliver customer support at any time (Vassilakopoulou et al., 2022). However, Larsen and Følstad (204) suggest that successful AI implementation requires that these systems embody essential public service values, such as transparency, inclusivity, and trust to sustain public legitimacy and ensure widespread social acceptance. Understanding the evolving role of chatbots is therefore critical, as it informs the strategic integration of automated systems with human expertise

to enhance digital interactions, improve service quality, and ultimately increase customer satisfaction.

2.1.1 Chatbots complementing service personnel in the service encounter

With the advent of digitalization, the context in which services are designed, delivered, and consumed is evolving at an increasingly rapid pace (Larivière et al., 2017). In the contemporary dynamic environment, organizations continuously seek strategies to enhance operational efficiency and cost-effectiveness (Barbuceanu et al., 2004). Traditionally, customer service has been a central aspect of organizational operations; however, it has experienced a paradigm shift from a personalized service model to a more self-service-oriented approach, primarily driven by technological advancements (Følstad et al., 2018). Barbuceanu et al. (2004) argue that conventional customer service methods, such as face-to-face interactions and telephone-based assistance, are often perceived as expensive, inflexible, and inefficient in addressing customer needs. Consequently, organizations have increasingly adopted digital technologies, leveraging information networks and the Internet to achieve cost savings and enhance service delivery (Froehle & Roth, 2004; Larivière et al., 2017).

While the initial transformation of service delivery led to the centralization of customer service within contact centers, it enabled customers to engage with organizations through multiple communication channels, including telephone service, messages, and chat services (Kumar & Telang, 2012; Scherer et al., 2015). However, the continuous advancement of AI has further revolutionized customer service provision, particularly within the public sector. AI-powered chatbots, which provide instant and automated responses to frequently asked questions, play a crucial role in improving service efficiency (Makasi et al., 2020). These solutions provide 24/7 service and can lead to significant cost savings for organizations (Gnewuch et al., 2017; Shetty, 2024; Carvalho & Barbosa, 2019; Keyner et al., 2019; Makasi et al., 2022). Furthermore, Borana (2016) emphasizes that AI leverages computational capabilities to deliver responses more rapidly than

human agents. By managing routine inquiries, chatbots enable human agents to focus on more complex tasks that require specialized expertise (Maedche et al., 2019; Shetty, 2024), while also allowing them to offer more personalized and in-depth support when needed (Viliavin, 2023).

From the customer's perspective, chatbots can offer several advantages. Følstad et al. (2018) assert that chatbots deliver concise and straightforward responses to simple inquiries, thereby streamlining customer interactions. Unlike traditional customer service channels, chatbot interactions are not constrained by time and location, which eliminates the necessity for customers to wait for assistance (Følstad et al., 2018; Dash & Bakshi, 2019; Shetty, 2024). Moreover, some customers may prefer interacting with chatbots over human agents, especially when seeking answers to questions they perceive as trivial (Følstad et al., 2018). Nevertheless, some studies suggest that in contexts requiring emotional support, customers often perceive chatbots as undesirable in service situations due to their perceived lack of empathy and reliability compared to human agents. Consequently, human interaction remains preferable in situations demanding emotional intelligence and nuanced support (Adam et al., 2020; Nicolescu & Tudorache, 2022; Lei et al., 2021).

The adoption of chatbots is frequently linked to factors such as ease of use, perceived usefulness, and user engagement (Belda-Medina & Kokošková, 2023). Additionally, Abu Shawar and Atwell (2016) suggest that customers may find chatbot-based information retrieval more engaging than traditional website search fields. Their study indicates that chatbots are perceived as interactive tools that facilitate natural conversations, with some users even preferring chatbot interactions over human interactions. Furthermore, chatbots can facilitate accessibility for international users by supporting multiple languages and facilitating seamless language integration (Abu Shawar & Atwell, 2016). Moreover, their 24/7 availability ensures continuous interaction between customers and organizations, which is particularly beneficial for users operating across different time zones (Johannsen et al., 2018; Dash & Bakshi, 2019). Beyond their application in

customer service, chatbots prove to be valuable tools for enhancing civic engagement and enabling interactions between customers and public organizations, particularly through the collection of customer feedback (Androutsopoulou et al., 2019; Petriv et al., 2020; van Noordt & Misuraca, 2019).

In examining technological developments in service interactions, Van Doorn et al. (2017) propose a comprehensive framework for understanding the role of technology in customer interactions and its impact on perceptions of human social presence. This framework is illustrated in Figure 1. The model categorizes technologies based on their degree of automation and social presence. At the lower end of the spectrum are self-service technologies, which operate independently of human intervention. These are distinct from technology-mediated channels, such as live chat services, where technology facilitates human interaction. The upper section of the framework encompasses technologies designed to emulate human behavior, including chatbots and service robots. While chatbots can independently manage customer interactions, thereby reducing the necessity for human agents, service robots often function as complementary tools to human employees rather than replacing them entirely (Van Doorn et al., 2017).

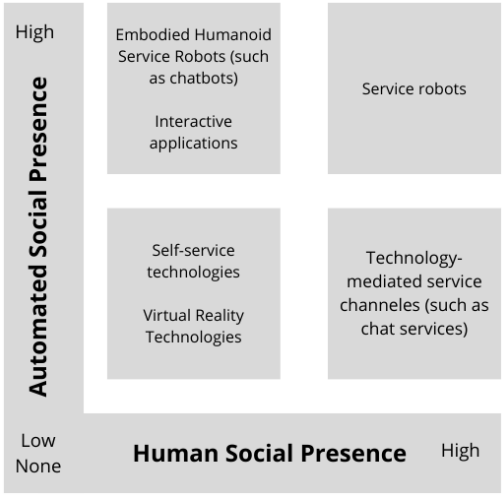

Figure 1. A typology of technology infusions into customers' service frontline experiences (Van Doorn et al., 2017).

Before implementing new technologies in customer service, organizations must conduct comprehensive assessments of their potential benefits (e.g., Kumar & Telang, 2012). This evaluation should consider both the target audience and the intended outcomes of the implementation. Kumar and Telang (2012) further emphasize that the introduction of a new service channel does not necessarily reduce the usage of existing channels, and organizations should not prioritize direct cost savings as the primary objective in service development. For example, if an online portal is poorly designed or lacks adequate information, it may result in an increased volume of customer inquiries due to user confusion (Kumar & Telang, 2012). Additionally, Scherer et al. (2015) highlight that research on self-service channels has often overlooked the role of traditional, personalized service in fostering customer trust, loyalty, and long-term relationships.

2.1.2 Chatbots' role in enhancing service delivery

Chatbots are increasingly being utilized as a digital interface for delivering public services, offering varying degrees of sophistication in service development (Nili et al., 2019; Riikkinen et al., 2018). Radnor et al. (2023) highlights that effective service delivery often necessitates a reciprocal exchange of information between the user and the service provider. Additionally, from the service perspective, the ability of chatbots to meet customers' needs is inherently linked to their technical capabilities. Studies indicate that chatbots can interact with customers at multiple levels, each constrained by their technological limitations. Consequently, the service experience associated with chatbots is contingent upon their technical capabilities. To clarify the capabilities of chatbots in service provision, Makasi et al. (2020) identified three distinct levels of chatbot-mediated service delivery, each defined by specific functionalities and varying levels of complexity. These levels are illustrated in Figure 2.

The first level in chatbot-mediated service delivery, *information provisioning*, involves providing customers with general information and guidance in response to their inquiries or search terms, without requiring authentication. At this stage, the chatbot strives

to interpret customer inquiries and connect them with relevant information and service resources (Androutsopoulou et al., 2019; Nili et al., 2019). The chatbot's replies are typically generated from predefined templates developed by the organization.

The second level, *targeted assistance*, introduces a higher degree of personalization in chatbot-mediated service delivery. This level entails the collection and analysis of customer-specific information, which often requires the disclosure of identifying details (Makasi et al., 2020). For instance, user data may be stored in an online profile accessible to the chatbot, allowing for more tailored responses. Additionally, chatbots can retrieve information about service variations and relevant business rules from a separate database (Ni et al., 2017; Venkatesan, 2018) to enhance service delivery. While chatbots can autonomously respond to less sensitive service inquiries, Makasi et al. (2020) further observe that for more advanced, complex, or sensitive matters, chatbots may forward these interactions to human agents. In such instances, chatbots can provide real-time and historical data from customer encounters to human agents to support their review and assistance.

The third level, *service negotiation*, involves advanced interactive negotiation and decision-making process between the user and the service provider (Makasi et al., 2020). At this stage, chatbots assist customers in exploring different service outcomes and negotiating the most suitable option based on their needs. Customers are presented with various service alternatives, enabling them to engage in a structured dialogue with the chatbot to determine the best course of action. The conversation progresses through a sequence of questions and responses, with the flexibility to revisit earlier discussion stages as needed (Androutsopoulou et al., 2019). Additionally, chatbots at this level may incorporate more advanced customization options to refine the final service selection (Nili et al., 2019; Zumstein & Hundertmark, 2017).

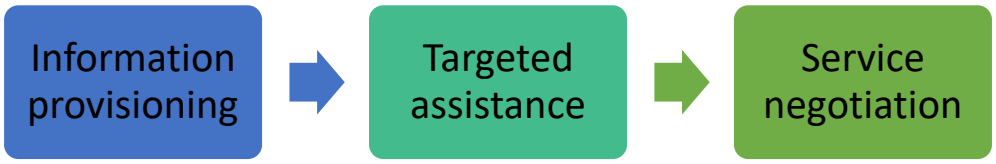

Figure 2. Chatbot-mediated public service delivery levels (Makasi et al., 2020).

As noted, these chatbot levels clearly illustrate the evolving functionality of public service delivery. In this context, Makasi et al. (2020) emphasize that many public services require ongoing interaction between customers and public organizations. Consequently, chatbots deployed in this context should ideally facilitate ongoing customer interactions. For instance, as customers' circumstances evolve, the chatbot could proactively suggest updated service options tailored to their changing needs. However, Makasi et al. (2020) contend that the number of current public-sector chatbots capable of supporting such dynamic interactions remains relatively limited. This limitation can be attributed to several challenges, including the complexity of implementation, concerns regarding public perception, the financial burden associated with high-cost technological infrastructure, and data privacy considerations (Androutsopoulou et al., 2019). Additionally, legal constraints governing the use of AI in public service provision present further challenges (Voutilainen, 2018). Nevertheless, as chatbot technology continues to advance, Makasi et al. (2020) anticipate a broader adoption of sophisticated chatbots within public service delivery.

2.2 Value creation in public services

Value creation in public services is primarily focused on meeting societal needs, enhancing citizen well-being, and ensuring efficient and equitable service delivery. Unlike the private sector, where value is often tied to financial gain, public services create public value by addressing collective interests and fostering trust in institutions (Moore, 1995; Osborne, 2021). This value emerges through interactions between service providers, citizens, and other stakeholders, emphasizing value co-creation, effectiveness, and the societal impact of service situations (Grönroos, 2019; Virtanen & Jalonen, 2023).

The organization and delivery of public services are crucial in shaping their overall value. Traditional bureaucratic models have increasingly been supplanted by approaches that emphasize citizen participation, service ecosystems, and digital innovations aimed at enhancing responsiveness and efficiency (Osborne, 2018; Taiminen, 2023). As public service models continue to evolve, it becomes essential to understand how value is created, delivered, and experienced in order to maximize societal benefits. Enhancing value creation through digital solutions requires a comprehensive understanding of both the structural dynamics and societal importance of public services, alongside the transformation of delivery models toward more customer-centric approaches. Moreover, the ongoing evaluation and adaptation of these models are critical to ensuring that public services remain relevant and effective in meeting the changing needs and expectations of society.

2.2.1 The Organization and Significance of Public Services

Over time, the organization and delivery of public services have become prominent topics of interest in both academic and political discourse. Their role and significance have evolved across different societal models, often framed through debates on the welfare state and its subsequent integration with competition- and knowledge-based paradigms (Mitronen & Rintamäki, 2012, p. 174). The later emergence of the “service state” further

advanced this evolution by incorporating elements from both public and private sector service frameworks (e.g., Häyrinen-Alestalo, 2009). This progression has highlighted the growing importance of clearly defining service production processes and establishing quality standards to guide their delivery (Mitronen & Rintamäki, 2012, p. 174).

Modern public services increasingly emphasize the value they create for customers. Value creation occurs in both private (e.g., Rintamäki et al., 2007; Vargo & Lusch, 2004) and public services (Osborne, 2021; Grönroos, 2019), although the goals pursued by organizations in these sectors differ significantly. Nonetheless, Grönroos (2019) argues that there are no inherent differences between public and private service organizations that would render public services less efficient or service-oriented than their private counterparts. However, some studies suggest that public services are fundamentally distinct from private services (e.g., Hartley & Skelcher, 2008, p. 9). While the private sector primarily seeks financial profit, public services aim to create public value, which is often conceptualized as the collective expectations of customers regarding public organizations and services (Moore, 1995). Talbot (2011, p. 28) further defines public value as "the combined view of the public about what they regard as valuable."

Virtanen and Jalonen (2023) argue that the concept of public value, initially articulated by Moore (1995), is grounded in three fundamental dimensions: first, how public activities create value for service users, stakeholders, and citizens; second, the ability of public organizations to attract resources and derive legitimacy from the political sphere; and third, the performance of public administration, organizations, and services in terms of efficiency, effectiveness, service ecosystems, and societal advancement (see McConnell, 2010, pp. 347–348; Criado & Gil-Garcia, 2019; Högström et al., 2016). Moreover, the clientele of public services differs substantially from that of the private sector. Public organizations must often cater to diverse customer groups with conflicting needs (Osborne, 2018). Unlike the private sector, where customer retention is highly valued, repeated usage of public services may sometimes even indicate service failure (Virtanen & Jalonen, 2023). Magnussen and Rønning (2021) further note that for-profit organizations

generally do not encounter unwilling or coerced customers, as they operate within a voluntary market. In contrast, public organizations frequently serve involuntary clients, which introduces additional complexity to service provision.

2.2.2 Evolving Approaches to Public Service Delivery

The complexity of public service delivery has led to growing interest in co-production and co-creation strategies (Brandsen et al., 2018, p. 3), which emphasize customer participation (Osborne, 2010). These approaches are often seen as responses to customers' needs, civic engagement, resource efficiency, innovation, and service acceptability (Kirjavainen & Jalonen, 2022). Osborne (2017) notes increasing research attention on value creation, public value, and service delivery. Historically, public organizations often followed inward-looking traditions that neglected or resisted service orientation (Grönroos, 2019), with traditional public administration viewing citizens as passive recipients with limited input in service provision (Pestoff, 2018).

For decades, New Public Management (NPM) theory shaped public sector reforms (Hood, 1991; Lane, 2000), promoting marketization and commercialization to increase efficiency (Pestoff, 2018). However, Osborne et al. (2013) argue that NPM failed to make public organizations effective service providers, relying on a manufacturing logic that focused on inputs and outputs rather than service outcomes. In response, New Public Governance (NPG) emerged, promoting partnerships where citizens co-produce services (Pestoff, 2018). Still, Virtanen and Jalonen (2024) argue that neither NPM nor NPG fully integrated public services into management doctrines in ways that connect service delivery, co-creation, and value-in-use with public value.

To address these gaps in public service delivery, research has turned to service-dominant logic (SDL), a marketing-based approach that emphasizes value co-creation through customer involvement (Osborne et al., 2015; Grönroos, 2019). SDL suggests that organizations can only make value propositions, which are realized through their interaction with

customers and other stakeholders (Vargo & Lusch, 2004; 2008). Complementing SDL, service logic (Grönroos, 2005) highlights direct interactions between service providers and customers, focusing on supporting customers' processes (Saarijärvi et al., 2013). Adaptations of Service-Dominant Logic (SDL) and service logic to the public sector have led to the development of Public Service-Dominant Logic (PSDL) and Public Service Logic (PSL). PSDL highlights the active role of citizens in the co-creation of services, challenging traditional service models that position them as passive recipients (Osborne, 2018). PSL builds on this foundation by emphasizing dynamic relationships and a service-oriented approach to public management (Osborne, 2018).

While Virtanen and Jalonen (2023) argue that value in public services is multi-dimensional, the perspectives offered by Public Service-Dominant Logic (PSDL) and Public Service Logic (PSL) particularly emphasize that this value is not inherent but emerges through service use (Osborne et al., 2018; 2022). Central to this view is the concept of value-in-use, which denotes the benefits customers derive from engaging with services (Virtanen & Jalonen, 2023). Accordingly, value is co-created through dynamic interaction and collaboration among the various actors involved, rather than being embedded in the service itself (Grönroos & Voima, 2013; Rossi & Tuurnas, 2021).

Despite the significant influence of SDL, some studies argue that this logic remains abstract and retains producer-centered elements (Mitronen & Rintamäki, 2012; Heinonen & Strandvik, 2015; Heinonen et al., 2010). In response, Heinonen et al. (2010) have proposed Customer-Dominant Logic (CDL), which centers on customer experience and value-in-use in their own context. CDL particularly shifts the focus from co-creation to understanding customers' independent activities and how services fit into their lives, urging organizations to support autonomous value creation (Heinonen et al., 2010).

With increasing digitalization, new forms of value creation such as value self-creation have emerged. Taiminen (2023) expands the idea of co-creation to highlight customers' independent roles in value creation. Unlike co-creation, value self-creation relies on self-

service technologies and digital platforms (Zainuddin et al., 2016; Taiminen et al., 2018), requiring public service providers to shift from authoritative roles to service facilitators (Taiminen, 2023). Thus, Taiminen (2023) stresses that from value creation perspective, service models must adapt to technology that empowers customers to create value independently. Rather than focusing solely on co-creation, service models should facilitate customer autonomy and trust. Public organizations should ensure that digital services enable rather than hinder value realization. By embracing self-service technologies, public services can better meet modern expectations for efficiency, accessibility, and meaningful value creation.

2.3 Chatbots and value creation in public services

Before delving into the specific mechanisms through which chatbots contribute to public value creation, it is important to situate their role within the broader transformation of service delivery in the public sector. Recent advances in conversational artificial intelligence have enabled public organizations to complement traditional human-mediated service channels with automated and increasingly sophisticated digital interfaces. As frontline touchpoints in public service interactions, chatbots can rapidly triage inquiries, present contextually relevant information, and guide users through administrative processes. In doing so, they not only expand service accessibility and enhance organizational responsiveness but also provide valuable data on customers' needs and behaviors. This data can be reintegrated further into service design and policymaking (Larsen & Følstad, 2024; Riikkinen et al., 2018). Chatbots in public services therefore embody a dual value creation logic: they perform immediate transactional functions while simultaneously strengthening organizational capacities to create public value through customers engagement. The following sections explore these dimensions more comprehensively, beginning with an examination of how AI-driven chatbots contribute to public value creation.

2.3.1 Enhancing Public Value Creation Through AI-Driven Chatbots

AI is increasingly recognized for its ability to facilitate value creation activities and customer engagement (Raimer & Weiß, 2022; Hollebeek & Belk, 2021), as well as to improve customer-organization relationships (Skålén et al., 2015), customer experiences (Puntoni et al., 2021; Haji et al., 2021; Rahman, 2006), and overall satisfaction (Gelbrich et al., 2021; Sweeney et al., 2015). However, the digital transformation of value creation systems necessitates a reconsideration of how creative processes unfold and are perceived by customers (Ramaswamy & Ozcan, 2018; Ostrom et al., 2019). Consequently, Riikkinen et al. (2018) emphasize the importance of recognizing the active role customers play in value creation, which places increased responsibility on organizations to support customers in integrating their resources effectively.

Although services have traditionally been seen as supporting customers in achieving their goals, Riikkinen et al. (2018) emphasize that understanding how customers perceive value is essential for service providers to effectively design and deliver their offerings. This assessment requires an understanding of how organizations facilitate value creation through their own resources and processes. In this context, chatbots emerge as a novel mechanism for organizations to interact with customers, enhance their understanding of citizen needs, and improve customer-oriented communication. This, in turn, fosters public value creation by improving information accessibility and service provision (Larsen & Følstad, 2024). Additionally, chatbots offer a cost-effective means of supplementing organizational resources (Riikkinen et al., 2018, p. 1149). Through these interactions, both organizations and customers influence each other's processes, making them active participants in the co-creation of value (Grönroos & Ravald, 2011; see Nyman, 2013).

Larsen and Følstad (2024) emphasize that enhancing public services requires continuous improvements by public organizations, including better service accessibility, improved communication between organizations and customers, and enhanced information dissemination (Twizeyimana & Andersson, 2019; Androutsopoulou et al., 2019; Cordella &

Paletti, 2018; Makasi et al., 2020, 2022; Rose et al., 2015). Implementing and utilizing chatbots in public services can significantly contribute to public value creation by better meeting customers' information and service needs (Androutsopoulou et al., 2019; Makasi et al., 2020) and facilitating faster, more convenient responses to customers' inquiries (Ostrom et al., 2019).

Riikkinen et al. (2018, p. 1149) highlight that a key resource for customer value creation is the information provided by the organization. However, they caution that data alone does not constitute information; rather, information becomes valuable only when it is relevant to the customer. As Drucker (1988, p. 4) states, "information is data endowed with relevance and purpose." Therefore, only relevant information serves as a potential resource for customer value creation (Riikkinen et al., 2018, p. 1149). Larsen and Følstad (2024) further stress that rapid information delivery is particularly valuable for customers, emphasizing their individual service needs and the role of chatbots in providing more efficient access to information (Makasi et al., 2022; Rose et al., 2015). Consequently, research suggests that chatbots significantly contribute to public value creation by enhancing efficiency, information availability, and the management and dissemination of organizational information (Larsen & Følstad, 2024). Berryhill et al. (2019) underscore the necessity for organizations to ensure access to high-quality, unbiased data to ethically and effectively leverage these digital tools.

Chatbots also contribute to administrative efficiency by reducing workload in customer service (Hilhorst et al., 2022; Makasi et al., 2020; Ranerup & Henriksen, 2019; Rose et al., 2015), lowering service costs, and improving administrative processes and service quality. Furthermore, they enhance open government capabilities, increasing transparency and professionalism in public service operations. This includes upholding key values such as fairness, trustworthiness, and accountability to customers (Twizeyimana & Andersson, 2019; Rose et al., 2015; Cordella & Paletti, 2018; Bannister & Connolly, 2014; Hilhorst et al., 2022; Jørgensen & Bozeman, 2007). Additionally, chatbot implementation must align with administrative law and procedural fairness principles (Henman, 2020; Surden, 2018,

2020). While chatbot capabilities define their potential to create public value, their actual impact depends on effective implementation, maintenance, and user adoption (Larsen & Følstad, 2024).

Beyond organizational improvements, chatbots can contribute to social value by fostering public trust and confidence in organizations (Larsen & Følstad, 2024). Gillath et al. (2021) highlight the importance of trust in human-computer interactions, while Glikson and Woolley (2020) assert that user trust in chatbots is essential for their successful integration into organizations. This trust encompasses organizational responsibilities such as safeguarding customer privacy, managing public resources, and ensuring chatbot interactions positively impact customers' lives (Twizeyimana & Andersson, 2019; Aoki, 2020; Bannister & Connolly, 2014; Cordella & Bonina, 2012; Scupola & Mergel, 2022; Jørgensen & Bozeman, 2007). Public service chatbots play a crucial role in shaping customers' trust in public organizations while promoting inclusivity and equitable access to services (Larsen & Følstad, 2024). Jiang et al. (2023) emphasize that chatbot design influences trust, with human-like characteristics enhancing perceived social presence (Morana et al., 2020). Additionally, personalized and interactive chatbot experiences simulate real-life interpersonal communication, further reinforcing customer trust (Chung et al., 2020).

Regarding public service value, Larsen and Følstad (2024) suggest that customers generally view chatbot implementation positively, as it demonstrates an organization's commitment to fast and flexible service delivery (Androutsopoulou et al., 2019; Makasi et al., 2022; Ranerup & Henriksen, 2019). By assisting with requests and streamlining information retrieval, chatbots support value-creating processes (Riikkinen et al., 2018). However, Larsen and Følstad's (2024) findings indicate that while chatbots enhance service efficiency, they are not perceived as a transformative solution. Instead, they serve as an additional service channel that effectively manages routine inquiries, allowing human resources to focus on more complex tasks. Although chatbots primarily deliver requested information, this information is often meaningful and enhances service

availability, contributing to overall value creation (Riikkinen et al., 2018; Larsen & Følstad, 2024).

While not all customers experience chatbot benefits equally, Larsen and Følstad (2024) note that chatbots can still improve public service delivery, indirectly benefiting other customers by enabling the reallocation of human resources to assist individuals who either cannot or prefer not to use chatbots for customer service. Additionally, customers associate chatbots with improved accessibility, reinforcing their role in fostering social value and trust in public services (Twizeyimana & Andersson, 2019). However, Aoki (2020) suggests that chatbot accuracy in responding to general inquirires requires further improvement, and trust in chatbots varies depending on the nature of the inquiries. Furthermore, customers anticipate continuous enhancements, reflecting growing expectations for efficient public service delivery as chatbot technology evolves (Larsen & Følstad, 2024).

2.3.2 Challenges in Value Creation with Chatbot Utilization

While AI holds considerable potential to enhance value creation in public services, its implementation is accompanied by significant concerns and challenges (Wirtz et al., 2019). In practice, chatbot initiatives within the public sector often fall short of customer expectations due to their simplicity, limited contextual understanding, and a predominant focus on organizational objectives rather than user needs (Larsen & Følstad, 2024). Public service chatbots have primarily been deployed to provide basic advice and information, confining them to simple text-based interactions and thereby restricting their broader value-creation potential (Cortés-Cediel et al., 2023; Abbas et al., 2023). Consequently, although some regard chatbots as transformative enablers of public service delivery (Androutsopoulou et al., 2019), their impact has largely been characterized as incremental rather than revolutionary (van Noordt & Misuraca, 2019).

Issues related to AI responsibility, implementation, and broader social and ethical considerations present further difficulties to its effective deployment (Purdy & Daugherty, 2016; Quraishi et al., 2017; Ransbotham et al., 2017). Furthermore, optimizing services without sufficient attention to contextual and societal norms can lead to customer confusion, discomfort, and uncertainty regarding service provision (Ostrom et al., 2019; Tene & Polonetsky, 2013). Trust is considered as a foundational aspect in online service environments, particularly within self-service channels, where it requires a higher degree of validation than in face-to-face interactions (Reichheld et al., 2000). While existing research has begun to identify key features for effective chatbot interactions (Feine et al., 2019), much of it remains software-centric and lacks a strong focus on the user perspective (Rodríguez Cardona et al., 2019). Moreover, traditional technology adoption theories often fall short in explaining the uptake of AI, as it represents a fundamentally new technological paradigm that extends beyond the scope of conventional models (Sohn & Kwon, 2020).

The rollout of these technologies can also worsen privacy concerns, particularly when personal information is required (Reichheld et al., 2000). Growing reliance on online services increases risks of data protection breaches and broader cybersecurity threats (Henman, 2020). Continuous data collection and ambiguity around data usage may erode trust (Nikunen et al., 2024), while inadequate maintenance or updates can cause technical failures that disrupt interactions and harm user experience (Shetty, 2024). Moreover, legislation can often lag behind rapid technological advances, creating ambiguities around customer rights and ethical guidelines (Tene & Polonetsky, 2013).

Customer capacity to adopt new technologies is another critical factor in chatbot utilization. Nonetheless, Ostrom et al. (2019) argue that existing research has largely overlooked the impact of AI on customers in service environments, as well as their adoption of emerging service applications. Studies of self-service technologies however indicate that motivation, ability, and role clarity predict adoption (Meuter et al., 2000), alongside perceived control and uncertainty (Lee & See, 2004; Guo et al., 2016). Yet motivational

factors and resistance vary by context (Antioco & Kleijnen, 2010; Heidenreich & Handrich, 2015; Edwards et al., 2016), and customer resistance to digital innovations remains a substantial organizational challenge (Ju & Lee, 2020; Talwar et al., 2020).

Although AI can facilitate customer experience, it also carries the risk of suboptimal outcomes: for instance, technical malfunctions may block access entirely (Ostrom et al., 2019), and latency or misinterpretation can frustrate customers (Pillai & Sivathanu, 2020; Kwangsawad & Jattamart, 2022). When chatbots fail to meet service customers' needs or deliver relevant information, dissatisfaction and subsequent reluctance to re-engage can intensify (Ashfaq et al., 2020; Shumanov & Johnson, 2021; Verne et al., 2022; Huang & Dootson, 2022; Shetty, 2024; Adam et al., 2020).

The proliferation of AI in public services also raises concerns about displacement of customer service personnel (Huang & Rust, 2018; Kaplan & Haenlein, 2019) and reduced opportunities for human interaction (Følstad et al., 2018). As customers often prefer personalized communication, particularly in nuanced contexts, they may worry that service quality will decline if AI wholly replaces human agents (Larsen & Følstad, 2024; Følstad et al., 2018). Nevertheless, AI's strengths today lie in task augmentation rather than full scale professional replacement, since spontaneous, context rich interactions remain a human forte (Huang & Rust, 2018).

Finally, chatbots' inability to convey genuine emotional intelligence and empathy, which are fundamental to human dignity and the development of societal bonds, significantly limits their effectiveness in sensitive or support-oriented contexts (Pillai & Sivathanu, 2020; Shetty, 2024; Nikunen et al., 2024). For this reason, many studies argue that chatbots should complement rather than replace human agents (Abu Shawar & Atwell, 2007). Achieving meaningful value creation requires a customer-centric approach that includes clearly defined value propositions and ensures that chatbot functionality aligns with genuine user needs (Coniam, 2014; Siggelkow & Terwiesch, 2023). Moreover, since customer experience is a dynamic and multi-level construct that organizations actively shape

through innovative engagement strategies (Prahalad & Ramaswamy, 2004; Lemon & Verhoef, 2016; Verhoef et al., 2015), public services must integrate advanced technologies in ways that preserve human-centered values in order to optimize adoption, engagement, and overall satisfaction (Gnewuch et al., 2017; Urbani et al., 2024; Nikunen et al., 2024).

2.3.3 Public service value for chatbot-mediated service delivery

Wirtz et al. (2019) argue that artificial intelligence in public services remains an emerging field, with limited research addressing its applications and challenges. In response, Makasi et al. (2020) explored public values to identify the key value dimensions relevant to chatbots used by public organizations for service delivery. However, as Rose et al. (2018) highlight, chatbot initiatives in the public sector often struggle to uphold and effectively integrate these public value dimensions. This gap in research is critical, as implementing chatbots without careful consideration of public values risks creating discriminatory services that selectively benefit specific stakeholder groups (Van den Hoven, 2013).

Makasi et al. (2020) observe that existing methods for evaluating chatbots from a customer perspective primarily focus on individual customer experiences (Fernandes et al., 2020). These assessments typically adopt a human-computer interaction approach, emphasizing factors such as empathy and ease of use, or an information quality perspective, focusing on the chatbot's ability to deliver timely and relevant information (Brandtzæg & Følstad, 2017; Chaves & Gerosa, 2021; Dennis et al., 2020; Maniou & Veglis, 2020). Additionally, dependability—defined as the extent to which users feel in control of the interaction—is considered a crucial determinant of user satisfaction (Chaves & Gerosa, 2019; Holmes et al., 2019).

While these elements are essential for enhancing individual user experiences, Makasi et al. (2020) argue that they do not fully capture the public service values necessary for effective service delivery. Moreover, Makasi et al. (2022) argue that many chatbot

initiatives are primarily designed to meet organizational objectives, which often neglects the expectations of broader public stakeholders. Consequently, they propose assessing chatbots through the lens of public service value, emphasizing the importance of incorporating diverse stakeholder perspectives in the evaluation process.

To address this research gap, Makasi et al. (2020) explored the integration of public service values into chatbot deployment, proposing a framework that aligns chatbot functionalities with these values. The framework consolidates a comprehensive list of public service values, drawing on prior studies examining the role of information and communication technology in public service delivery (e.g., Androutsopoulou et al., 2019; Barth & Arnold, 1999; Valle-Cruz et al., 2019). These values were further contextualized for AI-driven public service chatbots, leading to the identification of 14 core public service values, which are presented in the table below.

Table 1. List of public service values defined in the context of chatbot-supported public service delivery (adapted from Makasi et al., 2020).

A list of public service values defined in the context of chatbot-assisted public service delivery	
Public service value	**Adapted definition of public service value for chatbot-based service delivery**
Adaptability	The degree to which the chatbot adapts to changing conditions (varying non-technical conditions such as changes in business rules and service eligibility and varying technical conditions such as adapting to different devices and networks) while providing a service
User orientation	The chatbot's ability to effectively handle user expressions and needs in case resolution
Professionalism	The degree to which the chatbot demonstrates principled, competent, honest, respectful, consistent, and trustworthy behavior when it is used to deliver a service
Effectiveness	The degree to which the chatbot's effectiveness in achieving its intended outcome is

	determined by the resources invested in its service delivery
Efficiency	The degree to which the chatbot facilitates service delivery while reducing costs and resources required
Fairness	The degree to which favoritism and discrimination (based on individual differences) do not exist when a chatbot is used to provide a service
Legitimacy	The chatbot's compliance with legal and reasonable steps and mandates when delivering a service
Acceptability	The degree to which the chatbot is a viable option for service delivery and beneficial in such a way that the public has a minimal or favorable reaction to using it
Openness	The degree to which chatbots disclose their identity to users before beginning a service interaction and provide rationale (to users or their representatives, such as customer advocacy groups) for decision-making when delivering a service
Accountability	The degree to which the chatbot represents an accountable/responsible channel (including acknowledgment of limitations) when providing a service
Social license	The chatbot's continued approval as a viable service delivery channel by the community and other stakeholders
Privacy	The degree to which the chatbot ensures the protection of user's information during and after being used to deliver a service
Trust in public organizations	The degree to which a chatbot contributes to the public's intentional sharing of personal information with the organization, regardless of any associated vulnerabilities, such as access to personal information and services recommended to the user
Collaborative intelligence	The degree to which a chatbot collaborates with the user and other service stakeholders,

	complementing their abilities to meet service needs

The value aspects identified in the framework are inherently tied to the service interactions between public organizations and their customers. Meier et al. (2024) argue that customers' willingness to engage with chatbots is significantly shaped by their perceptions of the value these technologies deliver. While previous studies have often conceptualized values as distinct and additive (Yang & Lin, 2017; Zhu et al., 2023), Meier et al. (2024) suggest that a greater number of perceived values within a service interaction increases the likelihood of customer engagement with the technology. To investigate how these value dimensions are reflected in the context of chatbot use in public services, insights were gathered through interviews with representatives of the case organization. Insights from these discussions are further analyzed and presented in the research findings.

3 Methodology

This chapter provides a comprehensive examination of the study's methodological framework. It begins with an in-depth analysis of the chosen research method, followed by a detailed discussion of the overall research approach. Subsequently, it outlines the data collection techniques, and the methods applied for data analysis. The chapter concludes with a critical evaluation of the research's reliability and validity.

3.1 Research method

This thesis employs a qualitative approach to comprehensively analyze the role of chatbots in facilitating value creation for customers in public service interactions. The study includes interviews with employees from the case organization who possess expertise in chatbot operations and their application in facilitating both customer experience and value creation in service interactions. The research primarily adopts an organizational perspective, considering employees as key informants who provide valuable insights into the potential of chatbots for value creation.

Qualitative research prioritizes an in-depth understanding of individual phenomena within specific contextual settings. Unlike quantitative studies, which rely heavily on numerical data, qualitative research does not aim to establish generalizable, static cause-and-effect relationships (Kaplan & Maxwell, 2005). Instead, it focuses on understanding phenomena, capturing dynamic processes rather than static details, and uncovering individuals' perceptions within specific contextual settings.

In chatbot-related research, particularly within the domains of AI and customer service, the selection of an appropriate research sample is critical. Given that chatbots are a relatively recent phenomenon, there remains limited established knowledge about their interactions with users, especially regarding social dynamics and the structure of these interactions. Qualitative research is particularly well-suited to exploring such emerging

phenomena, as it does not depend on pre-existing hypotheses; rather, hypotheses are developed inductively throughout the research process (Kaplan & Maxwell, 2005). Moreover, Kaplan and Maxwell (2005) emphasize the practical strengths of qualitative methods, including their applicability and ease of implementation in real-world settings.

This study adopts a hermeneutic approach, emphasizing the importance of understanding and interpreting the research subject (Eriksson & Kovalainen, 2016, pp. 21–22). In the hermeneutic approach, the primary objective is to derive accurate interpretations from interviews, with linguistic expressions often serving as focal points for analysis (Laine, 2010, p. 33). The process of knowledge formation follows a hermeneutic circle, wherein the researcher's initial understanding of the topic expands over the course of the study. Through an iterative movement between theory and empirical evidence, the researcher gradually develops a holistic comprehension of the subject (Puusa et al., 2020, pp. 73–74).

3.2 A case study approach

For this thesis, an explanatory case study approach was adopted. This method aims to understand the underlying reasons for a specific situation or its developmental process. It focuses on exploring relationships and mechanisms between different entities and events (Eriksson & Koistinen, 2014, p. 13). Case studies are widely used across various scientific disciplines because they provide comprehensive and in-depth insights into the phenomenon under investigation, contextualized within specific cases (Eriksson & Kovalainen, 2016, p. 131). In this thesis, chatbots serve as the research focus, with particular emphasis on their characteristics that influence customer experience and value creation.

A case study typically entails a comprehensive and systematic analysis of a single organization, event, or instance, with a focus on the underlying processes, interactions, and contextual factors that influence the phenomenon under investigation. A range of

research methods, such as interviews and document analysis, may be employed to gather data. The primary aim is to collect information from real-world settings to enhance understanding of the phenomenon (Hirsjärvi et al., 2014, pp. 134–135).

This thesis examines the Finnish Tax Administration as the case organization. The selection is justified by its prominent role as a public institution committed to improving customer experience and exploring the use of AI in its services. Notably, the organization has substantial experience in implementing AI-driven solutions in customer service, making it a particularly relevant subject for this study. As such, analyzing the Finnish Tax Administration aligns closely with the research objectives.

The research data for this study is derived from the firsthand experiences and perspectives of employees at the Finnish Tax Administration. The participating employees were selected based on their expertise and active involvement in customer service, chatbot development, or customer experience enhancement. These insights are influenced by various organizational factors encountered during service development, which this study critically examines. Given the study's focus on chatbots in relation to customer experience and value creation within the case organization, the findings are context-specific and may not be fully generalizable to other settings.

The Finnish Tax Administration’s (2024a) has defined its mission to collect the correct amount of tax at the appropriate time to ensure the funding of public services. Its operations are underpinned by a strong customer-oriented approach that emphasizes customer understanding and guidance. The organization prioritizes the simplification of tax-related transactions while ensuring efficient tax revenue collection (Finnish Tax Administration, 2024a). While customer experience remains a primary focus, the organization has made significant investments in AI to enhance both service quality and operational efficiency.

To facilitate operational efficiency and the value provided in tax-related services, the Finnish Tax Administration has strategically incorporated AI into its service delivery. This integration aligns with its broader strategic goals, which include ensuring accurate tax revenue collection, fair tax assessment, and positive customer interactions (Finnish Tax Administration, 2024b). AI facilitates the automation of routine tasks, expediting tax assessment processes and minimizing human errors. Furthermore, AI enables the organization to allocate human expertise to more complex cases requiring nuanced decision-making (Finnish Tax Administration, 2024b).

In general, AI has primarily been utilized to enhance the efficiency of chat-based customer service. Initially, the introduction of human-operated chat services within the Finnish Tax Administration (2024b) was met with overwhelming demand that exceeded available human resources. The organization observed that during service hours, customer service agents were consistently occupied, resulting in extended waiting times and reduced accessibility for customers. Additionally, customers required assistance beyond regular service hours for using the MyTax online service and managing their tax affairs (Finnish Tax Administration, 2024b). These challenges underscored the necessity of developing customer service solutions that better aligned with customer needs in terms of availability and accessibility.

To address these challenges, the Finnish Tax Administration launched Chatbot Virtanen, which is integrated into the MyTax online service and also provides assistance via the organization's website. Chatbot Virtanen utilizes natural language processing to deliver real-time responses to frequently asked questions. Although initially acquired as an off-the-shelf solution, the Tax Administration independently oversees its operation, including response development, training, and functionality monitoring (Finnish Tax Administration, 2024b).

According to the Finnish Tax Administration (2024b), Chatbot Virtanen significantly enhances customer service by addressing high inquiry volumes and providing 24/7

assistance. This enables customers to independently manage their tax-related matters at their convenience. The chatbot's extensive database currently contains responses to over 4,000 questions (Finnish Tax Administration, 2023). If the chatbot is unable to provide a satisfactory response, it prompts users to rephrase their inquiries or directs them to the Tax Administration's telephone service for further assistance (Finnish Tax Administration, 2023).

The Finnish Tax Administration (2023) stresses that Chatbot Virtanen is designed to handle anonymous tax-related inquiries, excluding cases involving personal data. Consequently, its application in customer service remains limited to general questions. Nevertheless, the Finnish Tax Administration remains committed to continuously improving the chatbot's response capabilities and comprehension while ensuring ethical and responsible AI use (Finnish Tax Administration, 2019; 2023).

According to the Finnish Tax Administration (2024b), the implementation of AI and Chatbot Virtanen has significantly improved customer service, operational efficiency, and the overall taxpayer experience. The organization views this strategic AI integration as supporting its objectives of accurate tax revenue collection, fair tax assessment, and enhanced customer interactions (Finnish Tax Administration, 2024b). By automating routine inquiries, the chatbot enables the administration to focus on complex cases, thereby reducing the risk of human errors and optimizing resource allocation (Finnish Tax Administration, 2024b).

3.3 Data collection

The thesis employed thematic interviews as the primary data collection method, involving interviewees with experience related to the phenomenon under study. This approach allows for flexibility, as initial discussion points guide the interview without overly controlling its direction (Puusa et al., 2020). Thematic interviews are widely applicable in research due to their adaptability. Interviewees' active engagement in constructing

meanings offers vital insights, enabling the interviewer to conduct a more thorough exploration of the phenomenon (Hirsjärvi & Hurme, 2000, pp. 34–35).

The core concept of a thematic interview is to structure the conversation around specific research themes. The objective is to foster a conversational exchange between the interviewer and interviewee, enabling a deeper exploration of the subject under study (Hirsjärvi et al., 2015, pp. 203–204). Thematic interviews facilitate free discussion within the framework of these themes. Successful execution of such interviews relies on the interviewer's solid understanding of the subject matter, enabling the effective use of relevant information during the conversation.

Interviews can be categorized as structured, semi-structured, or unstructured (Tuomi & Sarajärvi, 2018, p. 87). Structured interviews consist of predefined questions with fixed answer options, allowing interviewees to select the most suitable responses. Conversely, unstructured interviews are more conversational, with no predetermined questions or themes, enabling the subject to be explored freely based on the interviewee's terms (Puusa et al., 2020, pp. 111–114). Semi-structured thematic interviews fall between these two methods, offering flexibility in the order and depth of exploring questions and themes, and allowing for adaptation as needed (Puusa et al., 2020, pp. 112–113).

In this thesis, semi-structured thematic interviews were employed as the primary data collection method. Themes derived from the theoretical framework of the thesis formed the basis for questions and discussion topics. Interviewees addressed questions related to these themes freely. The interviewer's thorough acquaintance with the chatbot phenomenon and its features prior to the interviews allowed for more detailed inquiries if needed. The thematic interview framework (Appendix 1) was developed using the theoretical framework. The interviews covered two main themes. The interviews began with a discussion of the participants' backgrounds and their experience with chatbots. The interview themes encompassed topics related to digital customer experience, the role

of chatbots in public services, and their integration into service development. The interviewees addressed these themes in a structured and sequential manner.

For this study, interviews were conducted with employees from the Finnish Tax Administration who have expertise in customer service, chatbot implementation, or the development and analysis of customer experience. Interviewees were required to be familiar with the operation or development of chatbots in customer service. Suitable candidates were identified through a contact person related to the thesis from the Finnish Tax Administration, and potential interviewees were approached via email. A total of ten individuals working in various roles at the Finnish Tax Administration were interviewed for the study.

The participants selected for the thematic interviews needed to have experience related to the subject or phenomenon under study to leverage their subjective experiences and perceptions. The objective was to highlight the interviewees' perspectives for the research; therefore, interviewees were chosen through purposive sampling from a broad area to ensure they possessed extensive knowledge of the phenomenon under investigation (Hirsjärvi & Hurme, 2000, p. 47; Tuomi & Sarajärvi, 2018, p. 99). This extensive experience and background knowledge were crucial for providing valuable insights and a deeper understanding of the phenomenon, thereby enhancing the reliability and validity of the research findings (Creswell & Poth, 2018).

The data collection process for this study involved conducting nine remote interviews and one face-to-face interview. All interviews were recorded, transcribed, and anonymized prior to the analysis phase. Each interview commenced with a brief discussion of the interviewees' background and their experiences with chatbots, followed by an in-depth examination of the chatbot and its functionalities. The final segment of the interviews focused on the service experience associated with the chatbot and its potential for value creation in customer service situations. A detailed overview of the interviewees is provided in the table below (Table 2).

Table 2. Research Participants.

Interviewee	Position	Unit
Interviewee 1	Senior Tax Clerk	The Incomes Register Unit
Interviewee 2	Senior Tax Clerk	The Incomes Register Unit
Interviewee 3	Product Owner	Product Management Unit
Interviewee 4	Senior Tax Clerk	Taxation Unit
Interviewee 5	Procedure Specialist	Taxation Unit
Interviewee 6	Functional Specialist	Product Management Unit
Interviewee 7	Account Manager	Customer Relations Unit
Interviewee 8	Customer Understanding Specialist	Customer Relations Unit
Interviewee 9	Software Designer	Product Management Unit
Interviewee 10	Functional Specialist	Product Management Unit

3.4 Data analysis

After gathering and anonymizing the data, thematic analysis was employed during the data analysis phase. In theme development, key themes and perspectives were identified from the material (Tuomi & Sarajärvi, 2018, p. 106). The primary goal of this research was to identify shared characteristics among the interviewees in the data. By synthesizing the data, the aim was to uncover patterns or similarities across different themes (Puusa et al., 2020). The method used in this thesis follows Clarke and Braun's (2013) six-stage approach to thematic analysis.

According to Clarke and Braun (2013), the initial stage of data analysis involves carefully reading through the transcribed data multiple times. Next, preliminary coding identifies repeated patterns and classifies them within the text. In the third phase, these classifications are grouped into larger thematic entities. Subsequently, the resulting theme groups are evaluated against the material to ensure that all created themes are well-

supported. In the penultimate step, emerging themes are named and defined. Finally, the analysis concludes by presenting material quotations, justifying findings, and comparing them to the theoretical framework that informs the research. Clarke and Braun (2013) emphasize that thematic analysis is well-suited for small data sets and can be effectively integrated with background theory. These factors justify its application in analyzing the study material. Furthermore, thematic analysis stands out as a straightforward method, making it particularly suitable for researchers who lack extensive prior experience in data analysis.

3.5 Reliability and validity of the study

According to Hirsjärvi et al. (2015, p. 231), the reliability and validity of research outcomes may vary, making the evaluation of reliability a crucial step in the research process. Tuomi and Sarajärvi (2018, p. 121) emphasize the importance of assessing reliability, highlighting its connection to accuracy, truthfulness, and objectivity. Similarly, Eskola and Suoranta (2009, p. 210) stress that conducting research requires adherence to good scientific practices throughout the entire research process.

Koskinen et al. (2005, p. 253) state that the terms reliability and validity are frequently used when assessing the trustworthiness of research. They further note that these concepts are applied in qualitative research to evaluate the dependability of the study, and the claims made within it. Hirsjärvi et al. (2015, p. 231) define reliability as the consistency of measurement results, meaning that research should produce stable and non-arbitrary outcomes. Conversely, validity refers to the extent to which the research accurately measures what it is intended to measure (Hirsjärvi et al., 2015, p. 231).

However, Tuomi and Sarajärvi (2018, p. 163) note that applying reliability and validity to qualitative research has faced criticism, as these concepts originate from quantitative research and are tailored to its requirements. Koskinen et al. (2005, pp. 185–189) assert that the concepts of reliability and validity are grounded in the notion of an objective

truth and reality. In contrast, Hirsjärvi et al. (2015, p. 32) suggest that the unique nature of qualitative research complicates the assessment of its trustworthiness using traditional notions of reliability and validity. Consequently, qualitative research is often evaluated based on alternative criteria, such as credibility, transferability, dependability, and confirmability (Tuomi & Sarajärvi, 2018, pp. 165–166; Eriksson & Kovalainen, 2016, pp. 305, 307–308).

Stenfors et al. (2020, p. 598) define credibility as the extent to which research findings are plausible and trustworthy. Eriksson and Kovalainen (2016, p. 308) emphasize that credibility is based on the researcher's deep understanding of the subject and their ability to gather sufficient evidence to support their conclusions. Evaluating credibility involves assessing whether the research claims are well-founded, whether a strong connection exists between observations and themes, and whether another researcher could obtain similar results using the same data. Additionally, Eriksson and Kovalainen (2016, p. 308) highlight the role of saturation—where the same themes emerge across multiple interviews—in establishing credibility. Stenfors et al. (2020, p. 597) further underscore that credibility requires a transparent and justified explanation of the chosen research methodology. In this thesis, credibility was ensured through a comprehensive and systematic examination of the research topic, supported by prior literature. The interview themes were derived from the theoretical framework, ensuring alignment between the research questions and data collection.

Transferability refers to the extent to which research findings can be applied to other contexts or settings (Ahmed, 2024; Tuomi & Sarajärvi, 2018, p. 165). Eriksson and Kovalainen (2016, p. 308) argue that researchers must identify commonalities between their findings and those of previous studies addressing similar topics. In this thesis, transferability was enhanced by establishing strong connections between the results and prior research incorporated into the theoretical framework. The semi-structured thematic interviews were constructed based on theoretical foundations, contributing to consistency in the research findings. Additionally, while the study focused on chatbots

within a specific organization, the findings are relevant to various customer service settings where AI-driven solutions are utilized.

Dependability relates to the consistency and stability of research findings over time (Eriksson & Kovalainen, 2016, p. 308; Ahmed, 2024). To establish dependability, researchers must document their methodological choices in a systematic and traceable manner (Ahmed, 2024). This process includes maintaining an audit trail—a detailed and structured record of key decisions throughout the research which ensures transparency and enables future researchers to replicate or verify the study.

In this thesis, dependability was ensured through a logical and well-documented research process. The study began with an examination of the theoretical background on digital customer experience and service logic for value creation, which helped identify research gaps and define the study's purpose, objectives, and methodological approach. This foundational understanding guided the development of the theoretical framework and the formulation of interview themes. Clear selection criteria for interviewees were established, and the interviews were conducted following a structured and consistent process. The collected data was analyzed using content analysis, ensuring a systematic and rigorous approach to interpretation. Although the core research topic remained consistent throughout, minor adjustments were made to refine the research objectives as the study evolved.

Confirmability refers to the objectivity of research findings and their clear linkage to the collected data (Stenfors et al., 2020, p. 598). Eriksson and Kovalainen (2016, p. 308) stress that the connection between findings and data should be transparent and easily understood by others. Ahmed (2024) explains that confirmability ensures that conclusions are not influenced by researcher bias or personal preferences. To enhance confirmability, researchers commonly use techniques such as peer debriefing, member checking, and reflexive journaling (Ahmed, 2024). Additionally, Stenfors et al. (2020, p. 598)

highlight that including direct quotes from research data strengthens confirmability by demonstrating how findings are grounded in the evidence.

In this thesis, confirmability was ensured by incorporating direct quotations from the interview data to support key findings. This approach not only enhances transparency but also demonstrates that conclusions are drawn from a thorough analysis of the entire dataset. By presenting a diverse range of perspectives from interviewees, the research findings reflect the authentic views and experiences of participants rather than subjective interpretations by the researcher.

3.6 Ethical considerations

Stenfors et al. (2020, p. 598) emphasize that ethical considerations are fundamental in all research, particularly in qualitative studies. Puusa et al. (2020, p. 175) define ethics as adherence to the moral principles that guide research throughout the entire process. Tuomi and Sarajärvi (2018, pp. 149–150) highlight that maintaining ethical standards enhances the reliability of research, reflecting both the quality of the study and the researcher's commitment to ethical conduct. Eriksson and Kovalainen (2016, p. 77) argue that researchers should act with a sense of responsibility toward their peers, the scientific community, and their information sources.

Ethical research practices are closely linked to good scientific conduct. The Finnish National Board on Research Integrity (2023) has established guidelines to ensure that research aligns with the principles accepted by the scientific community. These principles include reliability, honesty, respect, and accountability in research design, data collection, analysis, and reporting. Researchers must use methods that meet scientific criteria and are ethically sound, including proper referencing, respect for fellow researchers, appropriate research permits, and data protection (The Finnish National Board on Research Integrity, 2023).

This thesis adhered to ethical principles by following established standards of good scientific practice. Research participants were fully informed about the study's purpose, scope, and objectives prior to the interviews. However, the underlying assumptions were intentionally withheld to minimize potential bias in responses. Participation in the study was entirely voluntary, and strict confidentiality was maintained throughout the research process.

4 Findings

This chapter presents the key findings of the empirical research conducted through interviews with selected participants from the case organization. The analysis begins by exploring the interviewees' general perceptions and experiences with chatbots, providing a foundational understanding of their role within the service context. It then delves into how chatbots contribute to facilitating customer experience and value creation in public services. Adopting an analytical approach, the study incorporates both customer and organizational perspectives to offer a balanced view. In addition, the chapter examines the potential benefits and challenges associated with chatbot-enabled value creation in customer service, drawing on rich insights from the interview data. The chapter concludes by synthesizing these empirical findings and connecting them to the theoretical framework outlined earlier in the thesis.

4.1 Facilitating public service value with chatbots

At the beginning of the interviews, participants shared their views on the current role of chatbots in public services, along with their expectations for future developments in chatbot technology. They also offered detailed insights into how customers interact with chatbots and reflected on the nature of these interactions within public service contexts. Guided by the principles of value creation, particularly the perspective that positions customers as active co-creators of value in service interactions—the interview questions were designed to elicit a comprehensive understanding of participants' perceptions regarding the evolution of chatbots in customer service and their broader impact on value facilitation within these interactions.

As outlined in the theoretical framework, prior research has conceptualized chatbots in various ways; however, they are consistently characterized as conversational systems designed to interact with customers (Abu Shawar & Atwell, 2007). Chatbots have also been defined as computer applications that respond to customer inquiries and support the

use of digital services by offering guidance and facilitating transactions (Voutilainen, 2018, p. 906). By leveraging natural language processing, organizations can utilize chatbot technology to engage effectively with customers (Karlson, 2017; McTear, 2017; Reshmi & Balakrishnan, 2016). Overall, chatbots function as conversational agents that enhance customer experiences by enabling seamless access to information and services (Følstad et al., 2021, p. 2916). Both theoretical and empirical evidence suggest that chatbots offer significant benefits for service interactions, particularly among customers who possess strong technical skills and demonstrate a willingness to adopt new digital services.

> *Users of public e-services primarily expect ease of use and the ability to navigate the service independently. The goal is to complete necessary tasks without requiring additional assistance, such as contacting telephone support. In this way, customers are empowered to manage their affairs autonomously through the digital platform."* (Interviewee 4)

> *"Such insights contribute to service development by identifying ways to support customer self-service and, in turn, alleviate the demand on more resource-intensive channels, such as telephone support."* (Interviewee 7)

While the interviewees recognized the value of chatbots in facilitating customer service by automating key operations, they did not view them as complete substitutes for human agents in advisory roles, nor did they anticipate the full automation of customer service in the future. Nonetheless, the interviewees acknowledged that chatbots are well-suited for handling specific routine tasks, particularly general inquiries that facilitate initial customer engagement with the organization. Although human agents are expected to remain integral to customer service, the interviewees highlighted the significant capabilities that chatbots can contribute to these functions. Moreover, they specially emphasized the potential impact of ongoing advancements in AI on the future development of chatbot technologies within customer service contexts.

> *"Traditional customer service that offers comprehensive, personalized support will undoubtedly continue to play a vital role in the future. However, in contexts*

> *where artificial intelligence can be effectively applied, it is highly probable that chatbots will increasingly take over routine interactions."* (Interviewee 4)

Overall, the interviewees expressed a strong expectation that ongoing advancements in chatbot technology will significantly enhance customer engagement strategies. They particularly emphasized the potential for future developments to support key areas such as the personalization of service experiences, seamless integration with advanced AI language models, improved interoperability across systems, and expanded capabilities for voice-based interactions. Moreover, the interviewees suggested that the continued evolution of artificial intelligence is likely to further strengthen the strategic importance of chatbots as a vital component in the transformation and optimization of customer service delivery.

> *"While considering the overall development of technology and artificial intelligence, I foresee that chatbots will become more common in the future, and their significance will likely grow as well."* (Interviewee 2)

When reflecting on customer interactions with chatbots, the interviewees reported that no single customer segment predominated in the use of chatbot technology. Instead, they emphasized that users represented a broad spectrum of demographic backgrounds. This observation suggests that chatbots can serve as an effective communication channel for a diverse customer base, including individuals with limited experience in using digital services. Nonetheless, some interviewees observed that chatbots tend to be particularly favored by younger customers and those with strong technical skills or greater familiarity with digital platforms. Moreover, the interviewees consistently highlighted that chatbots are especially well-suited for customers who prefer to manage their interactions independently through digital channels, rather than relying on traditional service methods such as telephone support.

> *"I believe we currently lack precise data on specific user groups or the largest segment of chatbot users. However, it is reasonable to assume that many users*

> *are younger individuals who prefer not to make telephone calls and instead choose to engage with chatbots or explore digital service portals to the extent possible. At the same time, it appears that chatbot users represent a surprisingly diverse range of customer groups, including older generations. In my view, there is indeed a significant number of users even among elderly customers."* (Interviewee 10)

Furthermore, the interview findings did not indicate the dominance of any single topic in chatbot interactions within the Finnish Tax Administration. Instead, interviewees reported that customer inquiries encompass a broad range of subjects, resembling those typically addressed through traditional customer service channels. However, they observed that customer interactions with chatbots frequently involve recurring, general tax-related inquiries, particularly those concerning current events. According to the interviewees, a primary motivation for customers engaging with chatbots is the need for specific information or guidance, as well as support in navigating the digital services provided by the organization. From the perspective of the Finnish Tax Administration, these inquiries most commonly concern the use of the MyTax online platform.

> *"...We can provide customer service even when we do not always have human resources available. In such cases, our chatbot can increasingly meet customer service needs, and customers will likely turn to the chatbot more readily. For example, when there are long queues and other issues on the telephone service, the chatbot would be the primary service channel."* (Interviewee 3)

> *"Perhaps to some extent, it is also used for information retrieval. However, for the time being, the interaction still closely resembles the kind of customer service provided by humans."* (Interviewee 6)

The interviews also underscored the potential future role of advancements in AI in enhancing the chatbot's contribution to content production. As this task is currently carried out by human agents, it demands a considerable allocation of human resources to ensure the chatbot operates effectively. In this context, interviewees identified AI as a valuable tool for supporting both the maintenance and ongoing development of the chatbot system, while also enabling more efficient content creation within the existing

chatbot team. Furthermore, as chatbot technology continues to evolve, the integration of AI was viewed as having the potential to improve chatbot's capacity to manage digital service interactions, thereby reducing the organization's reliance on human resources in customer service.

> *"…one of the goals is likely resource savings and reallocating freed-up resources to more efficient or critical tasks. Additionally, ensuring speed and ease of use for customers can positively impact their experience."* (Interviewee 7)

As discussed in the theoretical framework, chatbots can enable the realization of many types of value in the context of public service delivery. Service value can be expressed in various forms during interactions, shaped by the differing perspectives of the organization and its customers. For example, Makasi et al. (2022) observe that customers tend to prioritize a limited subset of chatbot-mediated public service values, namely efficiency, effectiveness and trust. Organizations, however, can acknowledge a more extensive array of value dimensions, including user orientation, professionalism, adaptability, privacy, legitimacy, accountability, and acceptability. This discrepancy arises because users tend to prioritize their immediate service experiences, while organizations strive to incorporate a more comprehensive set of public service values into chatbot design (Makasi et al., 2022). Although some values are shared between customers and organizations, their interpretations and measurements may differ, highlighting the need for a balanced evaluation framework that reconciles both perspectives. Accordingly, Makasi et al. (2022) advocate for a comprehensive approach to chatbot development that integrates technical, functional, and customer experience considerations within the broader framework of public service values.

4.1.1 Efficiency

In discussing chatbot utilization, the interviewees identified customer service, information retrieval, and support for the use of digital services as the most common applications, each contributing to greater efficiency in service interactions. These findings are consistent with prior research, which suggests that while chatbots can fulfill a range of functions, their primary value lies in enhancing customer service operations (Io & Lee, 2017). The interviewees viewed chatbots as a key service channel through which organizations can facilitate customer engagement. Furthermore, they emphasized that the central objective of chatbot implementation is to improve the efficiency of public service delivery, while simultaneously promoting consistency and equity in user experiences.

> *"Efficiency is probably one of the key aspects related to chatbots, as that is largely what they aim to achieve. Additionally, there's the matter of equality—if it can be considered as such.* (Interviewee 6)

The interview findings further validated the theoretical framework by emphasizing the role of chatbots in managing routine customer service inquiries, particularly those related to general information and frequently asked questions. Additionally, the interviewees highlighted the considerable potential of chatbots to support human agents by alleviating their workload, effectively managing a significant share of customers' general inquiries as part of an ongoing service, especially during peak periods of customer demand. Chatbots were also perceived as capable of handling large volumes of interactions simultaneously, thus reducing customers' reliance on alternative service channels and their associated operating hours.

> *"…at some point we were able to answer 30,000 chat contacts with human agents, but when the chatbot was introduced, there were 90,000 chat conversations at that same time. When the bottleneck of the possibility of starting a chat conversation was removed, the number of chat conversations tripled."* (Interviewee 10)

The interviewees further emphasized that within the Finnish Tax Administration, clear and compelling evidence of the chatbot's efficiency in handling customer service tasks emerged shortly after its implementation. The automation of customer service processes through chatbots was considered not only as a means of providing faster responses to inquiries but also as a strategic approach to achieving cost efficiencies at the organizational level. In research, efficiency is commonly understood as achieving objectives with minimal resource expenditure (Karunasena & Deng, 2009; Meynhardt, 2009). In the interviews, this was considered particularly important given the ongoing cost-cutting measures affecting public organizations and their services.

> *"The chatbot quickly pays for itself, leading to significant cost savings."* (Interviewee 9)

"While organizations frequently interpret efficiency as cost reduction and the rapid responsiveness of chatbots to public needs (Makasi et al., 2020), customers tend to define efficiency in terms of a chatbot's ability to promptly deliver the desired service outcomes (Makasi et al., 2022). Furthermore, chatbots are expected to enhance efficiency by rapidly analyzing and responding to service inquiries (Brandtzæg & Følstad, 2018; Følstad et al., 2018). Although chatbots typically require a substantial initial investment, they were generally perceived as cost-effective tools for enhancing customer service, with tangible benefits often emerging within a relatively short time frame.

> *"...I believe that chatbots in public services bring efficiency, especially in the sense that they can provide answers to routine matters. If the question is simple enough, a chatbot can handle it effectively."* (Interviewee 2)

The interviewees observed that the core logic underpinning chatbot operations does not differ substantially from traditional customer service models. While chatbots typically provide responses comparable to those of human agents, their primary advantage lies in the speed and immediacy with which they deliver information. Importantly, beyond

enhancing the user experience, chatbots were regarded as tools for improving organizational efficiency by enabling more strategic allocation of human resources. These findings align with previous research suggesting that when chatbots function effectively, they are capable of independently managing routine service inquiries, thereby allowing human agents to focus on more complex issues requiring specialized expertise (Cui et al., 2017). As customer inquiries become increasingly complex in a dynamic service environment, this division of labor is viewed as increasingly essential. The interviewees emphasized that by handling straightforward and repetitive inquiries, chatbots help to alleviate pressure on human agents, ultimately streamlining service delivery and enhancing overall efficiency.

> *"…it is possible that tasks handled by human agents might become more complex or challenging in certain ways. Particularly in cases requiring evaluation and interpretation, chatbots might handle the simpler tasks, leaving the more difficult cases for humans to manage."* (Interviewee 7)

From a value creation perspective, the faster response times offered by chatbots were widely regarded as a significant advantage over human agents in handling customers' general inquiries. Some interviewees noted that whereas traditional customer service may involve delays due to the time required for human agents to locate relevant information, chatbots can deliver immediate responses. This capability was seen as contributing to both improved operational efficiency and enhanced customer satisfaction. The interviewees particularly emphasized the value of chatbot responsiveness in context where obtaining a prompt answer to a straightforward inquiry is the primary objective.

> *"First and foremost, chatbots offer clear and rapid responses. When a customer asks a question, it may take human agents some time to investigate the issue. However, I believe that with current technology, a chatbot can often retrieve the necessary information more instantly."* (Interviewee 1)

The interview findings suggest that the value-creation potential of chatbots lies in their ability to facilitate automated service interactions that benefit both customers and

organizations, while simultaneously reducing reliance on human resources in customer service. However, the findings also underscore the continued importance of human agents in managing more complex and interpretive service situations, thereby highlighting the complementary relationship between chatbot automation and human expertise. Moreover, the interviewees emphasized that the primary objective is to simplify customer interactions and accelerate service processes to deliver a more seamless user experience. As Ravald and Grönroos (1996) argue, minimizing customer effort and associated costs is fundamental to effective service value creation.

> *"…in my opinion, it does free up resources for more critical tasks."* (Interviewee 9)

> *"A chatbot is capable of processing a high volume of inquiries concurrently, virtually without restriction, allowing multiple users to engage with it simultaneously. Thus, it can be considered an effectively limitless resource."* (Interviewee 5)

In this context, the interviewees recognized chatbots as a critical component in streamlining service delivery and improving the accessibility of public services. With advancements in artificial intelligence, it was anticipated that chat interactions could become more sophisticated and increasingly automated, thereby reducing the need for human resources in the development of chatbot responses. At the same time, AI was also viewed as a valuable tool for supporting human agents in their daily work, particularly in tasks that require professional judgment and subject-matter expertise. Additionally, AI was perceived as instrumental in assisting organization's chatbot team in enhancing the quality and relevance of content provided during service interactions.

> *"Currently, a human workforce is still needed. However, as AI development progresses, I foresee that in the chatbot team, it will be possible to reduce human workforce or enable the existing human resources to do more with AI assistance."* (Interviewee 7)

4.1.2 Accessibility

The interviewees emphasized that a key advantage of chatbots in customer service is their ability to provide continuous availability for guidance and assistance. By eliminating the waiting times typically associated with traditional customer service and offering 24/7 access to support, chatbots were seen as significantly reducing the time and effort required from customers when interacting with the organization, thereby facilitating the overall service experience. The interviewees noted that the constant availability of chatbots removes the constraints imposed by traditional service operating hours, allowing customers to engage with the organization at times most convenient to them. While chatbots enhance service accessibility for customers who are inclined to use digital services, they may also indirectly improve access to traditional customer service by alleviating demand on these channels, thereby benefiting those who prefer more conventional modes of interaction.

> *“In my view, customer value is generated through the availability of support at any time, without queues or delays "* (Interviewee 10)
>
> *…one of the advantages of a chatbot is that the customer interaction is not tied to office hours..."* (Interviewee 7)
>
> *"I think customers seek easy accessibility and the ability to use the service at a convenient time for them, along with guidance on how to use other services."* (Interviewee 5)

The interviewees also emphasized the role of chatbots in promoting equitable access to services, a core principle of effective public service delivery. For instance, chatbots can enhance the availability of services by offering multilingual support, thereby upholding customers' legally mandated linguistic rights (Voutilainen, 2018, p. 918) and contributing to broader service accessibility. Additionally, chatbots can facilitate access for individuals who may be unable to engage with traditional customer service channels, such as those with health-related limitations, thus fostering greater inclusivity and ease of service use. Furthermore, legislation requires that guidance within public services be provided in sufficient quantity to meet demand and remain easily accessible to all customers

(Voutilainen, 2020, p. 108). In this regard, chatbots were viewed as a valuable tool for supporting the fulfillment of these legal and operational obligations.

> *"Equity is essential, and in this case, the generic nature of the service supports this. Additionally, resource efficiency and accessibility are important, ensuring that the service is available to everyone."* (Interviewee 5)

> *"In addition, the availability of the service in multiple languages has a substantial impact on the overall customer experience...It's about meeting the accessibility criteria set for digital services and complying with various legal requirements, such as offering services in Swedish. Although there is no legal obligation to provide services in English, it is still offered because there are many customers who prefer it."* (Interviewee 6)

> *"Naturally, it does not address the challenges faced by all customer groups. However, for example, when considering customers with hearing impairments, a written service channel is likely to enhance their accessibility or improve the availability of services for that particular group."* (Interviewee 7)

In discussions about the accessibility of chatbots, interviewees emphasized that the principle of service is a foundational aspect guiding the organization of public services. Defined in law, this principle seeks to ensure that public service transactions and case handling are structured in a manner that allows customers to receive services appropriately while enabling public authorities to fulfill their duties efficiently. It guarantees the availability of services while considering the needs of customers within the organization. The development of public services is thus focused on enhancing customer orientation and prioritizing operational effectiveness. From the perspective of the service principle and operational efficiency, interactions within public services should be immediate, flexible, straightforward, and cost-effective (Sorri, 2022, p. 21), underscoring the significance of chatbots in the evolution of customer service.

While the development of chatbots has the potential to enhance the accessibility of public services, the interview findings suggest that customers should not be required to rely exclusively on digital services. Specifically, the principle of service ensures the availability of alternative service options (Voutilainen, 2020, p. 184). Therefore, chatbots should be

viewed as one of multiple channels for accessing guidance, rather than the exclusive means of interaction for public services. From a resource perspective, the interviews further emphasized that chatbots should primarily be developed to support customers who find them genuinely beneficial for accessing services. At the same time, the interviewees acknowledged that well-functioning chatbots can facilitate the overall service experience, thereby fostering greater customer satisfaction and appreciation for the organization.

> *"…it ensures that the service is available 24 hours a day. This allows service provision to customers who are not available during standard business hours. It also enables more efficient service delivery with limited resources and scalable solutions, meaning that service can be extended to an increasing number of customers."* (Interviewee 6*)*

> *"There is undoubtedly an age-related variation in preferences—some individuals may prefer to call, while others are more adept at using chatbots. Moreover, for those with limited digital literacy or language challenges, handling matters over the phone may be the more accessible option."* (Interviewee 3)

4.1.3 Accuracy and user orientation

The interviewees highlighted that a fundamental requirement for chatbots utilized in public service contexts is their ability to provide accurate and reliable responses to customer inquiries. This expectation arises not only from user demands but also from the legal obligations of public authorities to provide accurate guidance and maintain the credibility and trustworthiness of the information and assistance they provide. In this context, the interviewees underscored the importance of chatbots possessing a robust capability to accurately interpret and classify user inquiries. Such a capacity is essential to ensure that users receive relevant and reliable information, thereby reinforcing institutional accountability and fostering public trust in digital service channels. From a value creation perspective, ensuring accuracy and user orientation was seen as a key aspect of developing chatbots.

> *"...if the chatbot is improved, it would enhance its trust and accuracy, as I mentioned earlier. These aspects are crucial when handling tax matters, as they are very important to people..."* (Interviewee 4)

To ensure consistent service across all customer interactions, the interviewees emphasized the chatbot's ability to utilize standardized responses. By relying on rule-based logic and predefined responses, chatbots can provide consistent answers to similar inquiries, thereby reducing variability that may arise with human agents due to factors such as mood, fatigue, or subjective interpretation. From a value creation perspective, the interviewees further noted that using predefined response templates allows chatbots to maintain a consistent tone, structure, and professionalism in communication. This not only enhances the reliability of the service but also fosters user trust, as customers can expect verified responses and consistent quality of assistance in each interaction. However, the interviewees also acknowledged that this approach limits the chatbot's ability to address customers' individual circumstances. Nonetheless, advancements in AI could enable more dynamic and personalized responses, thereby further enriching customer experience.

> *"Currently, the chatbot provides standardized responses to all users, as the answers have been manually created and reviewed. However, if generative artificial intelligence were to be implemented in the future, it could generate responses dynamically based on each individual query. In such a case—like how ChatGPT operates—the responses could vary slightly each time, as they would be uniquely generated by the AI in real time."* (Interviewee 3)

The interviewees emphasized that in situations where the chatbot is unable to provide satisfactory support, particularly in cases involving complex, nuanced, or interpretive issues—it is essential for the system to promptly redirect users to an appropriate alternative service channel. Furthermore, they highlighted that this redirection must be both efficient and timely to optimize users' time and ensure seamless customer experience. As a result, continuous development efforts were seen as crucial to ensure that the chatbot provides relevant, high-quality, and timely responses to customer inquiries. The

interviewees also underscored that ensuring the consistency of responses is a high priority in the development of the Finnish Tax Administration's Chatbot Virtanen.

> *"It is continuously updated and refined to enhance response quality and incorporate answers to emerging customer inquiries."* (Interviewee 3)

Since one of the primary reasons customers engage with chatbots is to acquire information, providing accurate answers or guidance becomes a key aspect for value creation in service interactions. The interview findings reveal that customers perceive value in chatbot interactions when the conversation aligns with their goals and directly addresses their needs. Therefore, the chatbot must effectively utilize its resources, particularly the information stored in its database, to ensure the conversation flows seamlessly and effectively.

The interviewees emphasized the importance of the chatbot's ability to provide reliable responses, as this fosters customer confidence in the trustworthiness of the information provided. They highlighted that a key advantage of chatbots lies in their capacity to deliver consistent answers to similar customer inquiries, which reinforces both the reliability and uniformity of the service. Accordingly, the interview findings stressed that the information utilized by the chatbot must be relevant, accurate, and readily accessible. Ensuring these qualities can contribute significantly to value creation and building and maintaining customer trust in such digital services. In addition, the interviewees emphasized the importance of chatbot user orientation in encouraging users to engage with the service. The interviewees further highlighted that customers should be able to receive responses with minimal effort, underscoring the importance of ease of use in chatbot interactions.

> *"The content of a chatbot must be well-produced to understand customers and their inquiries. This includes having enough vocabulary and synonyms to comprehend the terms customers use and their intended meaning, ensuring that the chatbot can provide accurate responses. This is crucial for the customer experience, as it ensures the chatbot responds correctly and promptly, maintaining*

> *system efficiency. Additionally, it is important for the customer to receive a response with minimal effort and that the chatbot can provide direct links or guidance to the appropriate resources for the customer's needs."* (Interviewee 3)

> *"In my opinion, every effort should be made to enhance intuitive usability, as this encourages more people to use the services."* (Interviewee 8)

> *"Interactivity is essential in customer service. To ensure customers have a positive impression and a satisfying experience, the chatbot must be highly interactive. It should engage by asking relevant questions, assessing the customer's situation, and providing accurate and timely responses."* (Interviewee 4)

From an organizational perspective, the interviewees emphasized that chatbot interactions generate valuable data concerning customer issues, which can be leveraged to enhance services on a broader scale. This data offers deeper insights into customer interests and needs, providing a more nuanced understanding of interactions compared to simply analyzing website usage patterns. For effective value creation, it is crucial for the chatbot to engage in frequent conversations with customers. High volumes of interactions contribute to a more comprehensive understanding of customer needs and concerns, ultimately improving the overall service process and experience. A successful service experience is achieved when chatbot conversations conclude effectively, offering appropriate solutions to customer inquiries.

> *“However, the chatbot also serves as a channel through which impulses related to anticipation can be identified—for instance, a particular issue may trigger communication needs or the need to share more detailed information."* (Interviewee 7)

As a result, AI-powered chatbots can progressively develop effective models from successful interactions, which can then be applied to future conversations, thereby enhancing overall value co-creation between the customer and the chatbot. In information-seeking situations, the value perceived by the customer primarily depends on the accuracy of the responses provided. However, value can also stem from other aspects of

chatbot interactions. A key benefit for customers is the efficiency with which chatbots operate, offering timely and effective guidance.

> *"Chatbot conversations can provide valuable insights into whether the available information is sufficiently comprehensive, easily accessible on the website, and clearly understandable—particularly in terms of whether customers are able to navigate, and act based on the online instructions provided. Additionally, chatbots may offer direct feedback on the types of content users would like to see on the organization's website. They may also inspire new initiatives, such as the creation of instructional videos..."* (Interviewee 7)

4.2 Challenges with creating value with chatbots

As outlined in the theoretical framework, prior research has identified several common challenges associated with chatbot utilization, including the lack of human interaction, the complexity of conversational topics, and limitations related to both adoption and functionality (e.g., Jenkins et al., 2007; Følstad et al., 2018; Abu Shawar & Atwell, 2007; Hill et al., 2015). From a customer experience perspective, some interviewees emphasized the significant challenge posed by the absence of human agents to intervene when chatbots fail to resolve customer issues. This concern aligns with existing literature, which underscores the importance of integrating chatbots with human support, particularly when handling complex inquiries that may leave customers without sufficient assistance (Shumanov & Johnson, 2021; Huang & Dootson, 2022). Additionally, the interviews revealed a clear demand for chatbots to engage in more human-like interactions, thereby enhancing the personalization of the service experience.

4.2.1 Lack of human touch

The interviewees observed that some customers may initially hold negative attitudes toward chatbots, perceiving them as unreliable or questioning the accuracy of their

responses. Furthermore, a preference for human-like interactions in customer service can lead to the belief that chatbots are unsuitable for meaningful engagement. The interviewees noted that skepticism about the chatbot's ability to provide accurate answers and effective service may hinder customers' willingness to adopt and use new technology. This observation aligns with existing research, which underscores challenges related to the lack of human-like qualities in chatbots and customers' pre-existing negative perceptions (Jenkins et al., 2007; Følstad et al., 2018; Abu Shawar & Atwell, 2007).

> *"…I get the impression that people prefer having a real human involved. I am not sure if it is a distrust of chatbot technology or the human element, but having an actual person responding seems important."* (Interviewee 1)

> *"From the feedback, it is evident that the service is not perceived as being on the same level… Customers probably feel that the service is inferior compared to what it would be if provided by a human, but that is likely quite obvious."* (Interviewee 6)

According to the interviews, a key challenge associated with chatbots is that they may be perceived as robotic from the customer's perspective, resulting in interactions that lack human warmth. Consequently, some customers may find chatbots less approachable. Additionally, the language used by chatbots is often perceived as excessively rigid and formal, lacking the personal nuance that characterizes human communication.

> *"There is a prevailing perception that chatbots and automated systems have yet to evolve beyond a distinctly 'robotic' feel. Their language often lacks personality and human warmth, making interactions seem impersonal and less approachable. Communication is typically characterized by formal, standardized phrasing, with little nuance or variation, which further reinforces a sense of detachment in the user experience.* (Interviewee 4)

The interviewees emphasized that current chatbot systems are constrained by their reliance on predefined responses, limiting their effectiveness in addressing detailed or nuanced customer inquiries. As customer situations are often complex and multifaceted,

chatbots were seen as lacking the capacity to manage such interactions comprehensively. Additionally, technical limitations that prevent access to customer-specific data further undermine their functionality. Consequently, the interviewees generally agreed that human agents will remain essential for handling more complex and context-sensitive service interactions.

> *"There are also issues that are very detailed and personal, which cannot be resolved through a chatbot. These situations require consideration of many factors specific to the customer's situation. Such evaluation and interpretation are not something a machine can handle well, even in the near future, so human judgment and interpretation are needed."* (Interviewee 7)

> *"The personal aspect often requires understanding of the customer's specific situation, which a generic chatbot's cannot address at the level that customers might sometimes expect."* (Interviewee 5)

Interviewees identified a key challenge for chatbots in their limited capacity to accurately interpret customer inquiries, particularly when these inquiries are complex or involve nuanced issues. This challenge is amplified in cases where customers have an incomplete understanding of the problem, often resulting in breakdowns in mutual intelligibility during interactions with chatbots. In scenarios where establishing common terminology is difficult, participants observed that human agents are typically more effective in delivering satisfactory service experiences. Unlike chatbots, human agents can tailor their explanations to align with the customer's level of comprehension and situational context, thereby enhancing clarity and facilitating issue resolution.

> *"I would say that when someone does not understand the terminology related to taxation at all or has difficulty grasping taxation concepts—such as cognitive challenges or language barriers—then a customer advisor can definitely better discuss the matter and explain it in detail tailored to that specific customer's situation."* (Interviewee 3)

Despite concerns about the absence of a human touch in chatbot interactions, interviewees generally regarded chatbots as an accessible and low-threshold communication

channel for engaging with public services. More broadly, the interviewees observed the development of AI to enable more personalized interactions. However, they also voiced concerns that increased reliance on AI may erode human-like interactions, which continue to be a vital component of the service experience for many customers.

> *"It is difficult to deeply analyze at this point how the development of artificial intelligence will impact humanity. It is uncertain whether AI will alienate us from each other or from our own humanity. I cannot say for sure."* (Interviewee 2)

4.2.2 Resource issues

The resource requirements for chatbots typically vary depending on factors such as the type of chatbot, its intended purpose, and the organization implementing it. The interviewees generally indicated that deploying chatbots requires both financial investment and human resources, as well as ongoing system maintenance. Continuous updates to the chatbot's responses and information are essential for sustaining its functionality, highlighting the need for dedicated personnel to manage these updates.

> *"Resources are definitely needed when inputting information into the system—everything it knows, all the data and substance—and resources are also required to maintain it so that it continuously provides up-to-date information."* (Interviewee 4)

The interviews revealed that the chatbot system used by the Finnish Tax Administration is provided by an external service provider. Consequently, technical maintenance and chatbot development do not demand substantial technical expertise from the organization. This arrangement thus alleviates the organization from the responsibility of technical development, enabling it to focus on leveraging its taxation expertise in refining chatbot functionality and the responses provided to customer inquiries. However, ongoing human resources are necessary to ensure the chatbot's proper functioning. Additionally, interviewees emphasized the importance of involving customer service personnel

in the development of the chatbot's responses, given their firsthand experience with customer inquiries in their daily work.

> *"Having a sufficient team for content production is crucial, including technical experts and those with subject-matter expertise from the customer interface. If we expand the chatbot, additional human resources might be needed to maintain such a comprehensive system."* (Interviewee 3)

> *"The most crucial aspect, in my opinion, is having people at the core of the work who understand customers' problems, know the answers to their issues, and can distinguish between essential and non-essential matters."* (Interviewee 10)

Furthermore, the interviews underscored the potential role of advancements in AI in enhancing the chatbot's content production in the future. AI was seen as a tool for improving maintenance and development processes, enabling more efficient content creation with existing human resources. Moreover, the use of AI was viewed as potentially reducing the need for human resources in service delivery over time.

> *"Currently, a human workforce is still needed. However, as AI development progresses, I foresee that in the chatbot team, it will be possible to reduce human workforce or enable the existing human resources to do more with AI assistance."* (Interviewee 7)

The interviewees highlighted the high cost of advanced applications as a key challenge in chatbot development. Such costs may hinder adoption, particularly in contexts where the public sector faces pressure to cut expenditures. However, they anticipated that as chatbot functionalities evolve, these costs will decrease, thereby enhancing the accessibility and effectiveness of these systems in public services.

> *"…the prices for these new functionalities are likely to change in the future as they become more common and widespread. However, at present, they remain quite expensive."* (Interviewee 3)

4.2.3 Reliability and trust

From a value creation perspective, the interviewees highlighted that a significant challenge in the use of chatbots arises in situations where some customers initially hold negative attitudes or preconceived notions about this technology. These customers may perceive chatbots as unreliable or question the accuracy of the information provided, which can undermine the perceived value and effectiveness of chatbot interactions. This may be due to customers' poor interactions with chatbots that did not understand their inquiries. These experiences can lead to a general skepticism about chatbot's ability to service interactions, making users prefer human agents. Similarly, the interview findings stressed customers' familiarity with human interactions in customer service, which has helped to build a high level of trust in the support provided by human agents. Thus, customers' high preference for a human-like approach in customer service may lead to the belief that chatbots are unsuitable as a service channel.

> *"Perhaps there is already a somewhat negative connotation associated with chatbots - questions about whether they are truly reliable, whether they can provide the accurate information needed, and whether they are capable of conveying everything that's important. So, it might be that the issue of trust and even the term "chatbot" itself doesn't inspire much confidence or willingness to use the chat service."* (Interviewee 4)

The interviewees emphasized that skepticism regarding the chatbot's ability to provide accurate responses can significantly reduce customers' willingness to engage with and adopt the technology. This aligns with existing studies that highlight challenges related to the lack of human-like qualities in chatbots and customers' pre-existing negative perceptions (Jenkins et al., 2007; Følstad et al., 2018; Abu Shawar & Atwell, 2007). However, the interviewees also noted that when customers engage with a chatbot despite having negative preconceptions, they may be positively surprised if the chatbot can successfully meet their needs. In such cases, the interaction can lead to positive customer experience and potentially shift initial attitudes toward the technology.

> *"If a customer has a preconceived notion about the chatbot and is skeptical about its usefulness but then tries it out and receives good and reliable answers, including links to relevant information on the Tax Administration's website, it naturally increases their confidence in the chatbot, proving that it's actually quite effective."* (Interviewee 4)

As customers' attitudes strongly affect their motivation to use chatbots, trust in chatbot-mediated public services is largely shaped by customers' perceptions of chatbot performance. From the organizational perspective, however, trust is often equated with the chatbot's ability to produce outcomes comparable to those of traditional public service channels (Makasi et al., 2022). Nevertheless, from customer perspective, trust typically refers to their willingness to share personal or sensitive information—often placing themselves in a vulnerable position—based on the expectation that the organization will act in their best interest (Mayer et al., 1995; Schoorman et al., 2007). Specifically, trust in chatbots depends on the system's perceived ability to securely handle data and deliver accurate, reliable responses (Androutsopoulou et al., 2019; Froy, 2019).

> *"…the fact that customers can trust that their information remains secure is crucial for them to feel confident in using chatbots or even wanting to use them."* (Interviewee 3)

Makasi et al. (2022) further highlight that customers assess trust based on the chatbot's accuracy and the level of control they retain over their information, which becomes particularly critical when dealing with sensitive data. For example, chatbots designed to provide personalized or targeted services typically require user authentication, access to private data, and informed consent, making trust and robust privacy measures essential. The interviewees also highlighted information security-related issues during the implementation of chatbots, emphasizing their crucial role in maintaining customer trust in the service. Given the growing prevalence of security challenges in recent years, they stressed the importance of ensuring the service's security. Technological failures (Ortiz de Guinea & Webster, 2013) and security threats (Liang et al., 2019) have been shown

to significantly disrupt user engagement, with data breaches often prompting users to abandon the service in favor of more secure alternatives (Nikkhah & Grover, 2022). The interviewees also stressed that robust security measures significantly influence how actively customers are willing to interact with chatbots. Moreover, it should be noted that chatbots that primarily deliver general information and answer simple inquiries typically do not require access to personal data, which therefore poses fewer privacy risks.

> *"In my opinion, the top priority is security, especially considering all the recent data security issues and breaches."* (Interviewee 8)

Despite these concerns, the interviewees generally perceived chatbots as an accessible, low-barrier channel for customer communication. However, they emphasized that fostering customer trust and ensuring service reliability necessitates chatbot functionalities that are transparent, consistent, and dependable. These attributes are considered essential for promoting sustained customer engagement with chatbot services. Furthermore, the interviewees underscored the importance of organizations actively monitoring and evaluating customer interactions with chatbots, as well as offering clear guidance to facilitate their effective use. Enhancing users' understanding of chatbot operations was identified as a critical factor in building trust and confidence in these technologies.

> *"…it's important to also consider how users interact with the chatbot. I believe we should think about it in terms of a cultural change in customer service. We need to create more user guides on how to use the chatbot. Once users know how to use it effectively, we can better address their questions."* (Interviewee 9)

> *"I believe that our chatbot functions as an integral member of our customer service, adhering to the same values as our telephone service. It is essential for our chatbot to be clear and reliable, ensuring that customers can trust the information it provides."* (Interviewee 3)

The interviews revealed that the growing use of large language models (LLMs) presents a significant opportunity for facilitating chatbot functionality. However, several challenges were identified, including regulatory constraints related to the use of language

models and the occurrence of hallucinated responses generated by these models. As a result, ensuring the accuracy of chatbot responses is essential for effectively utilizing LLMs. From a strategic development standpoint, the interviews underscored the importance of integrating chatbots with various services and establishing interfaces with other platforms. Additionally, the findings indicate that as a relatively new service channel, chatbots encounter challenges associated with rapidly evolving technologies and rising user expectations. Moreover, interviewees emphasized that chatbot development should be part of the organization's broader service ecosystem rather than treated as a standalone service.

> *"I think it is more connected to how the organization understands the process, considering how the entire system works, not just focusing on the chatbot itself, but the whole ecosystem it is part of and connected to."* (Interviewee 8)

The interviewees highlighted that the challenges in developing chatbots are closely linked to ensuring the accuracy and reliability of their responses. While generative models used in advanced chatbots have the potential to improve customer understanding and provide more precise answers, there remains a risk of unreliable responses due to chatbot hallucinations. As Voutilainen (2018) notes, the development of artificial intelligence, where applications are capable of independent decision-making, learning, and manipulation, raises questions about the legal boundaries of AI in public service production. Nevertheless, some interviewees expressed optimism that future advancements in chatbot technology could reduce response hallucinations, thereby improving their overall relevance and usefulness in public service contexts.

4.2.4 Technical and regulatory challenges

The interviews revealed that a significant challenge in chatbot interactions is their inconsistent ability to comprehend customer inquiries. Many customers may struggle with using chatbots effectively, leading to frustration when they fail to retrieve the necessary

information to resolve their issues. For instance, complex or multi-topic inquiries can make it difficult for chatbots to accurately identify the core issue. Furthermore, chatbots may generate incorrect or contextually inappropriate responses, which may reduce their perceived reliability. Therefore, prioritizing user experience and technical reliability is essential for fostering customer confidence in using the service. As noted by Jiménez-Barreto et al. (2021), customers' experiences, attitudes, and satisfaction with chatbots are enhanced when they feel more connected and competent during their interactions.

> *"The foundation of any system must be its technical reliability to ensure effective functioning. Public authorities, and we like to think so, require this trust to be unwavering. It must operate in a manner that genuinely instills confidence in people."* (Interviewee 8)

The ability to formulate responses in a clear and comprehensible manner also remains a significant challenge. This issue is particularly critical in the context of public organizations, which have a responsibility to provide accurate and trustworthy information. Additionally, interviewees expressed concerns regarding security, underscoring the need to address these issues to sustain customer trust. Negative feedback was predominantly associated with the chatbot's limitations in understanding inquiries, its inability to deliver precise or contextually relevant responses, and the perception that its replies were overly generic rather than tailored to individual customer needs.

As discussed in the theoretical section, the intelligence of current chatbots providing general information often remains at the level of mechanical intelligence (Huang & Rust, 2018). This limitation is particularly evident in their inability to adapt responses to varying question formats or situational contexts presented by customers. In such cases, a chatbot's ability to provide rapid responses adds little value if the content is neither relevant nor useful to the customer.

> *"I'm not sure how a chatbot manages holistic scenarios where one aspect affects another. In such cases, a human advisor might provide more*

> *comprehensive service. The holistic approach isn't really the chatbot's job; it is more suited for short and concise inquiries."* (Interviewee 4)

> *"The personal aspect often requires understanding of the customer's specific situation, which a generic chatbot's cannot address at the level that customers might sometimes expect."* (Interviewee 5)

The interviewees identified situations where the chatbot might fail to effectively integrate its resources into the service context as intended. For example, customers' questions may be too complex or ambiguous for the chatbot to comprehend, or the terminology used by customers and the chatbot may not align. Additionally, the chatbot's responses might be too generic to address customers' specific situations. These failures in resource integration can require customers to invest significantly more effort and resources than anticipated to resolve their issue, potentially leaving the conversation's original objective unmet.

> *"I would say that when someone does not understand the terminology related to taxation at all or has difficulty grasping taxation concepts—such as cognitive challenges or language barriers—then a customer advisor can definitely better discuss the matter and explain it in detail tailored to that specific customer's situation."* (Interviewee 3)

The interview data suggest that certain situations pose a risk of value creation failure, primarily due to unsuccessful resource integration in service interactions. This risk is particularly evident in the dissemination of information, which is one of the chatbots' key value-creation mechanisms. Specifically, failure may occur when a chatbot cannot provide answers that align with a customer's inquiry. The question may be too broad, complex, or unique for the chatbot, preventing it from generating a suitable response. Conversely, even when the chatbot has the correct answer, ineffective phrasing by the customer may hinder its ability to understand the query and deliver accurate information. Additionally, the chatbot's capabilities may be inherently limited, restricting its effectiveness in addressing customer inquiries. This limitation largely stems from the chatbot's

reliance on relatively simple rule-based models, which constrain its intelligence and responsiveness in handling more advanced inquiries.

> *"It is often evident from chatbot conversations that when there is a specific question or if topics overlap, the customer feedback may not always be positive."* (Interviewee 9)

> *"Negative feedback often arises when the chatbot fails to answer the question or understand the customer's inquiry. This can happen for various reasons, such as not considering the customer's perspective or the chatbot not being designed to address those specific questions, leading to customer dissatisfaction."* (Interviewee 10)

> *"There are also issues that are very detailed and personal, which cannot be resolved through a chatbot. These situations require consideration of many factors specific to the customer's situation. Such evaluation and interpretation are not something a machine can handle well, even in the near future, so human judgment and interpretation are needed."* (Interviewee 7)

Adopting technically advanced chatbots in public services presents significant challenges, particularly in meeting legal requirements and ensuring the reliability of the information provided. From the perspective of public services, the interview findings show that advanced chatbots with generative capabilities still face difficulties in these areas. Based on these findings, effectively integrating advanced chatbot technologies into public services requires minimizing their possible hallucinated responses and ensuring the delivery of reliable, accurate information in compliance with legal mandates. The interviews also revealed that the most advanced chatbots are currently unfeasible due to their limited functionalities and inability to meet the legislative requirements for public advisory services. However, it is expected that as technology advances, these chatbots will meet the necessary criteria and become suitable for use in public services.

> *"However, I believe there will likely be more opportunities in the future, and chatbots will probably be able to handle a significant portion of customer interactions. This is because they can perform much better once artificial intelligence advances further, leading to applications that can minimize hallucinations."* (Interviewee 6)

> *"The future challenge might be in combining traditional chatbots, which respond exactly as instructed, with language models to create a hybrid system. This hybrid model itself can help reduce clearly wrong answers, unlike a fully generative model. However, the challenge remains in managing hallucinations and other such issues."* (Interviewee 10)

The interview findings indicate that the development of chatbots was generally viewed positively; however, some interviewees expressed skepticism about their future role. This skepticism was partly fueled by the rapid pace of technological advancement, raising concerns that progress might outpace chatbot development. Additionally, some interviewees questioned whether chatbots could fully replace the expertise and human touch in customer service.

> *"Given the current state of the world, I am uncertain if chatbots will still be relevant in ten years. There is a possibility that they may become obsolete by then. Personally, I do not believe in their long-term viability or future prospects."* (Interviewee 7)

Although some skepticism toward chatbots persisted, interviewees generally viewed them as playing a crucial role in the future of public service delivery. It was anticipated that chatbots would increasingly handle a larger share of customer interactions. While the trajectory of technological development was acknowledged as uncertain, there remained strong confidence in the potential and capabilities of emerging technologies.

> *“I don't think they will ever disappear. They will develop in terms of organizations. They'll be at the forefront in the future and there's no getting around it unless something revolutionary happens.”* (Interviewee 9)

> *“Perhaps the future role of chatbots will be very central in advice, meaning at least at the moment the aim is to be able to handle a large part of the customer base with chatbots, and then it is important that the customer feels that they are getting good answers from the chatbot and that the matter is handled through that, and the most important thing is that the customer's trust in the chatbot is maintained.”* (Interviewee 3)

From a technological development perspective, the potential of chatbots is perceived to arise from their ability to integrate with multiple service systems. This integration allows for the combination of diverse technological strengths, facilitating the delivery of a more unified and comprehensive service experience. As a result, customers benefit from seamless and cohesive interaction. Additionally, the interview findings highlighted that for customers, the most crucial factors are how their case is managed throughout the service process and how effectively their issues are resolved.

> *"…different channels are more in symbiosis with each other, that in a way the best aspects of their different areas are utilized, and the solution is thought out as a whole"* (Interviewee 10)

> *"Regardless of the type of development, its value ultimately depends on how effectively the matter is resolved from start to finish. That is what the customer is most concerned with — whether they perceive added value through an easier or more efficient resolution compared to before, or simply through the fact that it gets resolved at all."* (Interviewee 10)

Based on the interview data, a clear conclusion was that although the adoption and development of chatbots in public services was recognized as a complex and challenging process, they were nonetheless regarded as an integral element of contemporary digital public service delivery. Accordingly, interviewees underscored the necessity for public sector organizations to remain aligned with technological advancements. While some interviewees contended that public organizations need not be at the forefront of technological innovation, there was a unanimous consensus that developments such as chatbots must not be disregarded.

> *"It is considered essential to actively monitor societal and global developments to remain informed about broader trends and directions. While there may not be a need to be at the absolute forefront—leading innovation, conducting early-stage trials, and refining services through initial failures, there is a clear desire not to fall behind. Rather, the aim is to position ourselves among the early adopters, ensuring responsiveness and relevance without being the last to adapt."* (Interviewee 7)

In summary, the interviews indicated that the organization's current chatbot was perceived as an effective communication channel in customer service. Technological advancements were viewed as enabling its broader use and delivering benefits to both the organization and its customers, particularly through enhanced service efficiency and availability. However, challenges and legislative restrictions associated with the operation of more advanced chatbots were identified as barriers to fully realizing the technological potential. Despite these limitations, chatbots were considered to add significant value to customer interactions, underscoring the importance of their continued development for effective service implementation.

5 Discussion and conclusions

This chapter presents a comprehensive summary of the study's key findings by critically evaluating the extent to which the research questions have been addressed. It explores both theoretical and practical implications, and provides managerial insights derived from the results while acknowledging the study's limitations. Additionally, it offers recommendations for future research, encouraging ongoing exploration and further development in this field.

5.1 Conclusion

This study has investigated the potential of chatbots to enhance customer experience and drive value creation within public services. Through formulated research questions and an analysis of critical dimensions of digital customer experience, it offers both theoretical contributions and practical insights for advancing public service development. The study examined the benefits and challenges of integrating AI technologies, particularly chatbots, into public service delivery frameworks, highlighting their role in optimizing customer interactions and fostering value creation. Despite its increasing popularity and significance, the adoption of chatbots has remained a relatively underexplored area of research (Senadheera et al., 2024). Therefore, this study lays the foundation for further research on chatbots in public service contexts, particularly their potential to facilitate customer experience and value creation.

The findings of this study indicate that public services have become increasingly customer-centric, with a growing emphasis on understanding customer needs and enhancing service experiences. Furthermore, the study highlights the rising significance of digital services within the public sector, positioning digital service experiences as a central component of public organizations' visions and strategies. As digitalization accelerates the shift toward self-service channels, innovative applications such as chatbots play an

increasingly vital role in customer service, significantly shaping customer experience in public services.

Aligned with the research theme, the study conducted an in-depth exploration of customer experience and value creation within public services. It examined the distinctive characteristics of public services from a value-creation perspective and investigated how public values manifest in service delivery within the context of chatbots. The thesis primarily analyzed these values using the framework identified by Makasi et al. (2020), linking them to the evolving roles of chatbots and their impact on advancing public service delivery. By integrating empirical insights from interview data with findings from existing research literature, the study demonstrates that public service values and their significance are closely tied to the technical capabilities of chatbots and their effectiveness in service delivery. Moreover, the study explored how public values manifest in chatbot-driven public services, identifying both the opportunities and challenges associated with chatbot development in the value-creation processes of public services. As chatbot technology advances rapidly, prioritizing these values is crucial for sustaining customer satisfaction and trust in public services within a chatbot-mediated environment (Makasi et al., 2020).

5.2 Theoretical and Practical Implications

The findings of this study reinforce established theoretical propositions that integrating chatbots into public services has fundamentally transformed customer interactions and service delivery (European Commission, 2020; van Noordt & Miuraca, 2022; Vassilakopoulou et al., 2022). By synthesizing Makasi et al.'s (2020) typology of chatbot functionalities with additional theoretical insights and empirical observations, this study evaluated chatbots' role in enhancing value creation and customer experience while it identified distinct service provision functions based on their technical capabilities. These functions range from basic information delivery to targeted assistance and dynamic service negotiation. Currently, public service chatbots are primarily designed to handle

repetitive customer service tasks, such as delivering information and addressing general inquiries (Senadheera et al., 2024; Chen et al., 2023). This ensures straightforward service access and rapid responses while minimizing the need for customers to authenticate or disclose their personal data. However, this study indicates that such a design inherently limits chatbots' capacity for personalization and targeted support, restricting their ability to deliver tailored responses and solutions for individual circumstances.

This study contributed to the broader discourse on digital service delivery by illustrating how chatbots' continuous availability, self-service functionality, and automated responses can reshape the digital customer experience and facilitate value creation, thereby promoting more equitable access to public services. Their advanced natural language processing capabilities, along with features such as multilingual support and effortless usability, further strengthen the foundation for a more inclusive service framework (Vogl et al., 2020). However, the heavy reliance of first-level chatbots on pre-programmed responses for information provision and assistance highlights a gap in their ability to deliver more advanced and personalized services. The findings of this study indicate that this limitation underscores the need to integrate sophisticated customer authentication and AI-driven personalization to enable a more comprehensive service experience, including enhanced targeted assistance and dynamic interaction (Chen et al., 2023). Moreover, aligning these evolving functionalities with stringent legal and regulatory standards remains a critical challenge in ensuring both accuracy and relevance in public information dissemination (Makasi et al., 2022).

From a practical perspective, this study highlights the significant benefits of deploying chatbots in public services, particularly in automating routine customer service inquiries and enhancing operational efficiency. Both prior research and this study's empirical findings suggest that automation allows human agents to focus on more complex tasks, ultimately improving service availability and organizational productivity when chatbots handle general inquiries (Chen et al., 2023). Furthermore, the consistent and rapid responses provided by chatbots can enhance organizational credibility. From a value-

creation perspective, this is particularly important in the public sector, where trust is a fundamental component of customer interactions (Makasi et al., 2022; Brandtzaeg & Følstad, 2017). To uphold this trust, ensuring accountability in chatbot interactions through strict adherence to legislative requirements and rigorous quality control remains crucial.

Despite these advantages, this study identifies several persistent challenges. The current generation of public service chatbots, primarily designed for information delivery, often lacks robust authentication mechanisms and advanced generative capabilities. Their reliance on pre-programmed responses can limit their effectiveness, particularly in contexts requiring the processing of personal data. Even more advanced generative AI chatbots remain vulnerable to issues such as hallucinations, which can lead to the dissemination of inaccurate or unreliable information. This not only poses legal risks but also threatens public trust (Ashfaq et al., 2020; Shumanov & Johnson, 2021; Verne et al., 2022; Huang & Dootson, 2022). Additionally, limited public awareness of AI capabilities and widespread technology anxiety (Kuberkar & Singhal, 2020) suggest that varying levels of digital literacy may hinder effective interaction with these systems.

The study further indicates that inconsistent chatbot performance and poor integration with other service systems can lead users to prefer human agents, particularly in situations where personalized and precise service based on individual data is essential. Additionally, incorporating humanlike design features and user-centric interfaces to enhance the perceived humanness of chatbots can improve customer experience and foster trust in public services (Kuberkar & Singhal, 2020; Jiang et al., 2023; Zhu et al., 2022). Therefore, theoretical findings indicate that integrating human oversight in handling complex inquiries is crucial to mitigating customer frustration and minimizing the risk of service failures (Ashfaq et al., 2020; Huang & Dootson, 2022).

5.3 Managerial implications

By facilitating a deeper understanding of customer experience and value creation through chatbots in public service interactions, this study aims to provide valuable managerial insights for the development and enhancement of digital public services. Emphasizing its key findings, the study highlights how chatbots can fundamentally transform public service delivery by automating routine inquiries, thereby reducing administrative burdens, improving productivity, and generating significant cost savings (Senadheera et al., 2024). Furthermore, it underscores that this technological innovation not only streamlines operational processes but also enables the reallocation of human resources toward more complex, strategic tasks requiring critical decision-making and specialized expertise.

As advancements in AI accelerate digital services and enhance chatbot capabilities, customer behaviors and expectations have concurrently evolved, demanding more personalized and immediate responses to inquiries. With increasing demand for accessible, always-available self-service solutions, public organizations must continuously refine their digital service strategies to align with these dynamic expectations. As chatbots rapidly evolve, their growing reliance on large language models exemplifies their enhanced capability to deliver effective, human-like customer service. Given the clear benefits of this technology, the study underscores the importance of public organizations investing in its adoption.

However, despite rapid advancements, the study emphasizes the need for a balanced integration of chatbot technology. While chatbots efficiently handle repetitive customer inquiries, human agents remain indispensable for addressing complex and nuanced inquiries. To maximize value and customer experience in service interactions, the study suggests that public organizations should invest in targeted training programs that foster effective collaboration between AI systems and human agents. This includes enabling seamless transfer of chat conversations to human agents when inquiries become too complex for chatbots and require human expertise. Additionally, incorporating human-

like characteristics in chatbot design can enhance customer experience and trust by facilitating more natural and personalized interactions (Kuberkar & Singhal, 2020; Ashfaq et al., 2020). Neglecting these relational aspects may result in communication breakdowns and reduced customer satisfaction (Scutella et al., 2022; Verne et al., 2022).

The study further underscores that enhancing chatbot accessibility and usability is a critical managerial priority in service development. Features such as multilingual support and an intuitive user interface are essential to ensuring diverse customer groups can effectively engage with public services (Gefen & Straub, 2000; Heart & Kalderon, 2013). Moreover, the ability of chatbots to collect and analyze customer interaction data can provide valuable insights that can guide ongoing service improvements and innovation, contributing to long-term value creation in public service delivery (van Noordt & Misuraca, 2019).

Finally, the study highlights the paramount importance of maintaining public trust in digital service development. Public organizations must adhere strictly to legal and ethical standards concerning data privacy and security to protect sensitive information and uphold customer confidence (Culnan & Bies, 2003; Cath et al., 2018; European Commission, 2018). By addressing these managerial challenges, organizations can fully leverage the transformative potential of chatbots, supporting broader e-governance initiatives while fostering a more efficient, customer-centric, and inclusive public service environment.
Overall, the effective integration of chatbot technology requires a comprehensive approach that balances automation with human expertise, continuously adapts to evolving operational landscapes, and prioritizes both accessibility and data security. This balanced strategy is essential for unlocking the full benefits of digital transformation in the public sector. While the study affirms that chatbots can significantly enhance interactivity in public services, it also stresses that realizing this potential requires ongoing evaluation of customer needs and ensuring chatbot capabilities effectively address them.

5.4 Limitations

There are several limitations in this study that should be acknowledged and considered. The primary limitation is the small sample size in the empirical research, which may affect the generalizability of the findings. With a limited number of participants in the research, the results may not capture the full diversity of experiences and perceptions related to chatbot use in public services (Patton, 2015). Consequently, the insights derived from this study should be interpreted with caution and may not be applicable to all public sector organizations or contexts.

Furthermore, the study relies exclusively on data from the organization's perspective, potentially overlooking the direct experiences and perceptions of customers. This limitation may result in an incomplete portrayal of the customer experience with chatbots in public services. Without the customers' viewpoints, important aspects such as user satisfaction, trust, and acceptance remain unexplored. Including customer perspectives in future studies would provide a more comprehensive understanding of the impact of chatbots on service delivery and value creation.

Additionally, a limitation of the study pertains to the empirical research, as the interviews were conducted in Finnish and later translated into English. Despite careful efforts to preserve the original meanings, some nuances may have been lost or altered during translation, potentially influencing the interpretation of the data. Language nuances and cultural contexts play significant roles in qualitative research, and translation may introduce subtle shifts in meaning (Temple & Young, 2004). This limitation emphasizes the need for caution when interpreting the findings and suggests that future studies might benefit from conducting analyses in the original language.

5.5 Further Research

The results of this study have uncovered several promising directions for future research. From a customer service perspective, it would be particularly valuable to explore the potential for value co-creation through collaboration between chatbots and customer service representatives. The findings from the interviews conducted in this study indicate significant potential for value creation within such collaboration. Examining how collaboration between human agents and AI applications can be effectively integrated into customer service is essential. Consequently, investigating the mechanisms of successful value creation, specifically from the perspective of this collaboration, is crucial (Breidbach & Maglio, 2016; Larivière et al., 2017).

Future research should also examine the dynamics of customer experience with chatbots in public services from the customers' perspective. Investigating customer satisfaction, trust, and perceived value in interactions with chatbots would provide a more comprehensive understanding of their impact (Gummerus et al., 2012; Araujo, 2018). This customer-centric approach could identify areas for improvement in chatbot design and implementation, thereby enhancing overall service quality.

Additionally, further research should explore the ethical, legal, and privacy concerns associated with the use of AI and chatbots in public services. Understanding regulatory compliance and data security is essential for responsible implementation and maintaining public trust (Culnan & Bies, 2003; Cath et al., 2018). Given that current legislation significantly constrains the deployment of AI in public services, further examination of legislative reforms is necessary, particularly from the perspective of value creation in customer service.

Moreover, future studies could explore strategies to enhance the accessibility and usability of chatbots for users with limited technological proficiency. As chatbots become increasingly prevalent, it is essential to investigate how the adoption of digital services can be effectively supported for users with limited technical proficiency. Investigating

inclusive design principles and user training programs could help ensure that all segments of the population benefit from digital service innovations (Heart & Kalderon, 2013; Helbig et al., 2009). This is particularly important in the context of public services, where resource constraints may affect the availability of traditional customer support. However, as digital services continue to evolve, public organizations must ensure that these services remain genuinely accessible to all customers, regardless of their technological background or experience. Beyond improving customer experience, accessibility is a fundamental ethical and societal obligation at the core of public service delivery. Therefore, as technological advancements reshape service provision, it is essential to examine how public organizations can maintain service availability while simultaneously promoting the adoption of digital solutions. This underscores the need for future research in the public sector to identify strategies that facilitate the transition to digital services while safeguarding inclusivity and universal access, thereby ensuring that public services remain equitable and accessible to all, regardless of their implementation method.

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Appendices

Appendix 1. Semi-structured thematic interview

Background

- Briefly introduce yourself and your experience with chatbots

Theme 1: Digital Customer Experience and Chatbots in Services

- How do chatbots currently contribute to public services, and what role could they play in the future?
- In your opinion, how can chatbots support the advisory responsibilities of public authorities?
- In what situations and how do users typically interact with chatbots?
- What chatbot features do you consider most important?
- Which chatbot features can enhance a positive customer experience?
- Conversely, which chatbot features might negatively impact the customer experience?
- Can you identify any potential limitations or challenges in chatbots' ability to interact with customers?
- Have you received any feedback—positive or negative—from users regarding chatbots?
- What do you think customers expect from digital services in the public sector?
- How would you define the value of a service in the context of chatbot interactions?
- Have you observed any challenges related to value creation in services, and could chatbots help address these challenges?
- How can chatbots anticipate or handle service-related issues?
- How can chatbots influence customer expectations or respond to their needs?

- What chatbot features do you think could enhance the perceived value of a service?
- What kind of customer experience do you think chatbots can provide?
- How does customer service differ when delivered by a human versus a chatbot? In what situations or tasks do you think chatbots are most effective?
- What strategies do you consider effective in developing chatbots?
- Can advancements in chatbots improve customer experience and create more value? If so, how? What types of value? How do you think chatbot advancements create value for organizations and customers?
- In your opinion, can chatbots enhance interaction between customers and organizations?

Theme 2: Chatbots and Service Development

- Can you list some typical chatbot applications?
- What resources do you think are necessary for a chatbot to function effectively?
- What objectives should organizations aim to achieve with chatbots?
- What insights or findings have been obtained from chatbot usage and monitoring?
- How can organizations utilize chatbot data to better understand their customers?
- What strategies or measures can be implemented to overcome challenges in chatbot deployment?
- How do you think chatbots will impact human work in the future?
- What is your opinion on the increasing use of AI in customer service?
- How do you envision the future of chatbots and their role within organizations?