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Examining the relationship between consumer innovativeness and trust in chatbot applications: A study on Turkish banking sector

Tüketici yenilikçiliği ve chatbot uygulamalarına güven arasındaki ilişkinin incelenmesi: Türk bankacılık sektörü üzerine bir araştırma

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Abstract

Life has transformed rapidly with technology taking on a dominant position in our time. The developments in the field of the internet and the point that web technology has reached has created radical changes in the way of life of today's individuals. Businesses also benefit from the opportunities that technology had provided them in how they reach their consumers. Businesses are using these technologies more and more every day to reach consumers who are constantly open to interaction thanks to technological tools. This is especially true in the service sector and e-commerce sites, where the effects of the digital transformation in banking are seen more clearly. Banks have started to use artificial intelligence-based robots in the customer relations process. In the present study, the general development of artificial intelligence-based chatbots was examined and their use in the rapidly digitalizing banking field was discussed. In this context, the approaches of innovative consumers to chatbot applications of banks were evaluated. The research was carried out on 407 people who were reached by convenience sampling method, using a questionnaire as a data collection method. However, since 13 people stated that they do not use internet or mobile banking, the analyzes were carried out on the answers of 394 participants. A correlation analysis was conducted to reveal whether the innovativeness level of consumers is related to their trust in chatbot applications. The research results show that there is no significant relationship between the "competence dimension" ($r=0.06$; $p<0,01$) and "benevolence dimension" ($r=0.06$; $p<0,01$) of consumer trust towards chatbot applications and consumer innovativeness; however, study revealed that there is a significant relationship between the "integrity dimension" ($r=0.17$; $p<0,01$) of trust and consumer innovativeness.

Keywords: Artificial intelligence, chatbot, digitalization, innovative consumer, consumer cxperience

Öz

Teknolojinin çağımızda başat bir konuma gelmesiyle birlikte yaşam hızlı bir biçimde dönüşmüştür. Özellikle internet alanındaki gelişmeler, web teknolojisinin geldiği nokta günümüz bireylerin yaşayış biçiminde köklü değişiklikler yaratmıştır. İşletmeler de tüketicilerine ulaşırken teknolojinin söz konusu olanaklarından yararlanmaktadır. İşletmeler, teknolojik araçlar sayesinde, sürekli etkileşime açık tüketicilere ulaşmak için hergeçen gün bu teknolojilere daha fazla başvurmaktadır. Özellikle de hizmet sektöründe; e-ticaret sitelerinde, bankacılık alanında dijital dönüşümün etkileri daha net bir biçimde görülmektedir. Bankalar yapay zekâ temelli bu robotları günümüzde müşteri ilişkileri sürecinde kullanmaya başlamıştır. Çalışmada, yapay zekâ temelli sohbet robotlarının genel olarak gelişimi irdelenerek, hızla dijitalleşen bankacılık alanında kullanımı ele alınmıştır. Bu bağlamda çalışmada yenilikçi tüketicilerin bankaların sohbet robotu uygulamalarına yaklaşımları değerlendirilmiştir. Araştırma, veri toplama yöntemi olarak anket kullanılarak kolayda örnekleme yöntemiyle ulaşılmış 407 kişi üzerinde gerçekleştirilmiştir. Ancak 13 kişi internet ya da mobil bankacılık kullanmadığını belirttiğinden analizler 394 katılımcının cevapları üzerinden gerçekleştirilmiştir. Tüketicilerin yenilikçilik seviyelerinin Chatbot uygulamalarına duydukları güven ile ilişkili olup olmadığını ortaya koymak amacıyla korelasyon analizi gerçekleştirilmiştir. Araştırma sonuçları chatbot uygulamalarına yönelik tüketici güveninin 'yetkinlik boyutu' (r=0.06; p<0,01) ve 'yardım boyutu' (r=0.06; p<0,01)ile tüketici yenilikçiliği ile arasında anlamlı bir ilişki olmadığını; ancak güvenin 'doğruluk boyutu' (r=0.17; p<0,01) ile tüketici yenilikçiliği arasında anlamlı bir ilişki olduğunu ortaya koymuştur.

Anahtar Kelimeler: Yapay zekâ, chatbot, dijitalleşme, yenilikçi tüketici, tüketici deneyimi

Introduction

The world has always been a place of constant transformation, from steam technology to mass production, and automation based on electricity and analog computing to today's digital technologies. Among the characteristic features of the social transformation of the 21st century is the change of lifestyle and of almost all fields of work on the axis of digitalization. With digitalization, the formulation of a continuous communication network between people, the development of new business areas, and the ability to do business on a global scale, have led to the expansion of the borders of people's lives to establish a stronger and closer bond between people and commercial enterprises.

In the process that started with the industrial revolution, as technology began to play a dominant role in people's lives, the focus of people's expectations regarding technology has turned into a more active role for machines in many areas where human labor is needed. With the rapid advancement of technological developments day by day, the innovations that are included in life and all these successive revolutionary milestones have brought about a new digital world order and the transforming digital individual who adapts to this order.

Businesses and brands that benefit from the new opportunities created by digitalization within the economy, science, and social life have discovered new ways to communicate and constantly interact with their existing customers and consumers in general, in line with the various advantages offered by the process. As a result of all these, in the digital age, commercial enterprises and brands have entered into a much closer communication compared to previous periods. Social media platforms, various messaging applications, and similar communication channels that have emerged in parallel with the developments in technology, especially the developments in the field of artificial intelligence (AI), offer new opportunities for businesses to communicate with consumers every day. In today's world, where the effects of the digitalization process are felt more and more in the global economy that features an intense competition, businesses and brands have started to apply more and more artificial intelligence technology. In this way, businesses that compete with each other in order to offer a better experience to their customers and maintain their interaction can direct their workflows more quickly, flexibly, and efficiently with the opportunities offered by artificial intelligence.

One of these opportunities applied by businesses today is chatbots, which have applications in a wide variety of fields from health to e-commerce, finance/banking, and especially in the service sector. Chatbots, which users use to receive services for various purposes such as communicating with a person through digital messaging, can improve the experiences of customers/consumers through the solutions they offer. Especially today, with the effect of technological innovations, the increase in the expectations of consumers from businesses and brands has led to the prominence of such applications based on artificial intelligence and dialogue.

In this context, the expectations of innovative consumers, who are open to innovations and constantly follow innovations, are in constant real-time connection with people and companies through social networks and have a positive attitude towards online purchasing, are important for businesses. When the literature on chatbot applications used in the field of banking is examined, it is seen that there are different studies dealing with consumers' evaluations (Mogaji et al., 2021), consumer satisfaction (Eren, 2021), and consumer confidence (Lappeman et al., 2022) for chatbots.

The importance of this study is to consider consumer trust in artificial intelligence-based chatbot applications, which have emerged due to technological developments

and innovations in the field of banking, in the context of consumer innovation. In accordance with this, the aim of this study is to reveal whether the consumers (bank customers) innovativeness is related to their trust in Chatbot applications. In order to reveal the relationship between consumer innovativeness and consumers' trust to artificial intelligence-based Chatbot applications, a quantitative research method will be used.

An overview of the evolution of chatbot technology

The concept of chatbot was originally used more in a more limited fashion as a computer program that imitated human language with a text-based dialog system. When searching for the origin of the term, it can be seen that the concept emerged from the combination of the words "Chat" and "Robot" (Zumstein & Hundertmark, 2017, p. 98). Chatbots are programs that support interaction between users and machines through natural language processing techniques (Pérez-Soler et al., 2021, p. 94). Chatbots are generally designed to imitate ingenious communication processes that develop on a textual or verbal basis. The main purpose of chatbots that simulate the human communication process is to communicate with users by chatting (Dahiya, 2017, p. 158).

Artificial intelligence-based chatbots, which are used by businesses to guide the decision processes of consumers, offer various conveniences to businesses in reaching their goals and personalizing their communication processes (Lappeman et. al. 2022, p. 3). Chatbots are defined by different names, such as: smart chatbots, interactive agents, digital assistants, or artificial speech entities (Adamopoulou & Moussiades, 2020, p. 373).

Chatbots, a combination of technology, artificial intelligence and business process designs, (Singh, Ramasubramanian & Shivam, 2019, p. 9) enable users to obtain the information they request using natural speech language instead of complex menus and graphical user interfaces (GUIs). When communicating with chatbots, natural language processes help users submit questions as if they were communicating with a real person. (Zumstein & Hundertmark, 2017, p. 98). Chatbots, which can learn continuously, can be developed and adapted to user needs. Because of these features, chatbots are perceived by users as highly personal, intelligent, useful, and responsive and can offer them highly personalized experiences (Joshi, 2021, p. 197). Developments in the field of artificial intelligence also allow chatbots to be constantly renewed.

Artificial intelligence (AI) is the process of developing intelligent computer software and systems to imitate humans by examining how humans think and learn, as well as their mental abilities to solve a problem (Donepudi, 2017, p. 84). There are two main concepts related to artificial intelligence. The former concept is machine learning, which focuses solving real-world problems with neural networks designed by taking some of the basic ideas of artificial intelligence and performing operations by following the entered commands. The other concept is deep learning, which focuses on a subset of machine learning goals and techniques to solve any problem that requires human or artificial thinking by learning (Bilgici Oğuz, 2019, p. 132).

Artificial intelligence, which forms the core brain of chatbots, enables them to communicate more effectively. It also allows them to make decisions during conversations (Singh, Ramasubramanian & Shivam, 2019, p. 9). When searching into the historical development of artificial intelligence-based or dialogue-based chatbots, it can be said that this idea is based on the question "Can machines think?" asked by Alan Turing in his article written in 1950 (Turing, 1950, p. 433). The Turing Test, which was developed based on this question, is essentially based on a tactic game in which an observer tries to guess the gender of two players, one male and the other female, whose voice or appearance is camouflaged. Turing suggested replacing one of the humans with a machine in the pretend game. Thus, if the observer in the game cannot distinguish which of the two players is machine and which is human, this situation can be considered as strong evidence that the machine can think (Standford, 2022).

The purpose of the test, in simple terms, is to reveal whether a machine can imitate human intelligence. Being successful in the test depends on a machine making people believe that it is a human being (Shridhar, 2017). This study, which was effective in transforming the interest in artificial intelligence into scientific research and popularizing the idea of chatbot, was followed by other studies and developments related to the subject.

ELIZA, developed by Joseph Weizenbaum in 1966, is a program that enables natural language conversation with a computer (Weizenbaum, 1966, p. 36). Considered the first chatbot, "ELIZA" was designed as a psychologist whose aim was to create human dialogues. However, the fact that natural language processing and machine learning technologies were not yet sufficiently developed at that time caused the program to respond to its users with a limited capacity only by word matching (Barış, 2020, p. 35).

Despite her limited speaking ability, ELIZA inspired people to start developing other chatbots at a time when people were not used to interacting with computers (Adamopoulou & Moussiades, 2020, p. 374).

Chatbots continue to evolve with their social and technological features. Scientists working in this field have continued their studies and produced more areas of use for chatbots. Under the studies carried out in the field since the late 1990s and early 2000s, there has been an aim to design chatbots that have speaking capacities closer to human beings (Neff & Nagy, 2016, p. 4919).

Based on the work of Alan Turing, the "Turing Test" was developed in the 1990s and has an annual structure that offers up a prize to the winner (Barış, 2020, p. 35). The Loebner Prize competition, which is based on the criteria of the Turing Test, determines the best performing chatbots each year (Shridhar, 2017). There are several chatbots that have been successful in this competition in the 1990s and 2000s.

ALICE is an Artificial Linguistic Internet Computer Entity first implemented by Richard Wallace in 1995 (Shawar & Atwell, 2005, p. 7). ALICE, the chatbot developed in 1995, won the Loebner Award based on Turing Test criteria in 2000, 2001, and 2004. The chatbot in question was the first computer to earn the "Most humane computer" ranking (Adamopoulou & Moussiades, 2020, p. 374). As studies in the field were continuing, chatbots that get closer to human speaking capacity have continued to be developed. These include the chatbots Albert One and Elbot (Neff & Nagy, 2016, p. 4919).

In the Turing Test, some predictions were made about the percentage of success of robots. It was predicted that by the year 2000, machines could convince 30% of the jury members. However, this result took much longer than expected. There are allegations that a chatbot named Eugene Goostman passed the test in 2014, convincing 33% of the relevant judges that he was a human. However, in the past, different competitions were held with similar results. When evaluated in general, it is seen that the results of such activities are a controversial issue for various reasons (Standford, 2022). According to some estimates, chatbots are likely to pass the Turing Test by the end of 2029 (Shridhar, 2017).

These developments in the field of chatbots in the 2000s were followed by virtual personal assistants, such as Apple Siri, Microsoft Cortana, Amazon Alexa, Google Assistant, and IBM Watson (Adamopoulou & Moussiades, 2020, p. 374). Chatbots with

different features, such as Siri and Cortana, can establish close relationships with users with their machine learning technologies. In the future, these technologies are predicted to take the form of virtual agents or physical entities that can establish close relationships with people (Przegalinska et al. 2019, p. 787).

Usage areas of chatbot technology

In our age, with the technological developments in artificial intelligence and machine learning, the interest in chatbots and the use of these tools have intensified. The increase in the use of mobile internet technology and messaging platforms has also been effective in the acceptance of chatbots by users (Barış, 2020, p. 36). Today's technological possibilities allow the exchange of messages between chatbots and customers via mobile phones or the web, enabling the transmission of information in real time (Singh, Ramasubramanian & Shivam, 2019, p. 9).

In recent years, developments related to technological innovations, such as artificial intelligence and natural language processing, have also increased the popularity of chatbots among businesses. Chatbots are an intermediate layer between users and customer service managers that find solutions to problems based on their own intelligence. In this way, it is possible to view chatbots, also known as chat agents, as software programs that help users find appropriate answers to their concerns through a website or app (Joshi, 2021, p. 197).

Chatbots include complex and goal-oriented behavior patterns (Kerly, Hall & Bull, 2006, p. 178). In this context, the use of chatbots in the field of customer service has positive effects in terms of productivity. The economic benefit of chatbots, which enables the employers in the institutions to benefit from the workforce more efficiently, is also significant for the institutions (Cui et al., 2017, p. 97).

Also, with the further development of artificial intelligence and machine learning in the future, users may reach the point where they cannot realize whether they are talking to a chatbot or a real representative (Adamopoulou & Moussiades, 2020, pp. 380-381).

In today's technological world, it is aimed to keep human interference at a minimum level when using technological tools. In this context, chatbots are able to service

multiple users more effectively than humans. In addition to reaching large users, they can also be effective in gathering information from users. Due to all these features, it can be seen that chatbots will provide significant financial savings in the operation of the customer service process (Adamopoulou & Moussiades, 2020, pp. 380-381). Chatbots, which reduce the cost of customer service, create a significant monetary value for companies with these features.

Besides all these financial contributions, these programs also add great value to the customer experience. Today, the customer-oriented approach is seen as a distinguishing feature for businesses. In this context, chatbots that contribute to customer experience are widely used as a useful tool in many sectors by helping to increase brand presence (Singh, Ramasubramanian & Shivam, 2019, pp. 9-10).

On the other hand, the development of chatbots over time and the fact that users share their data voluntarily may cause some concerns for users. While users have a more interactive communication with chatbots, the nature of these programs also require that users share their personal information with the chatbot when seeking suggestions. Companies that use chatbots collect data from their users, who are probably unaware of the situation. In this context, chatbots can also raise privacy concerns that users may have when interacting with digital technologies (Ischen et al., 2020, p. 34). On the other hand, consumers sometimes enter into a negative mood by interacting with chatbots or human-like machine interfaces and stated that they find such artificial intelligence-based service tools frightening and disturbing (Langer & König, 2018, p. 3).

Under current trends in service markets and with increasing competent technology chatbots will be used more. A chatbot has many functions such as collecting data, chatting, providing basic product information, etc. (İşeri, Aydın & Tutuk, 2021, p.359). Chatbots not only play the role of service intermediaries, but also provide companies with new marketing opportunities. For example, user interaction and social media behavior on digital platforms such as Facebook can be tailored to recommend content, products, or services based on user needs (Singh, Ramasubramanian & Shivam, 2019, p. 14).

Chatbots, which serve a number of purposes such as customer service, social/emotional support, information, and entertainment, are seen as an alternative to traditional customer service. For customers, conversations with these chatbots can be more natural and productive than interacting with a mobile app, where they can receive answers to

questions and suggestions on what to buy, as well as place orders directly. Chatbots, which can also serve as virtual assistants, can be preferred over other help tools, such as phone calls or online searches, due to their convenience (Barış, 2020, p. 37).

Today, the ability of experts in the field of marketing to meet the needs of consumers for online products and services through adequate and appropriate mechanisms is also increasing as the result of the ever-developing artificial intelligence technology. In this context, chatbots can be used in marketing strategies implemented through websites, social media, and online platforms as they suggest a way to understand a certain content or reality. Unlike their past practices, chatbots available today are more sociable, friendly, and genuine, and may even have a personality that can efficiently guide a particular buyer through the later stages of transactions, which can help save the buyer's time and cognitive effort (Gonçalves et al., 2022, p. 182). Due to all these features, the chatbot market is growing exponentially across the world, and it is seen that many sectors have started to benefit from chatbots.

In a global context, the market size of chatbots will increase from US $2.9 billion in 2020 to US$10.5 billion by 2026. This sector is expected to grow rapidly in the coming years due to the adoption of solutions provided by chatbots to companies. The most important factor contributing to the growth of the chatbot market is the emergence of technologies such as artificial intelligence and the cloud. In addition, changing customer demands provide businesses a competitive advantage by accelerating the adoption of chatbots (Markets Insider, 2022). It can be said that, behind these developments, innovation demands of both young and innovative consumers is effective on the prominence of the concept of speed in services.

The use of chatbots is expected to become more widespread in the future, as Generation Y and Z are more familiar with the mobile communication process and prefer messaging while communicating (Machkour & Abriane, 2020, p. 500). In this context, businesses have started to use chatbots to bring customer satisfaction and participation to the fore in their business models. Businesses can interact with their customers through chatbots similar to what they experience with real individuals (Chung et al., 2020, p. 588). In particular, businesses that turn to chatbots in order to respond to the expectations of customers who follow innovations more closely and adapt quickly, generally come to the fore with their innovative products.

The basis for success in new products is to identify the potential first buyers to buy the new product in the product market. This is because innovative customers play a very important role in the success of new products. Individuals with an innovative approach decide to adopt innovation independently from other individuals in the social system. People with this innovative attitude are generally described as brave and agile (Bass, 1969, p. 216). Therefore, innovative consumers are not price sensitive, have knowledge of new products, and tend to frequently use new products on the market. Innovative consumers are thought to have a unique consumption style when compared to their non-innovative counterparts (Xie, 2008, p. 235). When generations Y and Z are evaluated in general, it can be said that they follow technological innovations closely, can adapt to these innovations, and display innovative consumer attitudes and behaviors.

Chatbots are used by businesses to improve the quality of customer service. Some of the reasons for the implementation of chatbots in order to increase the efficiency of customer service include: chatbots are easy to access, they can be customized, and they provide a competent customer experience (Rajaobelina et al., 2021, p. 2339). With this interaction and the data they obtain from customers, businesses can improve their ability to understand the purpose of users and save time (Chung et al., 2020, p. 588). Considering all the above information, chatbots which serve various sectors are becoming increasingly widespread and developing alongside artificial intelligence and natural language processing processes. The increasing speed at which life moves which have driven customer expectations to receive faster service has increased the interest in chatbots. In this context, the dominance of an uninterrupted service approach and the rapid return to customers, especially in the banking sector, has increased the use of chatbots in this sector.

In terms of using of chatbots in the financial field, companies aim to increase the interaction between consumers and technology without involving service providers in the communication process (Mogaji & Nguyen, 2021, p. 7). Such a chatbot service exists in the financial sector, which provides personalized, secure, fast, and easy access. Erica, the chatbot used by Bank of America for the first time in May 2017 can be given as an example. (Hwang & Kim, 2021, pp. 2-3).

In the article titled "The 5 Hottest Technologies in Banking for 2022" in Forbes (Shevlin, 2022), it is seen that one out of every four financial institutions plans to invest

in chatbots. Currently, only 18% of banks have invested into the technology. While it took some time to reach this point, the industry is currently realizing that chatbots (or, more broadly, speech-based artificial intelligence) are becoming a competitive necessity. In this context, banks need chatbots not only for general sales and service tools, but also for the execution of critical business processes (such as opening an account). In addition, chatbots are also effective in the processes of obtaining customer data, and it is seen that bank customers rely more on the advice given by artificial intelligence about their bank accounts and financial investments. This is because such applications have no personal interest in in the private information of bank customers, unlike a human could (Lui & Lamb, 2018, p. 271).

Aim And Methodology

Changes in technology have brought innovations in the service sector as well. In particular, banks serve their customers by adapting to new technologies more quickly. Today, banks communicate with their customers through artificial intelligence-based chatbots. The aim of this study is to reveal whether the innovativeness of consumers (bank customers) is related to their trust in Chatboxt applications.

Aim

In this study, which aims to reveal whether the innovativeness level of consumers is related to their trust in chatbot applications, the following hypotheses have been developed in line with the studies (Brill, Munoz & Miller, 2019; Plotkina, Dinsmore & Racat, 2021; Xiao & Benbasat, 2002) on consumer trust and consumer innovativeness towards chatbots.

H1: The consumers' innovativeness level is positively related with the competency dimension of their trust in the Chatbot application.
H2: The consumers' innovativeness level is positively related with the benevolence dimension of their trust in the Chatbot application.
H3: The consumers' innovativeness level is positively related with to the integrity dimension of their trust in the Chatbot application.

In addition, it has been discussed in the literature whether the innovativeness of consumers or consumer approaches to technological developments, internet, and mobile environments differ according to age (Kasilingam, 2020; Kolodinsly, 2004;

Persaud & Azhar, 2012; Lappeman et al., 2022), gender (Kasilingam, 2020; Kim et al.; Persaud & Azhar, 2012), education (Kolodinsly, 2004; Persaud & Azhar, 2012), and income (Kolodinsly, 2004). Since chatbots are a new application that has emerged as a result of technological development and are being used by businesses, the following hypotheses have been developed within the scope of the study regarding regarding whether consumer trust towards chatbots and customer innovativeness level differs according to demographic characteristics.

H4: The competency dimension of consumers' trust in the chatbot application differs according to: (a) gender, (b) age, (c) education, and (d) income.
H5: The benevolence dimension of consumers' trust in the chatbot application differs according to: (a) gender, (b) age, (c) education, and (d) income.
H6: The integrity dimension of consumers' trust in the chatbot application differs according to: (a) gender, (b) age, (c) education, and (d) income.
H7: The consumers' innovativeness level differs according to: (a) gender, (b) age, (c) education, and (d) income.

Participants

The universe of the research consists of customers living in Turkey and receiving service from banks in Turkey. In this direction, the sample of the research consists of people who live in Turkey, use the chatbot applications of banks in the country, and receive service from these banks. The research has thus been built upon the convenience sampling method.

In the present study, a question was included in the survey that helps to filter whether the participants used Internet banking or mobile banking services. If so, they were asked which bank's internet banking or mobile banking service they use most frequently. The answers of the participants who do not use internet banking or mobile banking services were excluded from the scope of the research and were not included in the analysis. The fact that all banks included in the research part of the study have chatbot applications in all their internet and mobile banking applications and these applications provide services including basic banking services such as foreign exchange transactions credit card information, stocks, money transfer etc. For this reason, it is predicted that the participants who use the internet and mobile banking services of these banks know or use chatbot applications.

Considering the sufficient number of samples that should be included in the research, a sample formula was determined to be 384 participants, with a 95% confidence level and a 5% margin of error (Davis, 1997, p. 182). Since there is a possibility for those who fill out the survey to not use internet banking or mobile banking services and for participants to fill out the survey incorrectly or incompletely, there was an aim to reach a minimum of 402 participants, which is five percent more than the optimal sample size. In order to collect data during the research process, a questionnaire was applied to 407 people who were easily reached through online sampling. However, since 13 people stated that they do not use internet banking or mobile banking services, the surveys completed by these participants were not included in the analysis, and the analyzes were carried out by taking into account the answers of 394 participants. Women make up 62% of the participants, while 32% are between the ages of 18-25, 58% are undergraduate/associate degree students, and 40% are people with a monthly income of 9,000 Turkish Lira or more (Table 1).

Table 1: Demographic Data

Demographic Variables		**Frequency**	**Percent**
Gender	Man	149	38
	Woman	245	62
Age	18 – 25	126	32
	26-33	98	25
	34-41	103	26
	42-49	43	11
	50-over	24	6
Education	Primary education	2	1
	High school	19	5
	Undergraduate/Associate Degree	229	58
	Graduate	144	36
Income	Less than 3,000TL	83	21
	3,001-5,999TL	73	18
	6,000-8,999TL	81	21
	9,000TL and above	157	40

Data collection tool

In order to collect data for the research, an online survey was conducted. The questionnaire form consisted of four parts. In the first part of the questionnaire, there are two questions about whether consumers benefit from internet banking or mobile banking services, and if so, which bank they use this service from. In the research conducted on the trust of innovative consumers in chatbot applications, there are various variables that can affect the concept of trust. The fact that the frequency of use is not included in the study can be considered as a limitation of the research.

In the second part of the questionnaire, a scale developed by Xiao & Benbasat (2002) and adapted by Brill, Munoz & Miller (2019) was used to evaluate consumers' trust in the chatbot application. When the literature is examined, it is seen that there are studies that deal with the concept of trust related to the concept of trust in different fields and applications such as trust in e-commerce sites (McKnight, Choudhury & Kacmar, 2002); trust in digital assistants (Brill, Munoz & Miller, 2019); perceived trust in online purchasing decision (Kim, Xu & Gupta; 2012); trust in management (Mayer & Davis, 1999) and effects of trust in virtual communities (Ridings, Grefen & Arinze, 2002). As a result, the scale developed by Xiao & Benbasat (2002) and adapted by Brill, Munoz & Miller (2019) was used since it is one of the scale in recent studies and it is related to digital assistants among the trust related scales. The scale consists of three dimensions: competence, benevolence, and integrity. The scale includes a total of 13 statements arranged on a 5-point Likert scale. There are five statements under the competency dimension in the scale (sample statements: "The chatbot of the bank where I use Internet Banking or mobile banking most frequently has the expertise to understand my needs and preferences."; "The chatbot of the bank where I use Internet Banking or mobile banking most frequently is the one I am interested in and is competent about questions and topics."). While the benevolence in the scale consists of a total of 4 expressions (sample statements: "The chatbot of the bank that I use Internet Banking or mobile banking most frequently helps me to learn more about the subject I am questioning."; "I use Internet Banking or mobile banking the most. My favorite bank's chatbot wants to understand my needs and preferences."); "The integrity dimension includes a total of 4 statements (sample statements: "The chatbot of the bank I use Internet Banking or mobile banking most often gives honest answers."; "The chatbot of the bank I use Internet Banking or mobile banking most frequently gives correct information. I believe."). A high score

from the scale indicates that the participant has made a positive assessment in the relevant dimension, while a low score indicates the opposite.

In the third part of the questionnaire, questions were asked to measure the participants' innovativeness level. In the study, the scale adapted by Plotkina, Dinsmore & Racat (2021) was used by making use of an Agarwal & Prasad (1998) study to evaluate whether the participants were innovative or not. The scale consists of a single dimension. The scale includes a total of five statements arranged on a 5-point Likert scale (5: strongly agree to 1: strongly disagree) (sample statements: "Among my colleagues, I am often the first to discover new information technologies.", "I like to try new information technologies."). Accordingly, the high score obtained from the scale indicates that the person is the unit that is open to innovations, while the low score indicates the opposite situation.

In the fourth section, which is the last part of the questionnaire, questions about the demographic information of the participants, such as age, gender, education, and income, were included.

Process

In the research, factor analysis was performed to determine the structural validity of the scales used to measure the trust of the participants towards the chatbot application and whether they were innovative or not. Cronbach's Alpha analysis was carried out to determine the reliability.

The factor analysis performed for the consumers' trust scale confirms that the scale consists of three dimensions (KMO=0.93 Bartlett's Test $p<0.01$). The Cronbach's Alpha values calculated for the scale (ranging between 0.84 and 0.91) show that the scale has internal consistency ($\alpha>0.60$). In addition to this, as a result of the factor analysis performed for the innovativeness scale, it was confirmed that the scale consisted of one dimension (KMO=0.80 Bartlett's Test $p<0.01$). Since the Cronbach's Alpha value calculated for the scale is 0.79, it shows that the scale has internal consistency.

Since the data set should show a normal distribution in order to perform parametric tests, it was tested whether the data showed a normal distribution. For this normality test, the skewness and kurtosis values were examined. The fact that the skewness-kurtosis value is in the range of +3, -3 indicates that the data is normally distributed

(Kline, 2011, pp. 60-62). In this context, it was determined that the skewness values of the observed variables of the research model tested in the study were between -0.378 and -0.473, and the kurtosis values were between -0.22 and 0.99, which ensures the normality feature of the data. For this reason, the analyzes carried out within the scope of the research were carried out with parametric tests.

A correlation analysis was also carried out in the research to test the hypotheses developed to determine whether the trust of the participants in chatbot applications is related to their innovativeness. In addition, two-category variables were tested with the z-test, which is used to determine the difference between the means of two separate groups, in order to determine whether the trust they have in chatbot applications and the innovativeness of the participants in the research differ according to demographic characteristics. However, since the number of data analyzed was more than 30, the z test was used instead of the t test (Bowen & Starr, 1994, p. 372). A one-way ANOVA analysis was performed for variables with more than two categories. If there was a significant difference in the one-way ANOVA analysis, the Tukey HSD test (Büyüköztürk, 2006, p. 48), one of the post hoc tests, was used to determine between which categories this difference occurred.

Findings

In the research, the answers of the participants who use Internet banking or mobile banking to this question as a result of asking which bank they use Internet banking or mobile banking most frequently (the participants were asked to mark only one bank name) are given below (Table 2).

Table 2: Banks where users perform Internet banking or mobile banking transactions most frequently

Bank Name	Frequency	Bank Name	Frequency
Garanti Bankası	62	İşbankası	82
Halkbank	11	Ziraat Bankası	62
Akbank	27	Denizbank	7
Ing Bank	2	Yapı Kredi	45
QNB Finansbank	37	Fibabank	3
Vakıfbank	32	Diğer	24

According to the data obtained in the research regarding the trust of the participants in the chatbot application (Table 3), the trust of the participants towards the chatbot

application is close to positive in the dimension of competence (Competence dimension O= 3.20); benevolence is also close to positive (help/helpfulness dimension O = 3.22). Therefore, it can be seen that the participants evaluate these applications near the positive indicactor in the dimension of integrity (Integrity dimension O = 3.38).

On the other hand, when the innovativeness of the participants in the research was evaluated, it was determined that the participants in the research were close to positive (O=3.69) in terms of innovativeness. In other words, they were people who were interested in innovations and adopted innovations quickly.

Table 3: Mean and Standard Deviation Values Obtained from Scales and Correlation Analysis Results

	O	SS	(1)	(2)	(3)	(4)
(1) Consumer innovation	3.69	0.71	1			
(2) Competence	3.20	0.82	0.06	1		
(3) Benevolence	3.22	0.80	0.06	0.77**	1	
(4) Integrity	3.38	0.73	0.17**	0.64**	0.62**	1

**p<0.01

A correlation analysis was carried out to examine the relationship between the trust of the participants towards chatbot applications and the innovativeness of the participants. According to the results of the correlation analysis (Table 3), it was seen that there is no relationship between the competency and benevolence dimensions of the scale used to measure the trust of the participants towards the chatbot application and the innovativeness of the consumers (H1 rejected and H2 rejected). In other words, as a result of the evaluations of the participants regarding the chatbot application of the bank where they use internet banking or mobile banking, there is no relationship between the competency dimension of the trust in the chatbot application (whether the chatbot understands the preferences of the person and offers services according to these preferences), such as finding experts and finding competence in the chatbot, and the level of innovativeness of the participant. Similarly, there is no relationship between the benevolence dimension, which includes the evaluations that the chatbot application provides services in accordance with the preferences and interests of the person, and the level of innovativeness of the participant.

On the other hand, the integrity dimension of their trust towards chatbot applications is positively related to consumers being innovative at a low level ($r < 0.40$) (H3 supported).

Accordingly, as the innovativeness level of the participants increases positively, the level of integrity dimension of their trust towards chatbot applications also increases positively. When the participants hear something new about information technology, they are willing to try it, they are the first to discover innovations in information technologies, they like to try innovations in information technologies, and they love mobile technologies In other words, as the level of being innovative increases, the participants use internet banking or mobile banking more. Regarding the bank's evaluations of the chatbot application, it has been said that chatbots provide information and suggestions in an impartial way, give honest answers, give accurate information, and give unbiased information. This is because they are not affiliated with a particular company. These values also increase positively along the level of innovativeness.

It was also analyzed whether the trust of the participants towards chatbot applications and the innovativeness of the participants differed according to gender. Since the gender variable has two categories, the difference between the categories was examined using the z test.

According to the z-test analysis results (Table 4), it was found that the competency dimension, which is one of the dimensions of their trust in chatbot applications, differs significantly according to gender. In contrast, the benevolence and integrity dimensions do not show a significant difference according to gender. Women tended to find the chatbot application more competent when compared to men (H4 a supported; H5 a and H6 a rejected). On the other hand, it is seen that the innovativeness of the participants shows a significant difference according to gender (H7 a supported). It is seen that men were more likely to be more innovative people than women.

Table 4: Gender differences in participants' trust in chatbot applications and being innovative

Demographic Variables		**N**	**O**	**SS**	**Z**	**P**
Competence	Man	149	3.06	0.88	2.70	*0.01
	Woman	245	3.29	0.78		
Benevolence	Man	149	3.13	0.80	1.64	0.10
	Woman	245	3.27	0.80		
Integrity	Man	149	3.32	0.78	1.18	0.24
	Woman	245	3.41	0.70		
Consumer innovation	Man	149	3.81	0.73	2.67-	*0.01
	Woman	245	3.61	0.68		

**P<0.01 *P<0.05

It was also analyzed whether the trust of the participants towards chatbot applications and the innovativeness of the participants differ according to age, education level, and income. Since age, education level, and income variables have more than two categories, the differences between these categories were tested with one-way ANOVA analysis. According to the results of the one-way ANOVA analysis (Table 5) carried out on whether the participants' trust in chatbot applications and whether their innovativeness differ according to age, the benevolence and integrity dimensions of the participants' trust towards chatbot applications were determined by the age variable. In this regard, there was no significant difference (H4 b supported; H5 b and H6 b rejected). On the other hand, it was revealed that the competence dimension of the participants' trust towards chatbot applications and the innovativeness of the participants showed a significant difference according to age (H7 b supported). According to this, people between the ages of 18-25 and 26-33 evaluated the chatbot applications of banks more expertly and competently than people aged 34 and over. The results align with these age groups being more innovative people in general.

Table 5: Differences in the participants' trust in chatbot applications and their innovativeness by age

Demographic Variables-Age		**O**	**SS**	**F**	**P**
Competence	18-25	3.32	0.72	2.89	0.02*
	26-33	3.31	0.87		
	34-41	3.00	0.89		
	42-49	3.15	0.79		
	50-over	3.12	0.77		
Benevolence	18-25	3.32	0.76	2.41	0.05
	26-33	3.27	0.87		
	34-41	3.01	0.83		
	42-49	3.22	0.72		
	50-over	3.23	0.64		
Integrity	18-25	3.49	0.74	2.22	0.07
	26-33	3.41	0.84		
	34-41	3.22	0.70		
	42-49	3.31	0.51		
	50-over	3.45	0.73		
Consumer innovation	18-25	3.74	0.67	3.12	0.02*
	26-33	3.85	0.68		
	34-41	3.55	0.79		
	42-49	3.56	0.63		
	50-over	3.55	0.61		

**P<0.01 *P<0.05

According to the results of the one-way ANOVA analysis (Table 6) conducted on whether participants' trust in chatbot applications and whether participants' innovativeness differ according to their education level, it was determined that all three dimensions, namely competence, benevolence, and integrity, are not significantly different according to education level (H4 c, H5 c and H6 c rejected). Likewise, it was seen that the evaluations of the participants on whether they are innovative or not do not show a significant difference according to the level of education (H7 c rejected).

Table 6: Differences between participants' trust in chatbot applications and being innovative according to education

Demographic Variables-Education		**O**	**SS**	**F**	**P**
Competence	Primary education	2.70	0.42	1.33	0.26
	High school	3.15	0.66		
	Undergraduate/Associate Degree	3.27	0.78		
	Graduate	3.11	0.90		
Benevolence	Primary education	2.12	1.24	2.51	0.06
	High school	3.04	0.71		
	Undergraduate/Associate Degree	3.28	0.78		
	Graduate	3.14	0.84		
Integrity	Primary education	3.75	1.77	0.29	0.83
	High school	3.34	0.68		
	Undergraduate/Associate Degree	3.39	0.71		
	Graduate	3.35	0.75		
Consumer innovation	Primary education	3.74	0.99	2.57	0.05
	High school	3.50	0.57		
	Undergraduate/Associate Degree	3.27	0.68		
	Graduate	3.75	0.75		

**P<0.01 *P<0.05

According to the results of the one-way ANOVA analysis (Table 7) conducted on whether the participants' trust towards Chatbot applications and whether their innovativeness differ according to their income level, it was seen that the three dimensions of competence, benevolence, and integrity, which are among the dimensions of trust of the participants towards chatbot applications, and the evaluations of the participants on whether they are innovative or not, are not

significantly different according to education level (H4 d, H5 d, H6 d, and H7 d rejected) .

Table 7: Differences in participants' trust in chatbot applications and their innovativeness by income level

Demographic Variables-Income Level		**O**	**SS**	**F**	**P**
Competence	less than 3,000TL	3.29	0.73	0.03	0.10
	3,001-5,999TL	3.24	0.71		
	6,000-8,999TL	3.31	0.84		
	9,000TL and above	3.08	0.90		
Benevolence	less than 3,000TL	3.33	0.75	1.42	0.24
	3,001-5,999TL	3.21	0.72		
	6,000-8,999TL	3.29	0.86		
	9,000TL and above	3.12	0.83		
Integrity	less than 3,000TL	3.34	0.80	1.30	0.27
	3,001-5,999TL	3.53	0.62		
	6,000-8,999TL	3.34	0.80		
	9,000TL and above	3.34	0.70		
Consumer innovation	less than 3,000TL	3.63	0.73	0.52	0.67
	3,001-5,999TL	3.68	0.61		
	6,000-8,999TL	3.65	0.77		
	9,000TL and above	3.74	0.71		

**P<0.01 *P<0.05

Discussion and Conclusion

Technological developments have influenced all areas of life of individuals in our age. Innovations in the field of communication have especially increased the impact of technological tools on people's daily routines. Today, when the concept of time and space has changed, people are more open to interaction with technology. With the innovations of the internet, there have been great changes to the routines of both private individuals and producers of digital technologies. It is crucial also for banking services to quickly adapt to technological innovations in the digitalized finance sector. When the developments in the field of artificial intelligence are added to the opportunities provided by technology, the dynamics of social and economic life have also changed. Artificial intelligence has influenced all sectors in the economic field. The banking sector has also been affected by the technological developments of the field of artificial

intelligence. Today, banks that adopt an artificial intelligence-based service approach serve their customers through chatbots. It can be said that banks with an innovative approach that easily adapts to the digital world primarily attract the attention of their customers because they can benefit from such new technologies. The understanding of digital banking and the use of artificial intelligence-based chatbots in banking services have transformed the customer relations process. The use of artificial intelligence in the field of banking provides certain advantages to banks in terms of both collecting data and maintaining a more competent service understanding. In this context it is important for banks to make chatbots part of their data management strategy, not just their sales and service strategy.

Within the scope of the study, the historical development of artificial intelligence-based chatbots was discussed and their use in the banking sector was examined. In the study, the way chatbots are evaluated, especially by consumers who are open to innovations, was examined through a survey.

Based on all these, this study attempted to reveal whether the innovativeness of consumers is related to their trust in chatbot applications. According to the results, it has been seen that there is no relationship between the competency and benevolence dimensions of the participants' trust in the chatbot application and the innovativeness of the consumers. On the other hand, it was seen that the integrity dimension of the trust of the participants towards the chatbot applications is positively related to the innovativeness of the consumers at a low level. Therefore, as the innovativeness of the participant's increases positively, the level of trust towards chatbot applications increases in the correctness/integrity dimension positively. In this situation, as the level of innovativeness of the participants increases (which is related to the fact that they are the first to discover innovations related to information technologies, are willing to try these innovations, and are interested in mobile technologies), their evaluations of the chatbot application of the bank they use the mobile banking services of increase in a positive way. In other words, as the level of innovativeness of the participants increases, their evaluations that the chatbot application of the bank they receive service from also increases positively, meaning that the application is providing information and suggestions in an impartial way, giving honest answers, giving accurate information, and giving unbiased information because it is not affiliated with a particular company.

After the analyses carried out to determine whether the trust of the participants in chatbot applications and the innovativeness of the participants differ according to demographic characteristics, it was seen that men are more open to innovations than women in general. That said, regarding the competence dimension of the confidence in chatbot applications, it was seen that women evaluate the chatbot application as more competent than men. In terms of age, it was seen that people between the ages of 18-25 and 26-33 evaluate the chatbot applications of banks as having more expertise and being more competent in their field compared to people aged 34 and over. In addition, people between the ages of 18-25 and 26-33 are more open to innovation than people aged 34 and over. When evaluated in this context, it can be stated that younger participants are more open to innovation than older participants, and they think that chatbot applications are experts and have the necessary competence to understand their own needs and desires.

When all these results are evaluated in general, and when examining the participants' level of being open to innovation increasing along with the trust relationship towards chatbot applications, it is possible to understand the evaluations of the participants that these applications provide correct, impartial, and honest answers increase in a positive way. However, there is no relationship between the increase in the level of being open to innovation and the evaluations of chatbot applications as being competent and helpful. In addition, it was seen that the age factor is an effective variable in evaluating the consumer perception of chatbots.

In this context, further studies can be carried out on the adaptation processes and how older consumers who are less innovative can adapt to such technologies as chatbot applications of banking services. Understanding the approaches of the consumers in the older group, who have a more limited interaction with technological innovations, towards rapidly changing technological applications can also be examined in the context of countries where the population is getting older.

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