

Impact of AI Chatbots on Customer Engagement: An Investigating in The Role of Customer Trust in Online Services of Telecom Egypt Context

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Abstract

The current research examined the influence of AI chatbots on customer engagement, through customer trust, with the application on online services of Telecom Egypt. The objective of this research is to determine the effect of the relationship between AI chatbots as independent variable and customer trust as mediator variable and customer engagement as a dependent variable.

The results of the statistical analysis showed a set of results, the most important of which is that there is a direct positive effect of AI chatbots on customer trust, and that there is a direct positive effect of customer trust on customer engagement, and AI chatbots has a direct and indirect positive effect on customer engagement and customer trust mediates this relationship in online services of Telecom Egypt.

Keywords: AI chatbots, Customer Trust, Customer Engagement, Digital Customer.

أثر روبوتات الدردشة المدعومة بالذكاء الاصطناعي على ارتباط العملاء: دراسة حول دور ثقة العملاء في الخدمات الالكترونية للشركة المصرية للاتصالات

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مستخلص

تناول هذا البحث دور ثقة العملاء كمتغير وسيط، وروبوتات الدردشة المدعومة بالذكاء الاصطناعي كمتغير مستقل، وأخيرا ارتباط العملاء كمتغير تابع. وذلك بالتطبيق على الشركة المصرية للاتصالات في مصر، وقد تم الاعتماد على جميع العملاء الرقميين سواء ذكر او انثى كوحدة للمعاينة. وهدف البحث الى التعرف على مدى تأثير روبوتات الدردشة المدعومة بالذكاء الاصطناعي على ثقة العملاء، والتعرف على مدى تأثير ثقة العملاء على ارتباط العملاء، والتعرف على مدى تأثير روبوتات الدردشة المدعومة بالذكاء الاصطناعي على ارتباط العملاء وذلك في ضوء ثقة العملاء كمتغير وسيط وأمكن تجميع (٣٢٦) قائمة استقصاء صالحة للتحليل الإحصائي. وأوضحت نتائج التحليل الإحصائي مجموعة من النتائج أهمها، ان هناك تأثير إيجابي مباشر لاستخدام روبوتات الدردشة المدعومة بالذكاء الاصطناعي على ثقة العملاء، وان هناك تأثير إيجابي مباشر لثقة العملاء على ارتباط العملاء، وان هناك تأثير إيجابي مباشر وغير مباشر لروبوتات الدردشة المدعومة بالذكاء الاصطناعي على ارتباط العملاء وان ثقة العملاء تتوسط هذه العلاقة.

الكلمات الدالة: روبوتات الدردشة المدعومة بالذكاء الاصطناعي، ثقة العملاء، ارتباط العملاء، العميل الرقمي.

Introduction

In today's world, when consumers spend increasing amounts of time in digital environments, businesses prioritize always being available online to

stay in touch with their clients (Jenneboer et al., 2022). Customers currently want to spend as little time as possible contacting the company, thus they should be able to do so at any time and from any location, regardless of time, location, or channel (Abdel Wahab, 2023).

To attain this degree of communication, businesses turned to artificial intelligence. Artificial intelligence (AI) has expanded significantly in recent years as digital technologies have advanced. As a result, businesses are increasingly utilizing chatbots to supplement and even replace individuals in service interactions (Xu et al., 2023). Customers' service experiences are shifting from interactions with service staff to those with technology such as (AI) technology is increasingly used on the front lines of organizations (Li & Zhang, 2023). It is anticipated that up to one-third of internet interactions involve a chatbot, with this figure expected to rise (Xu et al., 2023).

An AI chatbot is a software program that acts like a human when communicated with message or voice over the internet to create a scripted conversation, understand human languages, and automatically respond to a conversation (Vanichvasin, 2022). When a client asks a question in an AI chatbot system, an intelligent robot investigates the reply system for relevant material that matches the topic of the customer's inquiry and then responds instantly. Customers can obtain product information via human-computer interaction and then complete the purchase process by themselves (Zhu et al., 2023).

Online communication is vital for enhancing the customer experience. A personalized approach to interactions with digital consumer is critical for the client's pleasure (Jenneboer et al., 2022). today, Consumers expect brands to engage with them and provide them more than just selling them a product (Lim & Rasul, 2022). In this dynamic business environment, customer engagement has been intensively researched in academic literature recently (Chaurasia & Parmar, 2023). Customer engagement (CE) is commonly viewed as a critical goal that marketers must actively pursue if they want to develop long-term customer relationships and connections,

as well as consolidate customer loyalty for their businesses (Lim & Rasul, 2022).

Customer engagement emphasizes interactive customer experiences. These interactive consumer experiences are the result of the rise of a computer-mediated marketing environment as technology advances and the Internet grows at a rapid pace. (Zheng et al; 2022). The key to successful customer engagement is to create meaningful and valued connections that foster strong relationships between the company and its clients and earn their trust. (Chaurasia and Parmar, 2023).

Thus, we may say that trust is one of the most essential elements influencing customer engagement. Trust is vital to creating long-term relationships within any company ecosystem, as "trust improves connections between individuals and companies, decreases uncertainty in negotiations, and enhances cooperation among partners" (Mombeuil & Fotiadis, 2017).

Hence, trust serves as an important link between using AI chatbots and customer engagement with organizations. So, the current research is considered as an attempt to investigate the effect of AI chatbots on customer engagement in the light of trust as a mediator variable on telecom Egypt.

1- Research Problem

Telecom Egypt showed growth in its customer base across all services provided compared to the last year, with the number of fixed-line telephone subscribers and fixed-line Internet customers increased by 9% and 8%, respectively, compared to the same period of the last year, while the number of mobile service subscribers achieved a growth of 4% to reach 13 million subscribers. With the increase in the number of customers at the Egyptian Telecom Company, it found it difficult to cope with the number of inquiries, problems, and services related to providing its services by communicating by phone or going to the company's headquarters, which relies on a safe and effective method for customers to meet their needs for the services provided. Given the company's 5G services, the existence of

intelligent assistants (AI chatbots) has become critical to maintaining the company's customer base.

As consumers are exposed to a growing number of advertising both online and offline, the major problem is directly acquiring customers (Markoski et al., 2018). Customers have a significant role in any business's long-term success. As a result, many marketing and relationship strategies revolve around customers (Fliess et al., 2012).

Customer engagement (CE) has received significant attention in modern marketing literature since it is considered to provide increased sales growth, superior competitive advantage and profitability, consumer value, customer loyalty, and satisfaction (Connell et al., 2019).

To encourage customer engagement, businesses must leverage new technology and social media. In a study on consumer engagement, Lim et al. (2022) emphasized the need of researching digital technologies such as artificial intelligence, virtual reality, augmented reality, and gamification (Bapat et al., 2023).

The COVID-19 crisis has caused significant changes in customer behavior and tastes, as well as an increase in the use of digital services, forcing businesses to shift their offline traditional business models and adapt to new modifications by digitizing their products and services in order to better serve their customers (Hamed, 2021). Artificial intelligence (AI) is considered as one of the most disruptive upcoming technologies, capable of radically altering business-customer relationships in any field (Hongyu et al., 2024).

As a result, adopting chatbots into business may help to establish a positive customer relationship. (Hongyu et al., 2024) By mixing machine learning intelligence and artificial intelligence with the user interaction via messaging platforms, chatbots have the potential to become one of the best ways to gain direct access to consumers in the near future (Markoski et al., 2018).

According to Sathar et al. (2023), customers' adoption of digital services is heavily influenced by their trust. User trust is required for new online technologies to be accepted into the market. Chatbots' humanlike

features, especially their capacity to converse in natural language, may make trust even more essential (Nordheim et al., 2019).

Getting consumers to engage with the business and its online services (AI chatbots) is an ongoing process that begins when the company is founded. When Customer Engagement is done effectively, customers share their experiences, which helps the company build loyalty and value. (Parekh and Jha, 2021) The literature has shown the impact of customer trust on customer engagement in the live streaming field. However, how the changed trust will influence customer future reactions and behaviors remains a "black box" in the live streaming business. (Guo et al., 2021).

Although much research has been conducted on AI technology and its use in marketing, there is a scarcity of research on how to build trust in chatbots to engage customers. This knowledge gap is crucial because telecommunications companies and service providers require proper models of user's trust in order to improve their experience and adapt chatbots to meet the requirements and wishes of users while also engaging them to their companies.

Based on this background, the problem identified in the following questions:

- 1/1 What is the level of the AI chatbots, the customer trust, and the customer engagement in online services that provided by Egypt telecom company?
- 1/2 What is the direct effect of AI chatbots (perceived ease of use-perceived usefulness) on customer trust in online services of telecom Egypt context?
- 1/3 What is the direct effect of customer trust on customer engagement (vigor – absorption – dedication) in online services of telecom Egypt context?
- 1/4 What is the direct effect of AI chatbots (perceived ease of use-perceived usefulness) on customer engagement (vigor – absorption – dedication) in online services of telecom Egypt context?
- 1/5 Does the customer trust have a role that mediates the effect of the AI chatbots (perceived ease of use-perceived usefulness) on customer

engagement (vigor – absorption – dedication) in online services of telecom Egypt context?

2- Research Objectives

The current research seeks to achieve the following objectives:

- 2/1 Measuring and determining the AI chatbots, customer trust, and customer engagement in online services that provided by Egypt telecom company.
- 2/2 Determining the nature of the relationship AI chatbots and customer engagement in online services of telecom Egypt context.
- 2/3 Examining the mediating role of customer trust in the effectual relationship between AI chatbots and customer engagement in online services of telecom Egypt context.
- 2/4 Finding some theoretical and scientific indications that may lead to expanding the research base in the field of customer engagement and help in increasing customer trust in using AI chatbots services that provided by Egypt Telecom company.

3- Research Significance

This research derives its importance from several considerations, some scientific and the other applied, including the following:

- 3/1 In light of the limited studies that dealt with the relationship of AI chatbots and customer trust, and the scarcity of studies that dealt with the relationship of customer trust and customer engagement, and especially not addressed in the environment of Arab and Egyptian organizations (as far as the researcher knows), so this research helps to determine the nature of the influence relationships between these variables.
- 3/2 Previous studies dealt with the variables of this research separately, or studied the relationship between two variables only, and therefore there is no study - within the limits of the researcher's knowledge - that combines AI chatbots, customer trust and customer engagement in the form of an integrated framework that explains the nature of these relationships.

- 3/3** Based on the recommendations of previous studies such as (Guo et al., 2021), the necessity of conducting more research to have a better understanding of the relationship between AI chatbots and customers attitudes and E-commerce as it is considered a “black box” and discovering its positive and negative results and its impact on the organization's success. This study tries to contribute by providing an answer to this, by using customer trust as a mediating variable that explains the relationship between AI chatbots and customer engagement, and these variables have not been tested by previous studies.
- 3/4** The importance of this research also derived from its study of the AI chatbots, as in this century human beings have reached the “second machine age” using robots and (AI) in their daily lives and at work. AI became a crucial element of the customer experience. So, it becomes a must for all organizations, especially our Arab and Egyptian organizations, to use it to survive in the global competition.
- 3/5** This research derives its importance from the fact that it deals with topics that have special attention from the country, as AI today is involved in every aspect of life and business, and this research tries to provide a better understanding of using AI chatbots and how it affects customer attitudes toward organizations and how this in turn affects organization success. So, the results of this research and its recommendations can contribute to shedding light on the positive and negative aspects of using AI chatbots and how to increase customer trust in using these services to motivate customer engagement with the organization.
- 3/6** This research derives its importance from the field of application. The results reached by the research and the recommendations it developed can help those responsible for the management of telecommunications companies in developing marketing plans, designing smart systems, and implementing procedures and policies that ensure the support of artificial intelligence robots in the telecommunications companies in

question, which leads to maximizing the strengths of these companies, developing opportunities, and avoiding potential threats.

3/7 This research is considered a starting point for much other research, as well as a guide for those interested in studying the variables affecting the Egyptian telecommunications sector to encourage them to conduct further research in this regard.

4- Theoretical background of the research and previous studies

4/1 Previous studies that examined AI chatbots and customer trust

Businesses strive to provide a better customer experience in order to maintain strong relationships with customers. Technological advances are critical in assisting businesses to improve their consumer experience (Trivedi, 2019). (AI) technologies have been viewed as game changers in many industries, and the interface between companies and consumers is becoming largely technology-driven than human-driven (Yun & Park, 2022).

AI and automation advances have been rapid, and they are now used in all industries, revolutionizing the way business' function. Although AI and automation have been around for a for a while, they are currently becoming more integrated into our daily lives (Abdel Wahab, 2023). Chatbots can act as a first line of assistance in customer service by providing an easily accessible and low-threshold source of help and information for frequently asked questions and support tasks (Nordheim et al., 2019). If customers have a positive experience using chatbots, they will be satisfied with the companies that provide them. Consumers have the best experience when chatbots provide them with relevant information, system availability, and customized options, and then redirect to deliver appropriate replies to the client (Trivedi, 2019).

Chatbots are one of the most popular types of human-computer interaction (HCI) (Eren, 2021). They vary from other types of AI technology in their ability to sell and submit orders directly to clients without any human interaction; they knowledgeably cooperate with

shoppers and assist them achieve their purchasing goals (Mostafa & Kasamani, 2021).

Chatbots are "an artificial construct designed to converse with human beings using natural language as input and output" (Yun & Park, 2022). It is also called "a computer program, which simulates human language with the aid of a text-based dialogue system" (Xu et al., 2021). So, we can say that a chatbot is a computer software that can interact with humans using synthesized audio or text to simulate human interlocutors for entertainment or information retrieval (Hsu & Lin, 2023).

The first chatbots were created in 1966, but their uses were limited due to hardware constraints and a lack of network connection (Hsu & Lin, 2023). Some AI chatbots have specific abilities that exceed those of human workers, such as information acquisition, memory, and arithmetic (Chen et al., 2023). This ability to understand spoken language and engage in talks enables chatbots to provide assistance to clients and improve customer experiences by decreasing consumer effort and enabling customers to better spend their time (Abdel Wahab, 2023).

Chatbots use complicated algorithms to investigate and understand patterns in user interactions. This enables them to give more accurate and relevant solutions, as well as customized interactions, thus improving consumer satisfaction (Zhou & Chang, 2024). Chatbots have four advantages, according to Winkler and Soellner (2018): they can act as a personal assistant, facilitate real-time conversations, predict client questions, and conduct complex problem analysis.

Furthermore, unlike a human, the AI-enabled chatbot does not experience negative feelings or work tiredness and can always connect with customers in a positive manner. Furthermore, chatbots can easily handle a high number of customer conversations at the same time, increasing customer service efficiency (Cheng et al., 2022).

Although it appears to be a golden era for technology, failures and weaknesses are common (Ranieri et al., 2024). Service failure can have major implications, including dissatisfaction, a negative reputation, and continued usage of chatbot' services (Zhou & Chang, 2024). There is an

ever-present risk of resulting in harm or disappointing clients, and research on both the negative and positive aspects of smart technology is scarce (Ranieri et al., 2024).

There are two types of chatbots: **The first type:** act according to the pre-defined, it is described as rule based. It selects the system response from a list of pre-programmed answers depending on the input text rather than developing fresh text (Vanichvasin, 2022). They are less useful in consumer computing since they demand a certain input and are programmed to produce a certain outcome, leaving little room for varied conversation styles (Markoski et al., 2018). **The other type** is an advanced chatbot, which is built on artificial intelligence, understands conversational terms, and is programmed to actively learn from prior discussions to continuously improve (Markoski et al., 2018). It is known as a machine-learning based chatbot. consequently, it can generate better answers than the first type according to user messages since it acts like a human utilizing machine learning algorithms and deep learning techniques (Vanichvasin, 2022).

Dimensions of AI Chatbots:

- **Perceived ease of use:** • Pillai and Sivathanu (2020) define perceived ease of use as a consumer's belief that using a system is simple and requires minimal effort. Previous research has shown that ease of use has a significant impact on users' perceptions of technological tools and should be taken seriously (Kasilingam & Soundararaj, 2021).
- **Perceived usefulness:** • Pillai and Sivathanu (2020) define perceived usefulness as the degree to which a consumer believes utilizing a system will improve job or task performance. According to Venkatesh and Davis, "perceived ease-of-use plays a critical role and gets more attention, while perceived usefulness is believed to be equally important as ease-of-use and leans toward service-dependent" (Kasilingam & Soundararaj, 2021). However, research reveals that human-chatbot interaction could be unsuccessful, and user approval of chatbots depends on a variety of circumstances. Previous research has examined chatbot use from several angles. These investigations

confirmed the importance of trust and satisfaction in chatbot use (Li et al., 2023).

AI Chatbot and Trust:

To be successful with full automation, companies must first overcome customer distrust of chatbot services. Customer opinion surveys on AI often suggest that chatbots are less understanding, caring, or flexible than human agents, as well as more difficult to interact with. Trust is essential in commercial and social interactions and relationships. It impacts the willingness of customers to engage in market exchanges and rely on providers (Huang et al., 2024).

Trust has consistently been an important topic in consumer-technology interaction, however considering chatbots, few studies explored this component (Silva et al., 2023) Trust is essential for creating long-term relationships in any company ecosystem. According to Esen (2012, p. 47), "trust improves interactions between individuals and organizations, reduces uncertainty in negotiations, and enhances cooperation among partners" (Mombeuil & Fotiadis, 2017).

Definition of customer trust:

The concept of trust means "the extent to which a user is confident in and willingness to act on the basis of the recommendations, actions, and decisions of an artificially intelligent decision support. "According to interpersonal connection theories, trust acts as a social glue in relationships, groups, and societies (Nordheim et al., 2019).

Before adopting and using technology, people must trust it. When people believe technology is trustworthy, they are more likely to accept and use it on a regular basis (Ayanwale & Ndlovu, 2024).

In other words, customer trust is the consumer's perception that the service provider will meet his or her expectations. It is noticed that loyalty, engagement, and satisfaction strengthen the relationship between the consumer and the company (Alam et al., 2021). Trust is a multidimensional construct that includes beliefs and intentions to believe. Trust has a different meaning in online shopping since it involves a relationship between humans and robots or online systems (Miao et al., 2022).

Companies continue to struggle to acquire the trust of their clients in online environments. According to marketing researchers, trust is both rational and experientially important in partnerships (Kundu & Datta, 2015). They demonstrate that consumer trust occurs when customers feel comfortable and safe while engaging with a company or brand, which often shows how trustworthy and responsible the organization is considered to be (Taheri et al., 2024).

Customers' trust in robot technology is limited, which leads to delayed adoption. Trust in a robot adviser, such as AI chatbots, might result from institutional trust, in which there appears to be a sense of security associated with that institution. There are good reasons to trust and use artificial intelligence, such as: no self-interest; humans are selfish; robot-advisors are deemed unbiased and do not judge their consumers; and finally, the efficiency of robo-advice (Sentio, 2023).

In contrast, a lack of trust in an online service provider might operate as a barrier to usage since consumers are hesitant to give the personal and financial information required to complete a purchase if they do not trust the website (Taheri et al., 2024).

4/2 Previous studies that examined customer trust and customer engagement

Trust influences customer attitudes and behaviors such as purchasing behavior, word-of-mouth, and engagement. How trust affects client emotions and behaviors is another "black box" in e-commerce (Guo et al., 2021). Previous research has highlighted the considerable effect of trust on engagement, claiming that trust may be regarded as a driver of customer engagement since it fosters cooperation and interactions (Agyei et al., 2020).

Furthermore, when trust is viewed as a factor in the technology acceptance model, researchers have found that it influences user willingness to engage in online money and sensitive personal information exchanges (Kassim & Abdullah, 2010). Furthermore, (Guo et al, 2021; Thanh & Binh, 2020) claimed that online trust has a significant impact on customer online behavior, such as customer engagement.

Furthermore, (Chaurasia and Parmar, 2023) define customer engagement as the combination of behavioral reactions with an emotional context that includes confidence and commitment, whereas the behavioral context is action. Despite the growing academic interest in customer engagement and the belief that trust plays a significant role in increasing engagement between customers and service providers, not much empirical research has been conducted on the subject so far, especially during the new era of online marketing.

Definition of customer engagement:

Similarly, the concept of customer engagement is emerging as an important research subject, having implications for both practice and theory. Furthermore, the rapid growth of the internet and related technologies that facilitate consumer interaction has resulted in the development of the customer engagement concept (Khan, 2023). Customer engagement advises companies on how to engage with their consumers in a profitable way that serves both the firm's financial and non-financial goals (Rajan et al., 2023).

Customer engagement is acknowledged as an important marketing concept that has the ability to provide several benefits. The idea of engagement has been studied in a range of research fields since it is related to customer behaviors and attitudes beyond purchasing (Park et al., 2023). It is seen as a crucial antecedent to a wide range of desirable customer behavioral results, including loyalty, word of mouth, sales performance, and others (Agrawal & Mittal, 2022).

Customer engagement has been explored and characterized in various ways. There are basically two major research streams. One of these streams mainly focuses on the behavioral manifestations of customer engagement with a focal brand (Winell et al., 2023). Definitions of CE were developed by scholars such as Brodie et al. (2011,2013), Hollebeek (2011a, 2011b), van Doorn et al. (2010), and Vivek et al. (2012), who indicated customer engagement as a behavioral construct, defining it as "the customers' behavioral manifestation toward a company or brand, beyond purchasing, that results from motivational (Lim and Rasul, 2022).

The other main stream focuses on the multidimensionality of customer engagement (Winell et al., 2023). Prior research has shown that CE is complex, encompassing cognitive, emotional, and behavioral investments (Taylor et al., 2023). Other academics, such as Patterson et al. (2006), define consumer engagement as a psychological concept defined by vigor, dedication, absorption, and interaction (Chaurasia & Parmar, 2023).

In this research, we adopt the approach of defining customer engagement as "a psychological state that occurs by virtue of interactive, creative customer experiences with a focal agent or object in focal service relationships" (Lemon, 2016). **According to Cheung et al. (2011), there are three key dimensions to customer engagement:-**

- **Vigor (Physical)** refers to the level of energy and mental resilience and willingness to invest time and effort in one's role as a consumer.
- **Absorption (Cognitive)** refers to being fully concentrated and deeply engrossed in the brand or the company.
- **Dedication (Emotional)** refers to a sense of significance, enthusiasm, inspiration and challenge towards the brand or the company.

Customers today are increasingly communicating with brands and companies online. As a result, organizations and businesses have recognized the need to engage customers online in order to generate favorable behavioral results for them. Virtual technology has made customer engagement more customer centric. Customers interact with AI assistants in ways that differ from other technologies. The literature on customer engagement with AI assistants in online shopping is limited (Shah et al., 2023).

Customer engagement in an online environment may appear as comments, reviews, word-of-mouth, better brand loyalty, stronger relationships, and higher business income (Wang, 2023). Although much of the existing research has investigated the causes and consequences of traditional customer engagement, few studies have focused on customer engagement in a virtual business environment (Chaurasia & Parmar, 2023).

4/3 Previous studies that examined AI chatbots and customer engagement

In an era characterized by rapid advances in conversational technology, online businesses are constantly looking for new methods to communicate with customers. These cutting-edge technologies are changing traditional customer engagement concepts, allowing for more customized, efficient, and seamless interactions (Rohit et al., 2024). Chatbots, which are powered by (AI), have been recognized as a crucial innovation in digital marketing which announces a new era in how brands can engage with consumers (Tsai, 2021). As a result, businesses began to seek insights on AI chatbots and their impact on customer engagement, as well as to use them as a communication channel tool to improve customer engagement (Ojapaska, 2018).

The research describes chatbots as an opportunity for better online engagement if they match a specific set of interaction criteria. Araújo and Casais (2020) suggest that investing in chatbots can help brands differentiate themselves by providing personalized experiences, customized offerings, and increased customer engagement (Rizomyliotis et al., 2022). Surprisingly, little research has identified the importance of AI chatbots for improving customer engagement (Islam et al., 2020).

Researchers suggest that the ease of use of AI chatbots and websites has a significant impact on consumer behavior, such as trust and customer engagement (Islam et al., 2020) also, (Duffett & Maraule, 2024) found that perceived usefulness and ease of use have a positive influence on customer engagement.

4/4 AI chatbots and customer engagement in the light of customer trust:

Based upon the above, the researcher can indicate that when an organization's chatbot agent communicates with its customers in a dialogic manner and customers are satisfied, such positive interaction is supposed to strengthen customer trust, which in turn will motivate customer engagement. In other words, a customer who has developed strong trust in an AI chatbot is more likely to engage with its organization over time.

Researchers tried to understand how different aspects of online channels help to build online trust and ultimately enhance customer

engagement with the firm (Shaheen et al., 2019). However, researchers such as (Shaheen et al., 2019 and Luo et al., 2019 and Guo et al., 2021) asserted that studies about enhancing customer engagement through online trust and AI chatbots are scarce and need more empirical study to improve marketing strategies that can help companies today. Hence, the present study attempts to investigate how AI chatbots affect customer engagement in light of customer trust in online services provided by telecom Egypt.

Inspired by the relationships between research variables, which derived from the theoretical background of the research variables and problem of research, the researcher reached to the following research model (1):

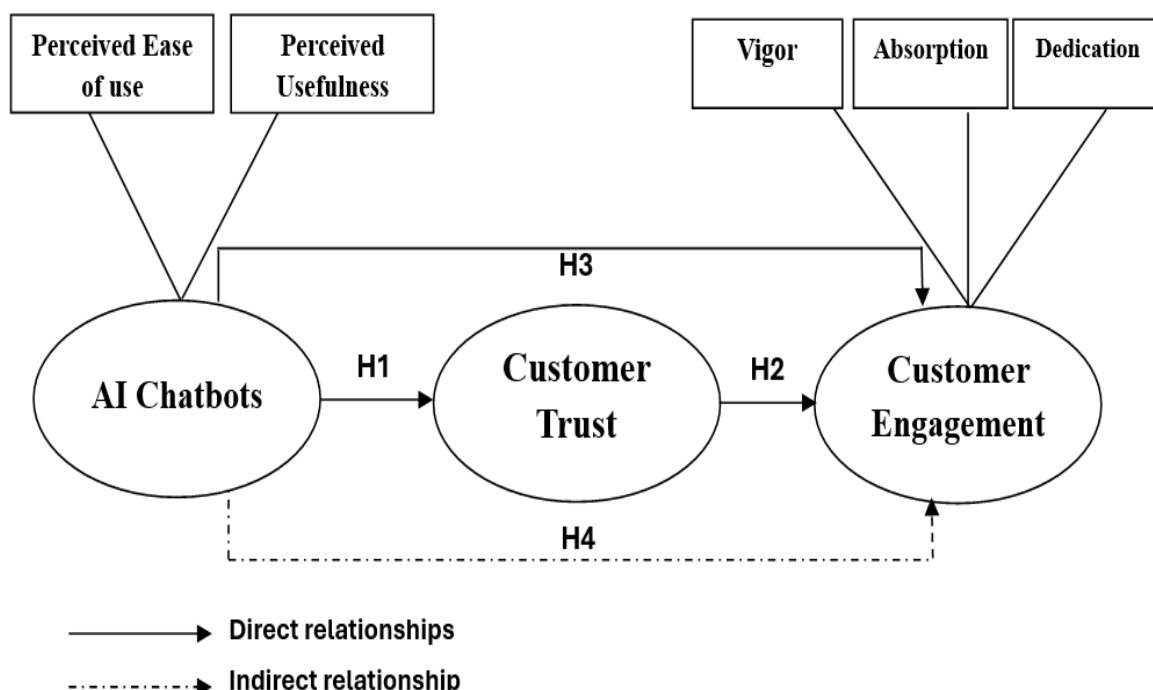


Figure (1): The Research Model

Source: by the researcher based on previous studies.

5- Hypothesis of the Research

This research is based on four basic hypotheses:

- H1:** There is a positive effect relationship with statistical significance between AI chatbots and customer trust in online services of telecom Egypt context.
- H2:** There is a positive effect relationship with statistical significance between customer trust and customer engagement in online services of telecom Egypt context.
- H3:** There is a positive effect relationship with statistical significance between AI chatbots and customer engagement in online services of telecom Egypt context.
- H4:** Customer trust affects as mediator variable in the relationship between AI chatbots and customer engagement in online services of telecom Egypt context

6- Research Methodology and Approach

To achieve the objectives of the research and test its hypotheses, the deductive approach was used in forming the theoretical framework for the research, identifying the variables included in the research model based on previous studies, determining the methods of measuring these variables, and developing the proposed framework for the relationships between them. The researcher also used the inductive method, as they directed a survey list to a sample of the research community. They analyzed the data and, through that, reached the results. The research methodology includes the following:

6/1 Research Population

The research population consists of all digital customers (male/female) of Egyptian Telecom Company in Egypt.

Reasons for choosing the population sector as an applied field of research:

- The telecommunications sector indicators report issued by the Ministry of Communications and Information Technology revealed that the

number of mobile and fixed phone subscriptions rises to 117.68 million subscribers⁽¹⁾.

- Telecom Egypt is considered one of the largest Internet service providers in Egypt. Telecom Egypt showed growth in its customer base across all services provided compared to the previous year, as the number of fixed-line telephone subscribers and fixed Internet customers increased by 9% and 8%, respectively, compared to the same period of the previous year. While the number of mobile service subscribers achieved a growth of 4%, reaching 13 million subscribers.
- Total combined revenues achieved growth of 28% compared to the previous year to reach 56.7 billion pounds, with data services revenues being the largest contributor to this increase, at 18% compared to the previous year, followed by infrastructure revenues, revenues from incoming international calls, and submarine cable projects, at 27%. 76% and 64%, respectively.
- In 2020, Telecom Egypt, in cooperation with Ericsson (Nasdaq: ERIC), succeeded in deploying a set of artificial intelligence (AI) solutions across the company's cloud infrastructure, with the aim of enhancing the operational efficiency of the company's cloud environment and supporting it with smart technologies that help automate and synchronize cloud operations for the network.

6/2 Research Sample

In light of the lack of a framework for the research population, and the inability to form it by the researcher, in light of the phenomenon that the research is concerned with, and in the light of the large size of digital customers, a sample of customers of the Egyptian Telecom Company in the Arab Republic of Egypt was chosen on the basis that it is non-random convenience sampling. By following the next steps:

- The reliable electronic statistical tables were used when determining the sample size, in light of the required degree of confidence being 95%,

(¹) Consolidated Business Results Report for the First Quarter Ended March 31, 2024, Telecom Egypt

which is a common level in administrative sciences research, and the standard error limits ($\pm 5\%$), which are also acceptable error limits in administrative sciences research (Bazrah, 2015). Due to the lack of studies on the percentage of availability of the characteristics required to be studied in society, the researcher assumed the greatest possibility for the percentage of availability of these characteristics to be not less than 50%, and this gives the largest possible sample size, and thus the sample size reached (384) individuals⁽¹⁾. And the percentage of responses was approximately 88%, and the number of valid questionnaires for statistical analysis was (326) after excluding (12) lists that were incomplete or had more than one answer for the same item.¹

- The researcher relied on the Online Survey Internet-Mediated Questionnaires, which were designed in the form of (a link prepared via Google Form) using social media (Facebook, Twitter, WhatsApp, Snapchat, Yahoo, YouTube). The questionnaire was designed in such a way that all questions are mandatory, and the researcher relied on the electronic survey in order to match the conditions for its application to the current research, as (Saunders et al., 2011) emphasized that in order for an electronic survey to be applied, the research population's unit must be able to deal with the Internet, and the questions must be closed and as short as possible, in addition to the large size of the sample and its geographical dispersion.
- The determinants of drawing the sample were represented in an initial question at the beginning of the electronic survey to find out whether the respondent uses the smart assistant service to obtain the services of the Egyptian Telecom Company. Those who have not previously used the smart assistant are excluded from the research sample, to arrive at representative results for the purpose of research and access and achieve the research objectives.

(¹) <http://www.surveysystem.com> has been used to determine the sample size

6/3 Sampling Unit

The sampling unit in this research is the (Digital) customer, whether male or female, who deals with the intelligent assistant and accepts cooperation with the researcher. This category was chosen because they are always constantly informed of the latest AI technologies carried out by organizations, in addition to being the category related to the research objectives.

7- Research Variables and Its Measures

The researcher of this study deployed a survey methodology. The survey contains 3 sections, each section designed to meet the specific objectives of the study. The instrument underwent rigorous modifications to ensure its relevance to the current study context based on previous literature. Where these metrics have been extensively employed and shown effective in earlier research. As a result, their validity and dependability are high. Following that, the measurements were converted from English to Arabic, the native tongue of Egypt, and three specialists in AI marketing went over and made changes to the questions to improve their clarity and fluency. In order to verify that the translations were accurate and sufficiently similar to the originals, they were finally back-translated into English. The purpose of this was to improve content validity to ensure data quality and representativeness. To investigate response bias, the early and late respondents were compared, and no discernible differences were discovered between them.

A five-point Likert scale to measure respondents' levels from "strongly disagree" (1) to "strongly agree" (5), representing the degree of disagreement or agreement.

7/1 The Independent Variable: AI chatbots: (q1-q8), (8) items, it is measured by the scale developed by (Wixom & Todd, 2005: Zarmpon et al., 2012) and used by (Gouveia, 2021: Chen et al., 2022) , divided to: **Perceived ease of use:** (q1-q3): (3) items, **Perceived usefulness:** (q4-q8): (5) items.

7/2 The Mediating Variable: Customer trust: (q9-q14), (6) items, it is measured by the scale developed by (Pelau et al., 2021) and used by (Nguyen et al., 2023).

7/3 The Dependent Variable: Customer engagement: (q15-q26): (12) items, it is measured by the scale developed by (Salanova et al., 2005) and used by (Cheung et al., 2011), divided to: **Vigor:** (q15-q18): (4) items, **Absorption:** (q19-q22): (4) items and **Dedication:** (q23-q26): (4) items.

8- Measurement model, stability, and validity of measurement

The researcher used the Confirmatory Factor Analysis (CFA) to ascertain the stability of the research measurements, using the (AMOS24) program, through convergent validity test, discriminant validity, at the research sample level, confirmatory factor analysis and Herman's single factor test were used as follows:

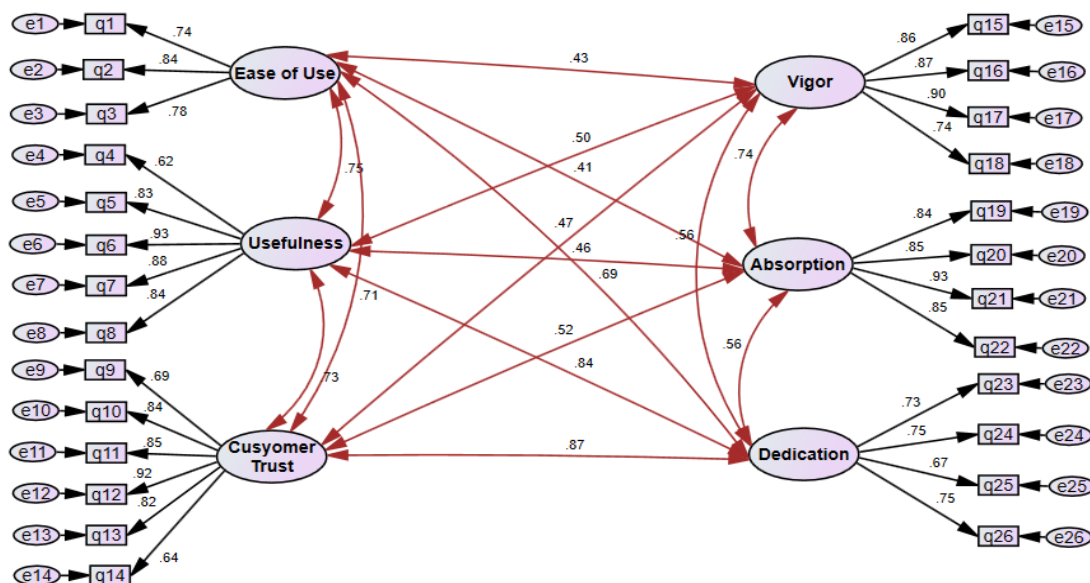


Figure (2): The combined measurement model using CFA of research variables.

Table (1): Estimates of the parameters of the confirmatory factor analysis model, its level of significance

Var.	phrase		Path		CMV	t-test	CR	AVE
			Without CLF	With CLF				
AI Chatbots								
Ease of Use (F1)	→	Q1	0.743	0.582	0.161	13.489	0.818	0.599
	→	Q2	0.836	0.623	0.213	Fixed		
	→	Q3	0.784	0.634	0.15	14.322		
Usefulness (F2)	→	Q4	0.618	0.446	0.172	12.306	0.915	0.687
	→	Q5	0.832	0.68	0.152	Fixed		
	→	Q6	0.93	0.731	0.199	22.335		
	→	Q7	0.88	0.699	0.181	20.476		
	→	Q8	0.844	0.742	0.102	19.085		
Customer Trust (F3)	→	Q9	0.687	0.523	0.164	14.047	0.911	0.634
	→	Q10	0.839	0.673	0.166	Fixed		
	→	Q11	0.847	0.667	0.18	19.212		
	→	Q12	0.924	0.778	0.146	22.192		
	→	Q13	0.822	0.635	0.187	18.292		
	→	Q14	0.638	0.753	0.115	12.436		
Customer Engagement								
Vigor (F4)	→	Q15	0.864	0.725	0.139	20.252	0.841	0.585
	→	Q16	0.868	0.712	0.156	20.420		
	→	Q17	0.902	0.801	0.101	Fixed		
	→	Q18	0.741	0.67	0.071	11.319		
Absorption (F5)	→	Q19	0.842	0.661	0.181	20.143	0.797	0.626
	→	Q20	0.845	0.729	0.116	Fixed		
	→	Q21	0.935	0.827	0.108	23.468		
	→	Q22	0.853	0.739	0.114	19.835		
Dedication (F6)	→	Q23	0.73	0.553	0.177	12.856	0.862	0.597
	→	Q24	0.754	0.622	0.132	13.683		
	→	Q25	0.671	0.477	0.194	11.460		
	→	Q26	0.747	0.796	-0.049	Fixed		
CMIN= 1270.206, DF=286, CMIN/DF= 4.441 , RMSEA= 0.069, RMR= 0.036,								
GFI= 0.952, NFI= 0.912, RFI= 0.895, IFI= 0.947, TLI= 0.935, CFI= 0.949, AGFI= 0.924								

Based on the Confirmatory Factor Analysis, **the construction validity tests** were conducted, which includes two tests, namely:

8/1 Convergence validity: It contributes to ensuring that the results obtained from two or more items (phrase) used to measure the same concept are results with a high correlation. Convergence validity is divided into two types:

- **Item Reliability Measure:** it is calculated by (standard path with CLF) and its level of significance through (T-value), and $T\text{-value} \geq \pm 1.96$ is statistically significant, It is clear from Table (1) that all values of the Factor Loading Standardized with CLF for each phrase is greater than or equal to (0.50) which indicating the internal validation of convergence of the research measurement and indicating that the percentage of variance explained by each phrase is due to the variable it is supposed to load on it (MacKenzie et al., 2011). According to the previous table, the measurement tool does not suffer from the problem of bias or **Common Method Variance (CMV)**, as the difference between the parameters of the standard path estimated without CLF, and those estimated by the CLF method does not exceed its value (0.20), which results in the possibility of making more One of the inferential statistical analysis tools to prove research hypotheses. It is also clear through the use of the (T) test that all coefficients of loading the observed variables on the latent factors are statistically significant at a significant level of ≤ 0.01 , which indicates the importance of the observed variables in measuring the latent variables.
- **Variable Reliability Measure:** Computed by the **Composite Reliability (CR)** (the ability of the phrases to measure the implicit concept of the variable), It is clear from Table (1) that all the composite reliability values for the implicit factors of the research and their measuring indicators ≥ 0.70 which are the minimum acceptable (Hair et al., 2010). The values of the research variables ranged from (0.797 to 0.915), which indicates the strength of consistency between the indicators of each variable. Also, Variable Reliability can be determined through the **Average Variance Extracted (AVE)**, which is an estimate

of the average variance that explained by the unobserved variable in the observed variables (phrases which measure the variable). The minimum accepted value of the average variance extracted is ≥ 0.5 (Urbach and Ahlemann, 2010). The values of AVE (0.50) ranged from (0.585 to 0.687), reflecting a close approximation between the indicators that measure each variable of the research variables. Also supports the validation of convergence, in addition that all composite reliability values are greater than the average of AVE, which confirms the validation of convergence of the dimensions of the measuring instrument.

8/2 Discriminant validity of the research variables: To determine the extent of the ability to distinguish the variable from other variables. The study successfully produced evidence of discriminant validity by checked the **Hetrotrait-Monotrait (HTMT)** values, which, according to the criteria stated by Hair et al. (2014), should be less than 0.90. Table (2) displays the results of HTMT, which all have values below 0.90. That there is discriminant validity is therefore indicated by the findings.

Table 2. Scales' Discriminant Validity Measures (HTMT)						
Var.	Ease of Use	Usefulness	Customer Trust	Vigor	Absorption	Dedication
1. Ease of Use						
2. Usefulness	0.833					
3. Customer Trust	0.756	0.835				
4. Vigor	0.500	0.611	0.608			
5. Absorption	0.533	0.641	0.701	0.873		
6. Dedication	0.895	0.889	0.867	0.653	0.733	

These results indicate that the measures used exhibit high reliability. In summary, the estimated model of measurement is valid and consistent

with sample data and can therefore be relied upon in the process of structural analysis and hypothesis testing.

9- Descriptive statistics of the research variables

SPSS V.25 program was used to determine Mean of the research variables and the Standard Deviation of the estimate, as shown in table(3): -

Table (3): Descriptive statistics of the research variables

Var.	Sample	Mean	ST.d	C.V
Ease Of Use	326	4.4427	.67469	15.18%
Usefulness	326	4.2479	.64614	15.21%
AI Chatbots	326	4.3453	.44163	10.16%
Customer Trust	326	4.2725	.52762	12.34%
Vigor	326	4.0889	.60204	14.72%
Absorption	326	3.9833	.59994	15.06%
Dedication	326	4.3029	.62605	14.54%
Customer Engagement	326	4.1284	.47505	11.50%

Based upon table (3), the general Mean of the sub-dimensions of (AI Chatbots) is (4.4427) for ease of use, and (4.2479) for usefulness. Therefore, the researcher finds that the degree of ease of use in the research population is greater than the presence of usefulness. The general Mean of the sub-dimensions of (customer engagement) is (4.0889) for vigor, (3.9833) for absorption, and (4.3029) for dedication. Therefore, the researcher finds that the degree of dedication in the research population is greater than the presence of other dimensions. Finally, the researcher finds that the degree of AI Chatbots in the research population is greater than the presence of other variables, which indicates the high degree of AI Chatbots in the research population.

10- Bivariate linear correlation coefficients between research variables

The Bivariate linear correlation coefficient is used to measure the degree of correlation between two variables and to determine whether there is a significant relationship between the independent variable and the dependent variable. Table (4) provides Bivariate linear correlation coefficients of each variable with the rest of the search variables.

Table (4): Bivariate linear correlation coefficients of the search variables				
		AI_Chatbots	Customer_Trust	Customer_Engagement
AI_Chatbots	Pearson Correlation	1	.690**	.652**
	Sig. (2-tailed)		.000	.000
	N	326	326	326
Customer_Trust	Pearson Correlation	.690**	1	.751**
	Sig. (2-tailed)	.000		.000
	N	326	326	326
Customer_Engagement	Pearson Correlation	.652**	.751**	1
	Sig. (2-tailed)	.000	.000	
	N	326	326	326
**. Correlation is significant at the 0.01 level (2-tailed).				

The researcher concludes that there is a positive correlation between the external variable related to AI Chatbots with customer trust and customer engagement, in Telecom Egypt, At a significance level (0.01). Therefore, there are positive and significant relationships between the independent variable and the intermediate variables and the dependent variable. This also indicates the validity of the structural consistency of the research variables.

This also indicates the validity of the structural consistency of the research variables. As a result of proving that these correlations correspond to trends of initial hypothesized relationships, it suggests that these relationships can be tested by using the Structural Equation Model.

11- Results of the tests of research hypotheses

To test the direct and indirect effects between the research variables, the researcher relied on structural equation modeling (AMOS). Figure (3) shows path analysis of the structural equations modeling of direct and indirect relations between the research variables of the final structural model of the research.

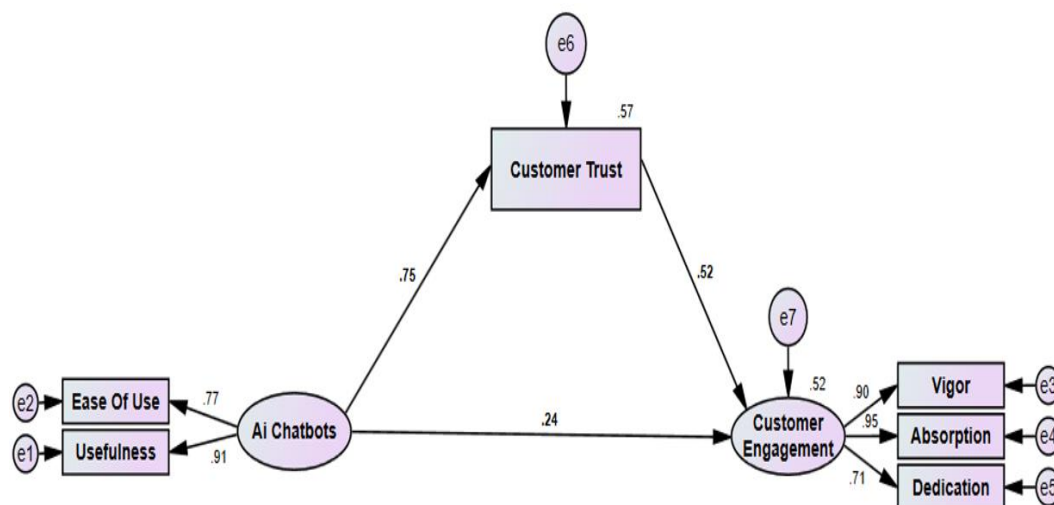


Figure (5): the analysis of the paths of the structural equations modeling of direct and indirect relations between the research variables of the final structural model of the research

In the light of the model quality indicators, the researcher finds that all the indicators are within the acceptable limits, thus the possibility of matching the actual model of the estimated structural model.

The following tables (5), (6), (7), (8), (9) discuss the in-depth analysis of the relationships between the research variables. While the research model showed a high level of goodness of fit using the SEM method, which means concurrent compatibility of direct and indirect paths, an additional test was performed to assess the existence of intermediation relationships between variables, in order to provide better interpretation of the results.

Table (5): Values of significant paths parameters of the research model

			Estimate	S.E.	C.R.	P
AI Chatbots	--->	Customer Trust	.754	.059	14.197	***
AI Chatbots	--->	Customer Engagement	.243	.089	3.160	***
Customer Trust	--->	Customer Engagement	.522	.075	7.240	***
AI Chatbots	--->	Usefulness	.906			
AI Chatbots	--->	Ease Of Use	.773	.054	14.604	***
Customer Engagement	--->	Vigor	.898			
Customer Engagement	--->	Absorption	.949	.040	25.114	***
Customer Engagement	--->	Dedication	.707	.044	15.497	***

Table (6): Standardized Total Effect between variables

	AI Chatbots	Customer Trust	Customer Engagement
Customer Trust	.754	.000	.000
Customer Engagement	.636	.522	.000
Dedication	.450	.369	.707
Absorption	.604	.495	.949
Vigor	.571	.469	.898
Ease Of Use	.773	.000	.000
Usefulness	.906	.000	.000

Table (7): Standardized Direct Effect between variables

	AI Chatbots	Customer Trust	Customer Engagement
Customer Trust	.754	.000	.000
Customer Engagement	.243	.522	.000
Dedication	.000	.000	.707
Absorption	.000	.000	.949
Vigor	.000	.000	.898
Ease Of Use	.773	.000	.000
Usefulness	.906	.000	.000

Table (8): Standardized Indirect Effect between variables

	AI Chatbots	Customer Trust	Customer Engagement
Customer Trust	.000	.000	.000
Customer Engagement	.393	.000	.000
Dedication	.450	.369	.000
Absorption	.604	.495	.000
Vigor	.571	.469	.000
Ease Of Use	.000	.000	.000
Usefulness	.000	.000	.000

Table (9): Standardized Indirect Effects - Two Tailed Significance

	AI Chatbots	Customer Trust	Customer Engagement
Customer Trust	...	...	...
Customer Engagement	.002	...	...
Dedication	.005	.004	...
Absorption	.007	.003	...
Vigor	.007	.002	...
Ease Of Use	...	...	...
Usefulness	...	...	...

In light of the previous results, the researcher can discuss the relationship between the variables of research and analyze research hypotheses as follows:

12/1 The effect of AI chatbots on customer trust:

The first hypothesis deals with this relationship, stating that " There is a positive effect relationship with statistical significance between AI chatbots and customer trust in online services of telecom Egypt context". where AI chatbots directly influences customer trust ($\beta = 0.754$; t-value = 14.197), which means that 75% of the variation in customer trust is due to use of AI chatbots. The results of Table (4) also support Bivariate linear correlation coefficients, as the table shows that the implicit correlation between AI chatbots and customer trust is positive and the correlation coefficient value is ($R = 0.690$), which means that there is positive correlation relation between AI chatbots and customer trust in online services of telecom Egypt context. All these factors are significant at a significant level = 1%, which means acceptance of the first hypothesis of research hypotheses.

12/2 The effect of customer trust on customer engagement:

The second hypothesis deals with this relationship, stating that " There is a positive effect relationship with statistical significance between customer trust and customer engagement in online services of telecom Egypt context". where customer trust directly influences customer engagement ($\beta = 0.522$; t-value = 7.240), which means that 52% of the variation in customer engagement is due to customer trust. The results of table (4) also support Bivariate correlation coefficients, as the table shows that the implicit correlation between customer trust and customer engagement is positive and the correlation coefficient value is ($R = 0.751$),

which means that there is positive correlation relation between customer trust and customer engagement in online services of telecom Egypt context. All these factors are significant at a significant level= 1%, which means acceptance of the second hypothesis of research hypotheses.

11/3 The effect of AI chatbots on customer Engagement:

The third hypothesis deals with this relationship, stating that " There is a positive effect relationship with statistical significance between AI chatbots and customer engagement in online services of telecom Egypt context". Where AI chatbots directly influence customer engagement by a coefficient of value (0.243), and this influence is statistically significant as ($P = 0.000$), which means that 24% of the variation in customer engagement is due to use of AI chatbots only. And as table (5) shows, the value of the path parameter for this relationship is (0.243), the standard error is (0.089), the value of (T) is ($C.R=3.160$), and the significance level is (0.000). The results of Table (4) also support correlation coefficients, as the table shows that the implicit correlation between AI chatbots and customer engagement is positive and the correlation coefficient value is ($R = 0.652$), which means that there is positive correlation relation between AI chatbots and customer engagement. which means acceptance of the third hypothesis of research hypotheses.

11/4 The effect of customer trust as a mediate variable in the relationship between chatbots and customer engagement:

The fourth hypothesis addresses this relationship, stating that " Customer trust affects as mediator variable in the relationship between AI chatbots and customer engagement in online services of telecom Egypt context". The results of the field study supported the validity of the fourth hypothesis, which refers to the intermediate role of customer trust in the relationship between AI chatbots and customer engagement. Table (8) shows the indirect standard effects between the variables of the final model of the research. The table shows that there is an indirect significant relationship between AI chatbots and customer engagement through customer trust, the value of the path parameter for this relationship is

(0.393), which means that 39% of the variation in customer engagement is due to AI chatbots through intermediate variable (customer trust). Table (9) shows the significance of the indirect relation, The standardized indirect (mediated) effect of AI chatbots and customer engagement is significantly different from zero at the 0.01 level ($p=.002$ two-tailed). This is a bootstrap approximation obtained by constructing two-sided percentile- based confidence intervals.

12- Results of the field study

The main objective of this research is to investigate the role of customer trust in online services of Telecom Egypt context in the relationship between AI chatbot and customer engagement. Despite the focus of most of the previous studies on contextual factors that enhance customer engagement in the field of marketing, but the research interest was limited with regard to independent variables that could positively affect customer engagement through tools of AI, besides examining the essential role of customer trust in this relationship.

This research relied on the original technology acceptance model (TAM), that is a less explanatory model that considers only perceived usefulness and ease of use as drivers of attitude and adoption of technology (Silva et al., 2023). Based on this model, theoretical controversy, and previous studies, we derived several hypotheses for the relationships between the research variables, as following:

- The AI Chatbots in Online Services of Telecom Egypt from both dimensions (Perceived ease of use and Perceived usefulness) may result on the possibility of increasing the level of customer trust which may result on the possibility of increasing in the level of Customer Engagement in its three dimensions (vigor, Absorption, Dedication).
- Customer trust may mediate the positive effect in the relationship between AI Chatbots from both dimensions (Perceived ease of use and Perceived usefulness) and the level of customer engagement from its three dimensions (vigor, Absorption, Dedication)

The descriptive results show that the most important aspect of AI chatbots is "ease of use". Ease of use has a greater incidence in the research population than other dimensions, with a mean value of (4.4427). This suggests that ease of use has a significant impact on users' perceptions of technological devices and should be taken seriously as an indicator of technology acceptance (Kasilingam & Soundararaj, 2021). In other words, online service customers are more likely to accept and use AI chatbot technology if they believe it would need minimal mental work. While the variable (AI chatbot) was one of the highest variables present in the research population, with a mean value of (4.3453), this means that online service customers realize the importance of AI chatbot technology and accept to use it. Furthermore, the descriptive results show that the most important aspect of customer engagement is "dedication". dedication has a greater incidence in the research population than other dimensions, with a mean value of (4.3029). This suggests that the most important dimension that companies should take care of is the dedication dimension in the relationship with online customers.

This research tested (4) hypotheses for the relationship between three variables included in the research model: AI Chatbot, Customer Engagement and Customer Trust. And reached to fully support the validity of 4 hypotheses.

Where the results of the field study supported the first hypothesis, which indicates that there is a direct positive effect of AI chatbots on customer trust, and the field study also supported the validity of the second hypothesis, which indicates that there is a direct positive effect of customer trust on customer engagement, also the field study supported the direct and indirect relationship between AI chatbots and customer engagement.

The main contribution of this research is to verify the role of customer trust as a mediator variable that increase the positive impact of AI chatbots with its dimensions (ease of use and usefulness) on customer engagement with its dimensions (vigor, dedication and absorption). As the statistical results shows that AI chatbots directly influence customer engagement by a coefficient of value (0.243), and this influence is statistically significant as

($P= 0.000$), 24% of the variation in customer engagement is due to use of AI chatbots only. While there is an indirect significant relationship between AI chatbots and customer engagement through customer trust, the value of the path parameter for this relationship is (0.393), which means that 39% of the variation in customer engagement is due to AI chatbots through intermediate variable (customer trust). This means that to engage customers with companies that provide online services by using AI technology, companies must first gain their trust in these technologies to enable them to accept and use the technology to access online services. These results are consistent with the previous studies such as (Nordheim et al., 2019; Shaheen et al., 2019; Guo et al., 2021; Cheng et al., 2022) provided that Research on users' trust in chatbots is scarce and need more in depth study.

13- Research Recommendations and Future Research

The researcher presented a set of recommendations related to the results that were achieved and were in line with the research objectives and the application of the proposed framework, as well as proposing a set of future study fields, as follows:

13/1 Research Recommendations:

Based on the previous findings of the research, the researcher suggests a set of recommendations, as follows:

Companies using AI chatbots should pay more attention to the following:

- The development of effective customer support chatbots relies on adopting best practices from both technical and user experience perspectives.
- Providing guidelines emphasizes the importance of designing intuitive conversational flows, integrating human agents seamlessly, and enabling continuous learning to improve the chatbot's performance over time.

- Paying attention to the importance of the perceived ease of use of AI chatbots and attempting to increase its level through simplifying the design, making it available to use 24 hours, making it available to use for all customers, and enabling it to do effective tasks.

To increase customer trust on AI chatbots services, companies should take care of:

- Service quality, service quality matters. When the service is reliable, responsive, and efficient, trust in AI chatbots and human advisor service is positively impacted.
- Information security, focusing on securing customer information, especially financial information, as it is the main fear that faces customers in online shopping.

To increase customer engagement on AI chatbots services, companies should take care of:

- enhance customer engagement in AI chatbots and online service, by focusing on being perceived as trustworthy. So, any effort to build trust will directly pay off in higher customer engagement.
- Keep in touch, which means keep communication with customers on both ways by AI chatbots and human agents to recognize problems faster.
- Personalize communication by personalizing the website content, offers, and recommendations based on customer behaviors and preferences.

13/2 Future Research

In light of the current research results, limitations, difficulties, and studies related to the subject of the research, the researcher recommends undertaking several future research relevant, which would like to be carried out by the researcher in a future study, or by other researchers, to serve as a complementary to this research, namely:

- AI chatbots in a new field that need more and more experimental studies that discuss AI chatbots from different aspects and using different dimensions other than the dimensions that were used in this research.
- Trust in AI chatbots is considered a black box for researchers, and research on it is scarce, so it needs more experimental studies using different variables with it and different sectors.
- The research dealt with customer trust as a single structure and did not specify any dimensions of it that were more influential, so the researcher suggests conducting research concerned with the mediating role of the different dimensions of the customer trust in the relationship between AI chatbots and customer engagement.
- Applying the proposed model to different cultural variables to explore how cultural differences influence trust in AI chatbots and what this means for global companies seeking to engage diverse customer bases.
- Applying the proposed model to different demographical variables to explore how demographical groups perceive and interact with AI chatbots and how these interactions influence trust and engagement.
- Conduct a comparative study between voice- and text-based AI chatbots and compare the customer trust and customer engagement levels associated with voice-based AI assistance versus text-based assistance.

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