

The Impact of Chatbots on Customer Satisfaction: A Systematic Literature Review

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Abstract – The main objective of this article is to distinguish the impact of chatbots technology on customer needs. A systematic literature review was conducted to determine aspects such as: Studies exist of chatbots, type of chatbots, benefits and countries that used this technology. For this, 34 articles were carried out and analysing the documentation. Among the results obtained are the following that chatbots are applied in Information and Communication Technologies, the most use chatbots are textual, as the benefits are that it solves queries or doubts, and the country that is most used is the United States.

Keywords – Chatbots technology, systematic review, loyalty, satisfaction.

1. Introduction

Worldwide there are several studies on the improvements of a company to satisfy its customers [54], [55]. According to Gartner, 81% of marketing professionals point to customer satisfaction as an important area in the competitiveness of their sector [56]. A study conducted by PwC shows that 59% of costumers have been dissatisfied with the service received in companies, of which 17% have not returned to purchase a service or product after a bad experience [57].

DOI: 10.18421/TEM123-21

<https://doi.org/10.18421/TEM123-21>

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Received: 28 January 2023.

Revised: 08 June 2023.

Accepted: 19 July 2023.

Published: 28 August 2023.

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As technology has advanced, customer demands and needs have evolved, making it important for companies to study these changes, nowadays, thanks to technology, companies can maintain online contact with their customers around the clock [1]. It should be noted that customer satisfaction is essential for all companies, regardless of the category they are, this is because it is the basis for customers to be loyal and obtain greater profitability within the business [2].

Today, consumers spend more and more time in the digital environment, so they have the opportunity to choose between many companies offering the same service or product and increasing offers, where competition continues to challenge companies to attract and retain customers to improve their experience and meet their needs [58], [59]. Looking for ways to improve their processes to get the best care, is that some companies implement new methods, systems and tools to optimize their results, therefore, since online communication is an important factor, it is essential to prioritize consumer attention in a digital environment [3].

In this context, there are several technological solutions that help solve the aforementioned problem, and one of them is through the use of chatbots, a computer program that allows humans to interact with technology using various input methods through a conversational interface (voice, text, gestures, etc.) [4], thus offering a better experience to users, where [5], [6], they point out that chatbots are easy to use and are incorporated into any sector, be it business, entertainment, academic, etc.

Thus, when customer satisfaction is related to the use of the “Chatbot”, it has positive points of view, being present 2 hours a day, every day, as well as the comfort that people feel when using it [7], [8], and reducing costs for brands [9].

There are works on the use of chatbots to improve customer satisfaction, fulfilling the necessary functions regarding the attention provided to the consumer of the company, and where the personality of the communication agent and its efficiency influence the majority [10].

In addition, when using mobile devices in contact with the chatbot, it does so in a faster way, such as when responding to a consumer complaint in real time [11], [12]. So, by providing data effectively, it overcomes the slowness of searches that people would do manually [13],[14].

Based on this, in relation to chatbots, it indicates that in the coming years it will experience growth or prosperity, as the same uses prefer to search for information, have access to personalized content and services; and can be merged with their social networks to provide a better automated service [15], [16].

The purpose of this study is to conduct a systematic review about the use and benefits of chatbots technology, and its impact on customer needs. It answers the following research question: “How do chatbots contribute to customer satisfaction?”

The study is based on a very important factor for any company, which is the experience and customer satisfaction, since this is the critical factor for a company to increase its competence regarding the area in which its sales specialize. Therefore, they will have as a priority to be online anywhere and at any time to keep in touch with their customers and at the same time be able to provide quality and experience in the service provided; where the advancement of technology favors in many aspects, but at the same

time generates competition between companies, which must optimize the customer experience [17], [18].

Based on what has been said above, the research questions that are to be answered are the following:

RQ1.: What proposed studies exist on chatbot in customer satisfaction?

RQ2.: What type of chatbot is used to improve customer satisfaction?

RQ3.: What benefits does the use of the chatbot have on customer satisfaction?

RQ4.: In which countries are chatbots used the most for customer satisfaction?

This article is organized as follows: Section 2 will present the methodology of the systematic literature review. Section 3 shows the results and section 4 will present the respective analysis of the results according to the questions asked. Finally, section 5 presents the conclusions that have been raised in this review.

2. Materials and Methods

The methodology used for the development of this article was the systematic review following the regulations proposed by B. Kitchenham [20]. The elaboration of the methodology is carried out in 3 phases: planning, search and documentation.

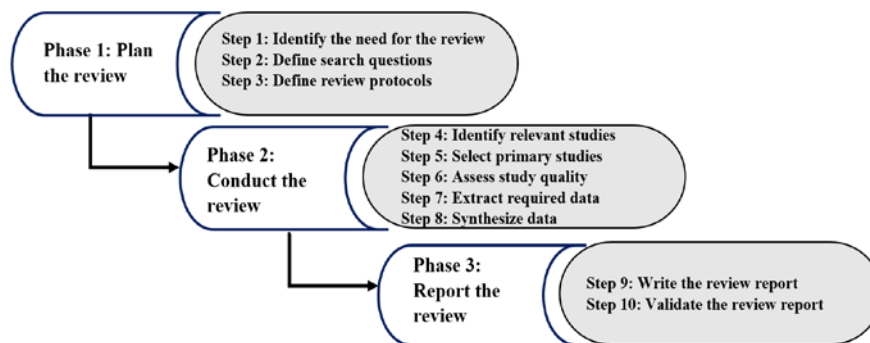


Figure 1. Stages of the methodology applied to the systematic review adapted from B. Kitchenham

The planning phase is done to clearly understand the scope of the project, it is necessary to obtain the best evidence from the existing literature on the impact of chatbots on customer satisfaction. Therefore, the systematic review planning process provides us with the best techniques for collecting and analyzing primary studies [19].

For a systematic review, research questions play an important role in deciding strategies for searching, extracting and analyzing data. The research questions identified for the present study, along with their respective motivations or objectives, are as follows:

Table 1. Research and Motivation Questions

Research questions	Motivation
Q1: What proposed chatbot studies exist on customer satisfaction?	Identify the areas that will benefit from the use of the chatbot
Q2: What type of chatbot is used to improve customer satisfaction?	Mention the types or agents chatbot conversations for customer satisfaction.
Q3: What benefits does chatbot use have on customer satisfaction?	Identify the main benefits of chatbot in customer satisfaction.
Q4: In which countries are chatbots used the most of customer satisfaction?	Identify the countries where chatbots are most used for customer satisfaction.

For the selection of studies, the following inclusion and exclusion criteria were considered, which were determined according to the question and topic of the review:

Table 2. Criteria for inclusion and exclusion of research

Inclusion criteria	Exclusion criteria
(a) Works published after 2015. (b) Search for information in academic databases such as: Ebsco, ACM, Science Direct, Scopus. (c) Publication of articles where they work on the impact of the Chatbot on customer satisfaction. (d) Projects that implement the chatbot for the customer service area.	(a) References prior to 2015. (b) Articles that do not come from reliable academic sources. (c) Articles that are not related to the topic. (d) Articles that are written in languages other than Spanish or English (e) Articles where the abstract is not very relevant. (f) Thesis, newsletters and books were excluded.

Search for reviews, the search process began on May 21, 2022, with the first searches combing “chatbot”, “productivity”, “technology”, “customer satisfaction” in the databases mentioned above in the inclusion criteria: ScienceDirect, ACM, Scopus and Ebsco.

Subsequently, the search was expanded using the Boolean operators AND and OR, incorporating the terms “chatbot”, “productivity”, “customer satisfaction”, “countries”, “companies”, “benefits” and “techniques”.

That is why we determined the following combinations of words that give better results in the search for studies in the databases, which are the following:

Table 3. Search String

Questions	Search String
Q1	((CHATBOT AND EMPLOYEE) AND PRODUCTIVITY)
Q2	((((CHATBOT AND TECHNIQUES) AND COMPANIES) AND CUSTOMER SATISFACTION)
Q3	((CHATBOT AND COUNTRIES) AND CUSTOMER SATISFACTION)
Q4	((CHATBOT AND COUNTRIES) AND CUSTOMER SATISFACTION)

These searches showed a lot of good results, some iterative or with poor information; but mostly very useful.

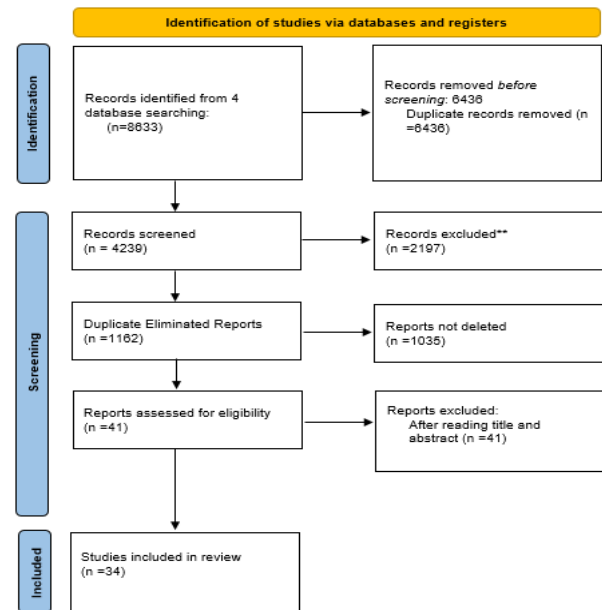


Figure 2. Articles search process

Of the 8633 articles found, the inclusion and exclusion criteria were applied, obtaining a total of 34 studies found.

3. Results and Discussion

The present systematic review includes two types of analysis: (a) a description of the publications selected for review and (b) the thematic analysis of the publications according to the research questions and based on the studies found.

3.1. Descriptive analysis – Organization of studies

As can be seen in Figure 3, there is an increase in interest in the years 2019-2020 of publications about the study of chatbots in customer satisfaction (58.8%), evidencing that in that range of years there is a greater number of researchers who deal with this topic.

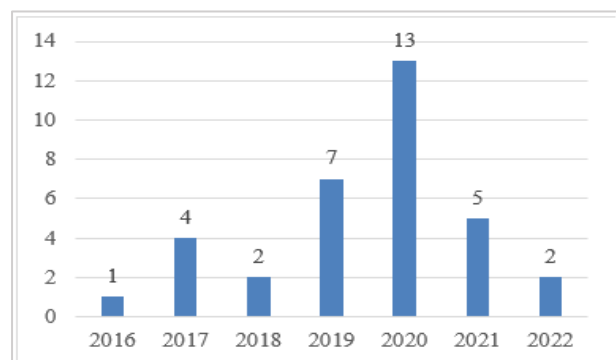


Figure 3. Number of articles per year of publication

3.2. Thematic analysis: Narrative description

The 34 studies found show a wide variety of content referenced to the impact of chatbots on the environment to customer satisfaction.

Table 4. Results found

Author-Year	Reference	Description
Kostelnik, et al (2019)	[20]	They mention that chatbots will become an important technology for interacting with users. At the same time, the WYSIWYG platform is one of the best known and easy to use and facilitates the creation of a simple chatbots. Multipurpose platforms are free, however they are not characterized by being cheap, concluding that when evaluating the proposed technique, every entity has the possibility of establishing the wights bases on the requirements, as well as selecting the chatbot platform that can best adapt to users.
Gumus & Cark (2021)	[21]	They point out the companies incorporate technological advances into customer service. Chatbots are developments that are gaining popularity due to their experience and positive comments from customers who now use them to consult bank accounts, make transactions, report and search for information, which conclude that the use of chatbots have a good reception from customers, since their experience was positive, that is, they enjoyed it, however they did not intend to use it again.
Akhtar, Neidhard & Werthnet (2019)	[22]	This article analyzes the chat conversations between customers and the chatbot of a telecommunications company to see if there interactions can be used to identify topics of interest and user satisfaction, obtaining as result that there are nodes of short answers and links to pages that must be improved, with respect to the following concepts: Offer of basic and additional service packages, notice time and online invoices, which should be more detailed, reconsidering and adjusting them to perfect the response options.
Xu, et al. (2017)	[23]	The study provides information on how users are switching to social networks, to solve the problem in order to have automatic responses based on the requests of consumers who use social media, where the results show that about 40% of requests are based on emotions, so the platform is not considered good for the human part of being empathetic in helping consumers in different contexts, as well as the proposed system surpassed the traditional one, this due to the indicators studied.
Sangroya, Saini & Anantaram (2017)	[24]	It presents a new framework in which a chatbots can act as a mediator of technology and consumers, concluding that the technology presented as a finite state machine, quickly adapt to the needs of the user, which has long-term advantage, such as collaborating on important decisions.
Folstad & Skjuve (2019)	[25]	Explains the consumer experience and user motivation, in the study, users of two types of chat software were interviewed, evidencing the need for software to offer services effectively, where the results show that the absence of corresponding answers does not produce a negative experience, as long as the chatbots provide an easy alternative to continue offering quality service in the handling of questions efficiently and necessary.
Carisi, Albarelli & Luccio (2019)	[26]	The studio designs and implements a customer service chatbots based on the use of computer systems for an aerodrome in Venice. It gives us a representation of the structure of the platform, as a model of the airport chatbot, concluding that the proposed technology offers a simple and effective help for consumers, by allowing five languages, which is evidenced in the potential to root the barriers through automatic translation, which differs from a traditional service that does not offer advantages such as an online one.
Wang, Kale & O'Neill (2020)	[27]	A growing analysis of how chat helps to serve the user of the Global South contributes, making it easier and more effective for the nurse to attend outside the health center, which concludes that the technology analyzed (WeChat) has advantages, among them it helps the chat load of health specialists, Achieving support among them, also influences the quality of practicing in caring for patients, which its technological design contributes to the variety of means of medicine, such as treating diseases.
Liu, et al (2020)	[28]	It analyzes how chatbots have been used throughout history and how they can gradually aggregate information through multiple expressions and generate smarter responses at the right time, which according to the results found concludes that the Jing Dong Dialogue and DiDi Dialogue prove to be better than the existing ones. However, through another technology, the productivity of the algorithm can be perfected.

Lubbe & Ngoma (2021)	[29]	The research gives us information about the useful experiences that chatbots provide us in customer experiences and how those experiences affect user satisfaction in a market context, obtaining as results that the experience predicted consumer satisfaction, concluding that marketers should invest costs, infrastructure and time to the development of service technology, there being the chatbots, the same ones that are helpful to create techniques that elevate the experience of the person.
Han, et al. (2021)	[30]	They addressed a computational framework to evaluate maintenance chatbots and at the same time presented iChatProfle, a tool for designers to qualify and improve the maintenance of recurring chatbots, so it is concluded based on the results that the tool presented drove the production of interview chatbots, improving the dimensions, encompassing these: consumer participation, consumer experience and quality of response options.
Haugeland, et al. (2022)	[31]	To explore users' perceptions of interaction designs, an experiment was conducted with 35 participants to investigate characters that strengthen the image of a human character versus interaction design, concluding that the use of chatbots helps to have an interaction of topics, inducing reflection and engagement on the part of the consumer, strengthening perspectives similar to the person and quality of technology.
Nuruzzaman & Khadeer (2020)	[32]	They analyze the working styles of existing chatbots and then propose a dialogue-based chatbot, using various techniques that generate a response with IntelliBot concluding that this evidence is superior by providing the consumer with a complete and dedicated response to dialogue.
Przegalinska, et al. (2019)	[33]	They propose a methodology linked to methods based on science and machine learning; using a system called Condor Tribefinder, concluding that chatbots follow more general human patterns, as well as a common language, as well as no pointing out political beliefs, which people take as a kind of trivial and somewhat nerdy technology.
Ashfaq, et al. (2020)	[34]	They propose an analytical framework that combines the model of confirmation of expectations, the model of success of the information system, total market, being important to interact with employees, concluding that the NFI-SE has an effect on the satisfaction of chatbot consumers, inducing a high IQ, in the same way the quality of data and service contribute to chatbots having and indispensable role in improving the degree of consumer satisfaction.
Rese, Ganster & Baier (2020)	[35]	The study shows that chatbots are an advantage for both business and consumers. Despite rapid advances in AI, interaction with chatbots are text-based that has limits and are effective, concluding that elements such as "authentic communication" and "perceived utility" are influential in the acceptance of "Emma", but privacy is concerning due to the presence of technological immaturity, having negative effects on how often and the intention it is used.
Misichia, Poecze & Strauss (2022)	[36]	They mention an overview of the features and functions of chatbots of customer service; And they also make an additional contribution by introducing 2 categories of chatbot goals: "Improvement of service performance" and "Meeting customer expectations", obtaining as a conclusion that chatbots have such characteristics as: reliability of personality, is empathetic and openly interacting raises quality, so perceived entertainment affects the attitude of customers in a positive way, and encourages tools productivity.
Smutny & Schreiberova (2020)	[37]	They conducted an evaluation of chatbots in the education sector for social networks which resulted in establishing 89 chatbots categorized by language, theme and platform of the developer, which use the system based on the process of analytical hierarchy of the characteristics of human part, quality of learning and be accessible, concluding that the education chatbot in social networks is variable based on the degree of sending personalized messages and are recommended regarding the that is published, answering common questions from students, configuring it t7o the objectives of teaching and controlling what has been learned.

Huang & Chueh (2021)	[38]	They develop a prototype of chatbot for veterinary consultations using artificial intelligence and big data technologies, concluding that chatbots are of help to veterinary specialists, by having consultations about pet pathologies, reducing labor costs and time invested in transporting their animals to health centers.
Selamat & Windasari (2021)	[39]	They show four chatbot functions that are considered indispensable in SMEs: reception chatbots; step from simple actions to know the activities of consumers; Interactions between people and personalization of recommendations, which is concluded according to the results that the prototype of chatbot presented is perceived more enjoyment and utility, unlike the traditional one, influencing the purchase intention of consumers, with important functionalities in companies.
Chung, et al. (2018)	[40]	It analyses the way that fashion minority franchises adapt to the needs of offering a personalization of service through electronic commercial activities such as chatbots, concluding that these are a tool that has advantages over assisting online services, helping to design positive relationships with consumers, Even if agents do not communicate fully with people which is what they expected during their experience with this technology.
Pantano & Pizzi (2020)	[41]	It provides a comprehensive look at real-world advances in artificial intelligence, highlighting chatbots as an emerging form of online retail customer service, shows the technological drive to adopt ne conversational agents based on natural language, concluding that chatbots are helpful in making automatic queries to consumers from various sources of information, using what they know about people to offer them personalized alternatives, there is a relationship between online assistance analysis techniques and the ability to interact.
Libai, et al. (2020)	[42]	It shows an analysis of the way in which technology has effects on communication with consumers, examining the capabilities the artificial intelligence in transforming in the acquisition and loyalty of consumers, concluding that technology has contributions such as simple improvements to skillful procedures, however they have not been as expected, that is, they did not manage to be high.
Murtarelli, Gregory & Romenti (2020)	[43]	It assumes that chatbots perform instrumental work on behalf of their owners, and currently do so through a base to interact with people based on the data provided, where they participate in dialogues similar to people, but these are not true, but examples of information collection, which concludes that chatbots is a technology that solves problems when managing communication with consumers, This is due to the creation of a set of questions, thus raising the required productivity measures.
Van den Broeck, Zarouali & Poels (2019)	[44]	They investigated the usefulness of the chatbots technology consulted on the Facebook Messenger platform as well as the relationship between perceived intrusion and sponsorship intentions, concluding that chatbots influence the response and attitude of the client, when performing cognitive evaluation, it can also be noted that this technology provides a quality service and a useful interaction, Requirement precedent to advertising, reducing the prospects of message intrusion.
Leung & Wen (2020)	[45]	They explored the perspectives and attitudes of consumers when making use of chatbots in takeout requests in restaurants, concluding that the use of chatbots has advantages in more effective orders compared to traditional, taking less time, so consumers felt more satisfied.
Zhou, Sinha & Liu (2020)	[46]	They show a demo of an AI-powered chatbot called AIMubot, which is a didactic platform to search for information through what is known from the place with a common language, concluding that chatbots have advantages, including: helping to consult products in a original language of the consumer, interacting efficiently and eliminating the ambiguity of the information, It also calculates query search matches by facilitating people's orders with an effective platform, making the technological tool competent for use.

Svenningsson & Faraon (2019)	[47]	They suggest that chatbots should have the functionalities of: avoiding trivial chatter and maintaining a formality in language when interacting with a user, concluding that chatbots help consumers have interaction with technology by meeting their expectations, since it analyzes, designs, measures and provides a positive experience to the person who uses it by creating a correct mapping of how they interact.
Yan, et al. (2016)	[48]	They present a chatbot model that uses a serverless system, whose design encompassed functionalities of beneficial actions, concluding that the model is scalable, extensible and accepts several ways of interacting with consumers, which contributes to the identification of bottlenecks by having XML communication strategies.
Valério, et al. (2017)	[49]	They analyze the communicative strategies that the best-known chatbots have used to transmit functions to users, using a method called Semiotics inspection (SIM), concluding that the use of chatbots has positive effects, including: predicts responses to the consumer and helps the user with short tutorials in first messages, which helps to have similar strategies when transmitting functionalities, being an understandable and didactic technology.
Seering, et al. (2020)	[50]	It informs us about the designs of chatbots focused on interaction with users focused on conversational agents for online communities, so it is concluded that the technology designed is a good option, being an agent with personality and more varied interaction, considered as something novel and legitimate, expanding the understanding of people about their requests, but that will probably lose interest over time.
Galitsky & Ilvovsky (2019)	[51]	It shows us a chatbot in a domain of personal finance, the content it provides in a way of online communication, whose answers are established with shared results, and automatic question, concluding that the proposed technology is innovative to interact between system-man, however, there is little information to dialogue and on the other hand the authenticity of them.
Hu, et al. (2018)	[52]	In this research, a chatbot was created that recognizes the tone and generates responses as human agents according to user requests, so it is concluded that technology is beneficial by elevating the consumer experience, that is, empathy and passion are present, integrating the data in generation of understandable answers according to what is queried.
Candello, Pinhanez & Figueiredo (2017)	[53]	It informs that we must understand the perceptions of the chatbot, since it is an essential element to generate trust between conversations of humans and technological machines, concluding that an important factor in communication with chatbots is the typography of letters, so those that are Georgia and Helvetica, are considered as creation of the system, something that does not happen with Bradley, that does not generate any influence, in addition to being more didactic and better to relate to people.

3.2.1. Studies on the use of chatbots in customer satisfaction

Q1: What proposed chatbot studies exist on the customer satisfaction?

Companies take into account that chatbots today, thanks to artificial intelligence and machine learning, have become valuable tools for customer service operations, because they not only improve the user experience in each service area, but are also useful for customer service representatives. For example, as can be seen in Figure 4, in the case of the health area, where they provide focused care by automating patient responses [27], as well as for veterinary consultations [38].

On the other hand, it is also used in administrative areas, since customers can use chatbots to verify their bank accounts, make online transactions, report power outages, describe locations [21], among other things; where this can generate a response to the request, interacting with the user [32].

In the case of Information and Communication Technologies (ICT) there are media where chatbots are being implemented, such as social networks [23], where it is the main tool for automated conversation with customers [20], [22] through indirect interfaces, such as mobile applications or websites [26], this in order to generate smarter responses at the right time [28].

For entertainment areas, chatbots adapt to the user experience: emotions, preferences, perceptions, and responses, before, during or after the use of an interactive system [31], [46], [50].

In other cases, it is used for the sales area, where it seeks to satisfy customers through programmed chatbots that can record useful information about users/customers, and direct them to buy the products [45], providing personalized attention through an electronic service [40].

Table 5. Types of chatbots for improving customer satisfaction

Types	Related Studies
IA	[26][28][33][42][46][47]
Textual	[23][32][37][44][45][48][51][53]
Voice	[52]



■ Health ■ Administration ■ TIC ■ Entertainment ■ Sales

Figure 4. Areas of study about chatbots

3.2.2. Type of chatbot used in customer satisfaction

Q2: What type of chatbot is used to improve customer satisfaction?

Today there are many types of chatbot that companies implement to satisfy their customers, so this research question aims to know what type of chatbots is used to improve customer satisfaction. According to the theoretical framework, there are three types of chatbots: (a) AI, (b) textual and (c) voice, which is detailed below:

A. IA

One of the most used types are those implements with AI, where these intelligent systems provide information through multiple expressions, so that they can generate smarter responses at the right time [28], [33], [42],; as is the example of a proposal for Venice airport, where it seeks to use modern cloud-based services [26], or as well as the so-called AIMubot as an interactive search system [46],[47].

B. Textual

Another type of chatbots are conversational and are usually implemented in a web page [23], [37], [44] enabling communication with visitors through text messages [32].

C. Voice

Finally, voice chatbots communicate in an automated way using a vocal input and output method [52], allowing the bot to speak as a person would.

3.2.3. Benefits of chatbots

Q3: What benefits does the use of the chatbot have on customer satisfaction?

The benefits related to the use of the chatbot are multiple, in this case when talking about customer satisfaction, they can be grouped into the following: (a) Solve queries or doubts and (b) Seek to solve the problems.

Table 6. Benefits of chatbots use on customer satisfaction

Benefits	Related Studies
Solves queries or doubts	[21][26][28][36][38][41][53]
Seeks solutions to problems	[22][23][24]

In the related articles, the benefits that chatbots present in customer satisfaction are shown. The benefits found were that chatbots help us solve queries and/or doubts and find solutions to problems [21], [26], [28]. In the case of solution of queries or doubts tells us that chatbots, with advances in technology, make customers use it more frequently [36], [38], [41], and in the case of finding the solution to problems, chatbots act as mediators to be able to react to user interactions [22], [23], [24]. At the same time that by using a typeface similar to human writing, users feel more familiar as if they were talking to advisors [53].

3.2.4. Countries that use Chatbots

Q4: In which countries are chatbots used the most for customer satisfaction?

When conducting a review of the research in relation to the subject treated, it can be seen that there are several countries in which the use of chatbots technology has been studied. As shown in Figure 5, the countries of the European continent that use this technology are: Austria, Czech Republic, Norway and Italy.

On the part of the continent America are: the United States, and in Asia, China. However, the US is the country that uses chatbots the most for customer satisfaction (43.5%).

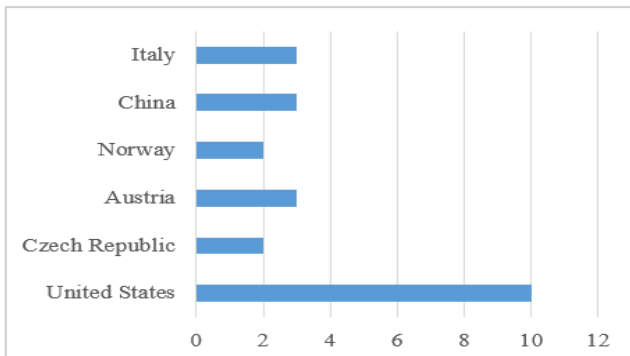


Figure 5. Range of countries using chatbots for customer satisfaction

This shows that chatbots are the best tool for customer satisfaction, since they maximize the service process and have no time limit, so you can make inquiries at any time of the day.

4. Conclusions

According to the analysis carried out in the studies related to the impact of chatbots for customer satisfaction, a total of 34 articles were discussed where it can be concluded the following:

The areas where a virtual assistant is mostly implemented are: health, administration, entertainment, sales and ICT, the most prominent being the area of information and communication technology.

On the other hand, the types of chatbots most used to satisfy users were identified, which are: AI, textual and voice, considering that the most implemented by companies, are textual chatbots capable of interacting with the client through text messages.

In the same way, the benefits found were that a chatbot helps in the resolution of doubts, queries and provides solutions to problems, allowing better interaction with users.

Finally, the United States, belonging to the American continent, was the country where most studies have been conducted on the use of virtual assistants for customer satisfaction.

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