

# A literature review on users' behavioral intention toward chatbots' adoption

Users' intention  
toward  
chatbots'  
adoption

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## Abstract

**Purpose** – Despite the fact that chatbots have been largely adopted for the last few years, a comprehensive literature review research focusing on the intention of individuals to adopt chatbots is rather scarce. In this respect, the present paper attempts a literature review investigation of empirical studies focused on the specific issue in nine scientific databases during 2017-2021. Specifically, it aims to classify extant empirical studies which focus on the context of individuals' adoption intention toward chatbots.

**Design/methodology/approach** – The research is based on PRISMA methodology, which revealed a total of 39 empirical studies examining users' intention to adopt and utilize chatbots.

**Findings** – After a thorough investigation, distinct categorization criteria emerged, such as research field, applied theoretical models, research types, methods and statistical measures, factors affecting intention to adopt and further use chatbots, the countries/continents where these surveys took place as well as relevant research citations and year of publication. In addition, the paper highlights research gaps in the examined issue and proposes future research directions in such a promising information technology solution.

**Originality/value** – As far as the authors are concerned, there has not been any other comprehensive literature review research to focus on examining previous empirical studies of users' intentions to adopt and use chatbots on the aforementioned period. According to the authors' knowledge, the present paper is the first attempt in the field which demonstrates broad literature review data of relevant empirical studies.

**Keywords** Chatbots, Literature review, Adoption intention, Usage, Text-bots, Artificial intelligence

**Paper type** Literature review

## 1. Introduction

The widespread use of the Internet and the development of modern technologies have brought about significant changes, including artificial intelligence (AI) agents or chatbots. Chatbots are programs which, using AI, can answer users' questions usually during a text-based conversation [1–4]. Thus, in many cases they replace employees in customer service transactions, who, in the context of interaction with customers, answer their questions, propose solutions and redefine suggestions according to preferences and choices [5–7].

Chatbots have been variously defined in the international literature. They are frequently described as “software agents that facilitate automated conversation through natural language processing” [8], or as “an artificial construct that is designed to converse with human beings using natural language as input and output” [9], and “Artificial Conversational Entities or computer programs, based on AI, which are very interactive and conduct a conversation via auditory or textual method” [10].



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Text chatbots have transformed communication and interaction between businesses and customers, by providing immediate response to requests, without time or space constraints and without human intervention.

In recent years, the use of chatbots has been widely adopted as part of the companies' marketing strategy [11]. Based on their utilization, customer service has been improved by reducing response time to requests and increasing loyalty. Typically, chatbots have been used for providing customers with entertainment and useful information, easily and fast, 24 hours a day with personalized help, saving both costs and manpower [3].

On the other hand, conventional customer service practices have not been abandoned. It is worth noting that a potential significant deterrent to the adoption of chatbots by users is the fact that a large number of customers tend to use traditional communication channels (i.e. mail, website and telephone) when communicating with companies, mainly because of security and privacy of personal data, which are critical issues requiring special attention in terms of their management [11]. Thus, as research has shown, trust and privacy concerns affect customers [12].

In the extant literature, various researchers have focused on a number of aspects related to chatbots. Remarkably, a significant number of researchers have focused on the intention to adopt and use chatbots by investigating factors which affect users in specific research areas, such as health [13], financial services [14–16], tourism [5, 17–20], customer service (e.g. Refs [1, 21–34]), mobile commerce [35–37], business [38, 39], insurance [12, 40] and education [41, 42].

The purpose of the present research is to provide a comprehensive literature review of the existing empirical studies in the field regarding individuals' intentions to adopt and use chatbots. More specifically, the research intends to categorize these studies in terms of a number of criteria, such as applied research methods, areas of chatbots' utilization, theoretical models, influential factors, the countries/continents where most studies have been carried out in the specific field and relevant research citations and year of publication. These classifications are expected to provide a cumulative and better view of the examined topic. As there has not been any other comprehensive literature review research to focus on examining previous empirical studies of users' intentions to adopt and use chatbots, the present paper is the first attempt in the field which demonstrates literature review data of relevant empirical studies.

The research questions arising from the relevant review are as follows:

- RQ1.* Which behavioral theories have been most frequently used in the research of individuals' intention to adopt and use chatbots?
- RQ2.* Which are the most commonly observed factors that influence users toward the adoption and use of chatbots?
- RQ3.* In which sectors are the use of chatbots more frequently observed?
- RQ4.* In which countries/continents has extensive and focused research been carried out?

Apart from the specific issues in relation to chatbot adoption and use, the paper aims to identify research gaps in the context of individuals' adoption intention toward chatbots, as well as reveal future research prospects in such a promising information technology solution for contemporary e- and m-business models.

The rest of the paper is divided into four sections. [Section 2](#) discusses the applied research methodology, whereas [Section 3](#) provides a literature review classification. Finally, [Section 4](#) includes the conclusions drawn from the relevant literature review as well as the potential limitations before recommending a series of suggestions for future research and practice.

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## 2. Research methodology

As already mentioned, the present paper discusses the researched literature review using PRISMA methodology (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), a most suitable methodology tool for the objectives of this study, by encompassing all the empirical studies concerning individuals' intention to adopt and use chatbots during 2017-2021 (i.e. from January 2017 to September 2021). The researched papers were selected in terms of specific inclusion and exclusion criteria, such as language—all texts should be written in English—and specific search keywords: *chatbot*, *intention*, *adoption*, *usage*, *text-bot* and *AI*, either in the paper title, abstract or keywords. Specifically, the search statement was as follows: (“chatbot” or “text-bot” OR “AI”) AND (“intention” OR “adoption” OR “usage”). Moreover, it was decided to focus on the most contemporary period when chatbots have been adopted and utilized. Hence, this is the reason why the research has included empirical studies from the last five years (2017–2021). Finally, it should be mentioned that the survey took place between February 2020 and September 2021.

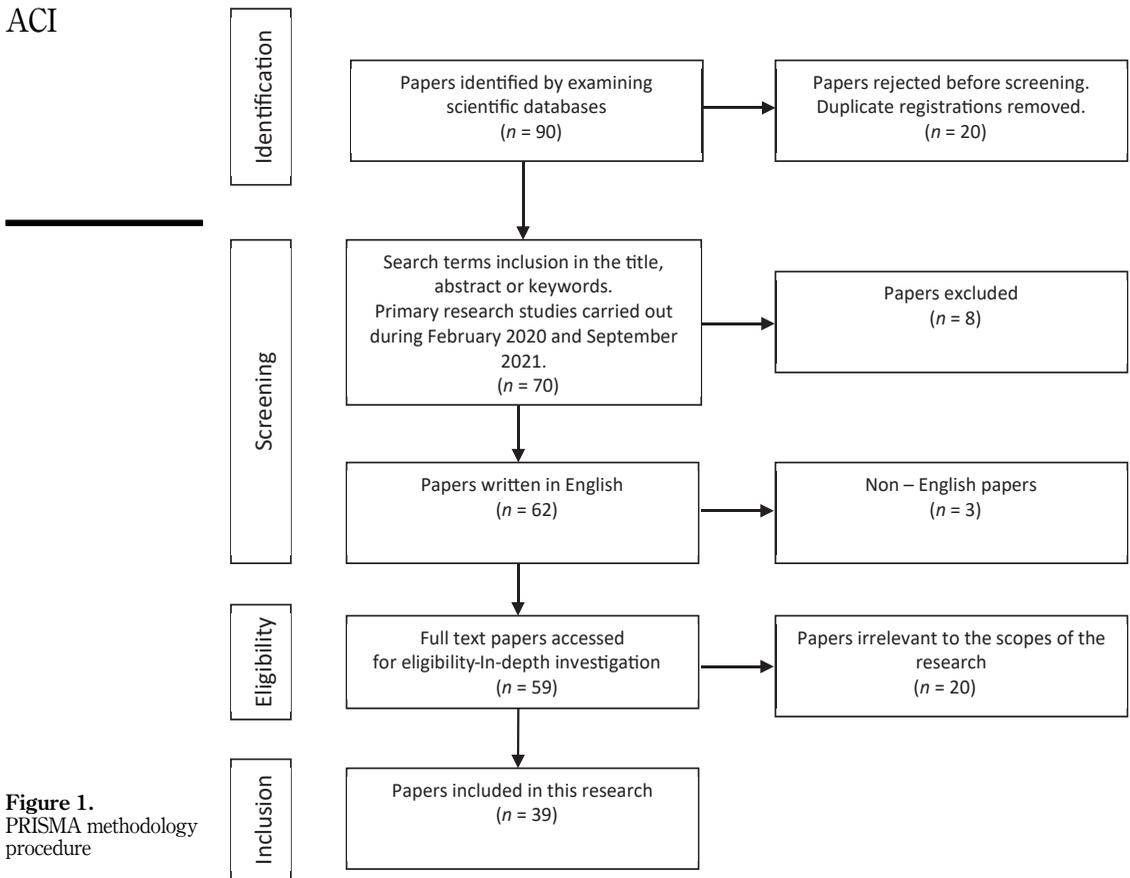
Collection of data was based on the following procedure: Initially, a search of scientific databases was carried out, during which 90 empirical research papers emerged, 20 of which were readily excluded due to duplicate registrations. Next, 10 papers were rejected; eight of them because they did not meet the search criteria and three because they were not written in English. Full access to text was possible for 59. Of these 59 papers and after an in-depth investigation, 20 were not taken into consideration since they were not related to the scope of the paper. Of the remaining 39 sources, eight were conference papers, 27 were published in journals, 1 was an MSc Dissertation, 1 a workshop paper, 1 a symposium paper and 1 a book chapter. Our research relied on the following online academic databases: Science Direct, Emerald, Taylor and Francis, Elsevier, Research Gate, Wiley, IEEE Explore, ACM Digital Libraries and Google Scholar. The quality of the papers that are included to these databases guarantees the trustworthiness of the results of this literature review study.

All researched papers were carefully reviewed, and through their examination, a classification of the prevalent categories emerged. Notably, most research studies include all categories. The classification was based on eight different criteria: Types of Data Analysis, Research Methods, Statistical Methods of Analysis, Field of Study, Behavioral Theories Used, Factors which Affect Adoption Intention, Citations and Year of Publication, Country/Continent, all of which correspond to the specific research questions. The results of the classification were then organized into tables, followed by related comments, aiming to answer the research questions.

The use of certain criteria reflects the studies which were conducted, and describes the issues examined, distinguishing several categories, in accordance with those discussed by Misirlis and Vlachopoulou [43]. The review raises the research questions which reveal the trends in the specific field of individuals' behavioral intention to adopt and use chatbots. The applied methodology is shown in [Figure 1](#) below.

## 3. Literature classification

The literature review classification was conducted in terms of the following eight criteria: types of data analysis, research methods, statistical methods of analysis, field of study, behavioral theories used by previous researchers, factors affecting the adoption and use of AI agents, number of citations and year of publication of the empirical research and countries/continents where the specific studies were conducted. Following previous literature review studies (e.g. Ref. [43]), the selection of these categorizations is expected to better present the extant and most contemporary empirical studies in the examined issue as well as reveal potential research gaps in the context of individuals' adoption intention toward chatbots.



### 3.1 Types of data analysis

Overall, the most common research method regarding users' intention to adopt and use text chatbots is quantitative research ( $N = 20, 51.2\%$ ), whereas qualitative research was used by authors to a much lesser extent in the literature ( $N = 4, 10.2\%$ ). Overall, most researchers have applied quantitative analysis methods to investigate the intention to adopt and use chatbots, such as Van Den Broeck *et al.* work [21]. In the specific empirical study 245 Facebook users were asked to rate their experience of using a chatbot (Cinebot). Qualitative methods were used by authors such as Mogaji *et al.* [15], who investigated the interaction of 36 Nigerians with chatbots in the banking sector.

However, there have also been mixed methods that include both qualitative and quantitative research ( $N = 15, 38.4\%$ ). For example, Cardona *et al.* [40] examined the factors which affect the adoption of chatbots in the insurance sector in Germany, using a sample of 300 respondents via email and social networks, as well as seven interviews with experts.

Summarizing the information presented, it can be deduced that quantitative studies seem to be more suitable for investigations in the context of individuals' behavioral intention toward chatbot adoption. The outcome of the type of analyses classified in quantitative, qualitative and mixed methods is presented in Table 1.

### 3.2 Research methods

Regarding the research methods applied, almost all empirical studies utilized e-questionnaires ( $N = 19, 48.7\%$ ), which was the main data collection method. For example, Soni and Pooja [26] developed an e-questionnaire to determine the factors affecting the adoption of chatbots by generation Z.

With regard to interviewing, only three (7.7%) researchers utilized it as a data collection method. Interviews were used by researchers, such as Folstad *et al.* [44], and Mogaji *et al.* [15] who, by conducting semi-structured interviews, expected to receive answers to specific research questions.

However, several research studies utilized mixed research methods, such as experimental investigations and questionnaires (e.g. Refs [27, 28]) or a combination of interviews and experimental methods [29].

By combining these methods, the researchers tried to investigate the interaction with chatbots and the effect they had on the subsequent intention to use chatbots (e.g. Refs [45, 46]), as shown in Table 2.

The above discussion demonstrated that e-questionnaires have various key advantages compared to other research methods, such as easy, fast and inexpensive access to a broad base of potential respondents, as well as anonymity, which makes it ideal for relevant empirical studies. Thus, it was applied by the majority of previous researchers, whereas a considerable number of studies preferred a combination of e-questionnaires with experimental investigations. In effect, the interaction of individuals with a chatbot, combined with a set of relevant questions, is another attractive way to get and analyze data about a number of users who interact for the first time with a new chatbot agent. Such studies can significantly help companies to further improve their emerging or utilized AI solution.

### 3.3 Statistical methods of analysis

Concerning data analyses, the researched quantitative surveys used statistical processing methods to draw valuable conclusions. The principal method was PLS-SEM ( $N = 13, 33.3\%$ ), followed by descriptive statistics measures ( $N = 10, 25.6\%$ ). Methods with lower frequency of utilization were regression analysis ( $N = 8, 20.5\%$ ), ANOVA ( $N = 9, 23\%$ ), *T*-test and chi-square test ( $N = 7, 18\%$ ). Factor Analysis ( $N = 4, 10.2\%$ ) and correlation analysis ( $N = 5, 12.8\%$ ) were used to a lesser extent, as shown in Table 3. Finally, four research papers did not use statistical methods of analysis ( $N = 4, 10.2\%$ ); they used content analysis after interviews.

Types of data analysis	Source
Quantitative	[1, 5, 12, 17, 19, 21, 24–26, 30, 33–38, 42, 47, 48, 52]
Qualitative	[13, 15, 29, 44]
Mixed methods	[8, 16, 18, 20, 27, 28, 31, 32, 39–41, 45, 46, 53, 54]

**Table 1.**  
Types of data analysis

Research method(s)	Source
E-questionnaire	[1, 5, 8, 12, 17, 19, 21, 24–26, 30, 33–36, 38, 42, 48, 52]
Interviews	[13, 15, 44]
Experiment and questionnaire	[16, 20, 27, 28, 31, 32, 37, 41, 45–47, 53, 54]
Interviews and e-questionnaire	[18, 39, 40]
Interviews and experiment	[29]

**Table 2.**  
Research methods

It is worth noting that in several research papers a combination of statistical methods and analyses were applied. For example, Malik *et al.* [30] applied ANOVA and factor analysis. However, the predominance of PLM-SEM as the most suitable applied method can be attributed to the fact that it can analyze a large number of factors via various simultaneous regressions, which can have any direct and indirect impact of the examined factors on a single structural model.

*3.4 Field of study*

As discussed in the introduction, although chatbots have been applied in various areas, the largest percentage of previous empirical studies were focused on e-commerce and customer service ( $N = 17, 43.6\%$ ). Companies, especially those with strong customer interaction, have realized the importance of incorporating modern technologies, such as chatbots, in their operations. Hence, they compete with each other to offer the highest quality of customer experience, and their marketing practices have been restructured and oriented toward new tactics, including chatbots, which are an alternative to traditional customer service, by providing an additional level of support of services anytime, anywhere (e.g. Refs [1, 21]).

A smaller percentage surveyed the intention to use in the tourism industry ( $N = 5, 12.8\%$ ), where this technology is widely applied (e.g. Refs [5, 17]) and has been greatly benefited by the utilization of technologies, such as chatbots.

The research also demonstrated adoption of agents by students in 5.1% ( $N = 2$ ) of cases; similarly, factors that lead to chatbot adoption using mobile phones was also observed in 7.7% ( $N = 3$ ) of the cases [35–37]. Overall, mobile commerce is an easy and convenient process, with no space or time constraints. As all consumers who have a mobile phone can make purchases, chat-based marketing is one of the most popular digital tools.

In addition, 5.1% ( $N = 2$ ) of the papers examined the acceptance of chatbots among employees in the banking sector [14–16]. An increasing percentage of financial institutions have already adopted the technology of chatbots aiming to facilitate the support to their clients’ financial decisions and transactions. With regards to insurance companies, two studies (5.1%) were identified. Finally, one survey in the public transport [47], one in the health industry [13] (2.5%) and one in veterinary medicine [48] were also identified (Table 4). The specific discussion of the sectors where chatbots have been examined is related to the 3rd research question of the paper.

*3.5 Behavioral theories*

The empirical studies examined in the present study were based on well-known behavioral theories, schemes and models to investigate specific factors. More specifically, the most

**Table 3.**  
Statistical methods of analysis

Statistical methods of analysis	Source
ANOVA	[20, 24, 27, 30–32, 46, 53, 54]
PLS-SEM	[1, 12, 17–19, 21, 26, 31, 37, 38, 42, 47, 48]
Factor analysis, exploratory factor analysis, confirmatory factor analysis	[26, 30, 31, 35]
<i>T</i> -test, Chi-square	[17, 28, 36, 37, 39, 41, 54]
Regression, OLS regression	[16, 25, 32, 35, 39, 41, 46, 52]
Correlation analysis	[28, 34, 40, 41, 45]
Descriptive statistics	[5, 8, 24, 28, 33, 35, 39, 41, 45, 54]
Content analysis	[13, 15, 29, 44]

Fields of study	Sources	Users' intention toward chatbots' adoption
Health	[13]	
Veterinary	[48]	
Education	[41, 42]	
Tourism	[5, 17–20]	
Banking	[14–16]	
Customer service	[1, 21–34, 44, 52]	
Business	[38,39]	
Mobile commerce	[35–37]	
Insurance	[12,40]	
Transport	[47]	

**Table 4.**  
Field of study

frequently used approach in previous studies is UTAUT (Unified theory of acceptance and use of technology) and UTAUT2 ( $N = 5$ , 12.8%), proposed by Venkatesh *et al.* [49] to explain user intentions and subsequent use behavior in relation to information systems. According to this theory, the factors which affect the intention to use technology are performance expectancy, effort expectancy, social influence and facilitating conditions. Venkatesh *et al.* [50] expanded it to UTAUT2 theory, by adding three intrinsic factors affecting usage intention: hedonic motivation, price value and habit. According to the above characteristics, this theory fitted well and was applied in two research papers of this investigation [19, 42].

Another theoretical model observed in research papers is TAM (technology acceptance model), formulated by Davis *et al.* [51], to predict users' behavior toward adopting a new technology. In specific TAM, on its original form, was utilized by two studies [12, 18]. However, TAM was widely applied by being combined with other theories. Particularly, in five studies combined theories have been used (TAM and DOI; TAM and ECM and ISS; TAM & SST; TAM, DOI and TOE) [1, 29, 35, 37, 40], whereas in seven (18%) research papers information system (IS) continuance models such as SOR, U&G, TPB, CAT, TRA, SERVQUAL, extended post acceptance model were applied. Cheng *et al.* [52] used SOR theory to explain the behavior of consumers toward chatbots in the context of e-commerce.

Finally, it is worth noting that 51.3% of the research papers did not employ a common theoretical model ( $N = 20$ ). In specific, these empirical studies base their proposed framework by combining various factors used in a number of past papers and have been already proved for their validity and reliability. Despite the fact that UTAUT(2) and TAM are the most widely applied behavioral theories in previous empirical studies, it should be emphasized that a large number of other theories have been applied in the examined field as well. The results are presented in Table 5 and are associated with the 1st research question of the paper.

### 3.6 Factors affecting adoption intention

Regarding the second research question, the results (Table 6) demonstrate that the main determinants of TAM and UTAUT (both versions), which are the main behavioral theories, and on which previous researchers based their empirical studies, have been more commonly applied. More specifically, perceived usefulness, which is a key factor of TAM, is top on the list, followed by performance expectancy, trust and attitude. Apart from these factors, effort expectancy, habit, perceived enjoyment, perceived ease of use and social influence were also examined and confirmed in various relevant empirical studies. It should be emphasized, however, that these factors have a direct effect on individuals to adopt and use chatbots.

ACI	Behavioral theories used	Source
	UTAUT	[15, 34, 47]
	UTAUT2	[19, 42]
	TAM	[12, 18]
	TAM and DOI	[35, 37]
	TAM and ECM and ISS	[1]
	TAM and SST	[29]
	TAM and DOI and TOE	[40]
	U&G	[8]
	SERVQUAL	[30]
	TPB	[38]
	SOR	[52]
	CAT	[21]
	TRA	[31]
<b>Table 5.</b> Behavioral theories	Extended post acceptance model of IS continuance	[17]

Constructs/Factors	Directly affecting chatbot intention-adoption	Quantity	Indirectly affecting chatbot intention-adoption	Quantity
Performance expectancy	[15, 19, 34, 42, 47]	5		
Effort expectancy	[34, 42, 47]	3		
Habit	[19, 34, 42]	3		
Perceived usefulness	[1, 12, 18, 26, 39, 48]	6	[37]	1
Perceived enjoyment	[1, 19, 39]	3	[37]	1
Perceived ease of use	[1, 18, 29]	3	[37, 48]	2
Trust	[12, 16, 18, 34, 37]	5	[38]	1
Privacy concerns	[12]	1		
Perceived humanness	[16, 19]	2		
Perceived completeness			[48]	1
Perceived convenience	[48]	1		
Personal innovation	[37]	1		
Attitude	[13, 35–37]	4	[21]	1
Social influence	[19, 34, 47]	3		
Facilitating conditions	[34, 47]	2		
Anthropomorphism	[18, 47]	2		
Reliability	[30]	1		
Empathy	[30]	1		
Tangibility	[30]	1		
Predisposition (to use self-service technologies)	[19]	1		
Perceived intelligence	[18]	1		
Perceived utility	[33]	1		
Communication style			[53]	1
Hedonic motivation	[34]	1		
Price value	[34]	1		

**Table 6.**  
Factors influencing intention

On the other hand, there are factors which indirectly affect users toward their behavioral intention to adopt and use chatbots (i.e. perceived completeness and communication style) [53]. There is also a significant number of factors with both direct and indirect impact on individuals in the examined topic, such as perceived usefulness, perceived enjoyment, perceived ease of use, trust and attitude.

### 3.7 Citations and year of publication

The research demonstrated the top five most popular citations until 7/10/2021 (Table 7). Obviously, the research article by Brandtzaeg and Folstad [8] ranks first with 410 cross-references, followed by Ciechanowski *et al.* [45] and Go and Sundar's [54] empirical work.

As shown in Figure 2, research in the examined topic has significantly increased since 2019, peaking in 2020. Two papers were carried out in 2017 and 2018, nine in 2019, 15 in 2020 and 11 until September of 2021. Therefore, the results show an increase in the published papers during the last two years.

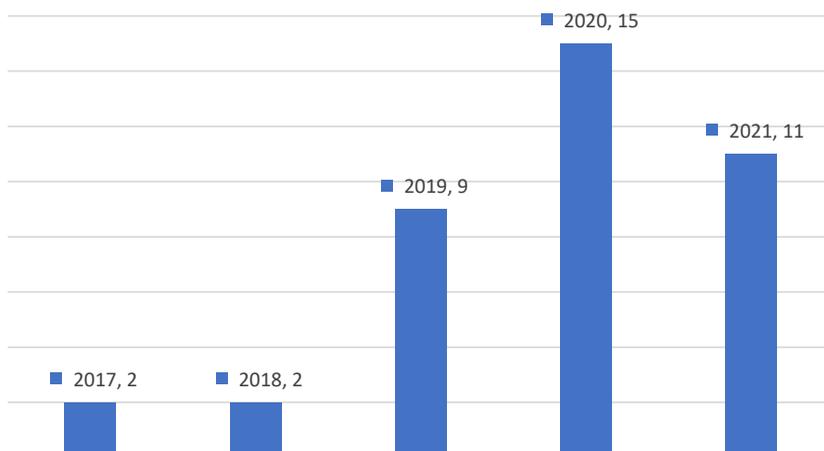
### 3.8 Researched countries/continents

With regard to the countries where these empirical studies were undertaken, the countries where there is the vast majority of investigations on users' behavioral intention to adopt and use chatbots were the United States ( $N = 7, 18\%$ ) and India ( $N = 6, 15.4\%$ ), followed by the United Kingdom ( $N = 5, 12.8\%$ ). These three countries are followed by Germany, Italy, the Netherlands, Norway and China ( $N = 2, 5.1\%$ ), whereas in Poland, Japan, South Korea, Indonesia, Nigeria, Spain, Taiwan and the Philippines only one research paper was identified in each (2.6%). In addition, one empirical investigation was conducted in two countries – the United States and the Netherlands, whereas in four (12.8%) studies the countries where the investigations took place were not mentioned.

As regards the continents where the greatest number of surveys has been carried out, Europe ranks first with 15 surveys, followed by Asia where 13 empirical studies were identified, whereas in America, except for the USA, no other countries have carried out any investigations. Similarly, one empirical study was observed in Africa (Nigeria), whereas there are no such

#	Authors	Year	Journal or conference	Citations
1	Brandtzaeg and Folstad [8]	2017	4th international conference on internet science	410
2	Ciechanowski <i>et al.</i> [45]	2019	Future generation of computer systems	249
3	Go and Sundar [54]	2019	Computers in human behavior	182
4	Nadarzynski <i>et al.</i> [13]	2019	Digital health	118
5	Zarouali <i>et al.</i> [21]	2018	Cyber psychology, behavior and social networking	96

**Table 7.** List of the top-5 most cited papers, as of October 7th, 2021



**Figure 2.** Number of references per year

studies in Oceania, which is quite surprising. Taking into consideration the broad and continuous adopt of chatbots from numerous e- and m-business models worldwide, it is very surprising that there have not been analogous studies in a large number of countries so far. [Table 8](#) summarizes the relevant information and demonstrates the relation to the 4th research question of the paper.

#### 4. Conclusions

The present paper is a literature review study concerning the empirical investigation of users' behavioral intention to adopt and use chatbots during the last five years. By analyzing key characteristic points of these empirical research studies, a number of significant findings were drawn.

According to the research results in terms of the theoretical models applied, the most commonly used approaches are UTAUT(2) and TAM. Regarding the factors which affect the intention to use and adopt chatbots, performance expectancy, effort expectancy, social influence, trust and attitude are the most significant considerations associated with the behavioral theories on which they were based, whereas in relation to the areas on which most of the research work was focused, customer service ranks first by far. It can, thus, be concluded that an increasing number of companies are focusing their marketing strategies on adopting such technologies to provide rapid and effective services through websites or mobile apps, as a great number of consumers spend most of their time online, either for fun or for informational and/or professional issues.

The present research discussed surveys based mostly on quantitative data collection methods through e-questionnaires, whereas most researchers employed the PLS-SEM statistical method. As regards the countries and continents where empirical research has been carried out, most surveys have taken place in Europe and Asia. Notably, however, there have been no such studies in Oceania and in a large number of developed countries, such as France, Canada, Sweden, Switzerland, etc., where chatbots have been widely applied and greatly welcomed by users in various e- and m-business models. Therefore, this is a significant research gap, on which researchers are expected to focus attention in the upcoming period.

Continent	Country	Quantity	Sources
Asia	China	2	[17, 52]
	India	6	[5, 18, 26, 33, 37, 47]
	Indonesia	1	[39]
	Japan	1	[41]
	South Korea	1	[46]
	Philippines	1	[34]
	Taiwan	1	[48]
America	USA	7	[1, 8, 20, 29, 31, 32, 54]
Europe	The United Kingdom	5	[13, 16, 27, 42, 53]
	Poland	1	[45]
	Germany	2	[12, 40]
	Norway	2	[24, 44]
	The Netherlands	2	[29, 35]
	Spain	1	[19]
	Italy	2	[28, 36]
Africa	Nigeria	1	[15]
Unknown countries		4	[21, 25, 30, 38]

**Table 8.**  
Chatbot adoption-  
intention papers per  
continent and country

Furthermore, taking into consideration that there is a great interest in using chatbots mostly in customer service, companies should understand their role, especially in the context of the pandemic and the ensuing social distancing, so that they would be able to meet their customers' needs promptly, safely and beyond geographical or time constraints. However, despite the fact that most empirical studies have focused on customer service, there is a significant research gap in specific fields, such as the telecommunication industry, where chatbots have been already applied. Thus, a number of studies on such fields might provide useful insights for chatbots' adoption and further use.

The present literature review highlights the need for the academia to employ knowledge and further investigation of additional factors and dimensions requiring the application and use of chatbots in e- and m-commerce, which have not been identified to date. The specific factors may provide the ground for empirical studies in digital contexts. The categorization ensued should stimulate further efforts for development and evaluation for improving and advancing the relevant research.

Moreover, the research aims at emphasizing the developments in the relevant field by highlighting the factors that cause users to adopt AI agents and provides the appropriate theoretical background for both the academia and the industry. It also underscores additional components which have not been researched and may play a role in e-commerce and m-commerce, such as time response, efficiency and effectiveness of users' experience, mobile apps convenience, internal barriers, pre- and post-use behavior and how it relates to intention and satisfaction resulting from the quality of chatbot service.

The implications of the survey for practitioners are associated with the policies they must follow to enhance the factors which affect the intention to use chatbots, as well as create the conditions that will make individuals integrate and further utilize chatbots in their transactions with companies. In addition, as already discussed, a significant number of such investigations should take place in countries and sectors where chatbots have been applied or intended to be used. Hence, companies could definitely have a more comprehensive view about their chatbot investments and how they can derive better outcomes from this promising IT solution.

With regard to further future research recommendations, particular attention should be paid to the generalization of the research results, as this is related to various factors, which seem contradictory and cover multi-dimensional perspectives in a way. In detail, the most common determinants are the socio-economic and cultural environment of each country and its status in terms of development, as well as digitization level and access-use of the Internet in each country. An additional key factor of differentiation is individuals' personality and innovation characteristics. Thus, a person who is reluctant to accept anything new and innovative will not adopt chatbots as readily as a person who is eager to try new and innovative e-solutions. On the other hand, a fourth factor is to build trust and ensure the quality of service between individuals and companies as far as chatbot is concerned. Companies, especially those involved in customer service, make efforts to respond as quick and efficient as possible to their customers' requests, aiming to satisfy and subsequently gain their loyalty. Therefore, e-readiness to integrate such marketing practices in their business strategy is interesting to be further investigated. Chatbots have already been widely acceptable in some countries, and an important issue is how to get most benefits from their capabilities. In contrast, as aforementioned, there are a number of countries that lag behind because of socio-economic factors and technology-related determinants. To sum up, a multi-dimensional future examination of the aforementioned factors is expected to reveal useful insights and possibly reveal novel chatbots' perspectives to both academia and the industry.

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