

## Prospects for Chatbots

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### Abstract

*At the end of the second decade of the digital millennium, the flow of daily human and business life is increasingly dependent on the development and invention of information and communication technologies. One of the innovations is chatbot, which is software that performs tasks as an automated information assistant with a wide range of applications and fields. This article reviews the nature and characteristics of chatbots and, based on their imposition and development in electronic exchange channels, comments are made on their potential impact on the retail and outsourcing business related to customer service.*

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### Introduction

The information-communication technologies are a sphere of constant scientific discoveries and improvements, which create broad opportunities for digitalization of separate operations or whole processes in business. Their evolution induces completely new approaches for management of the commercial process in a real and digital environment, where through the application of the chatbot (CB) technology in the dimensions of the information exchange before, during and after the sale, the levels of information asymmetry between the participants are reduced. This allows the interactivity between the trading parties to take place in real time, with a complete communicative synchronization, independently of their physical remoteness, by means of a uninterrupted digital commitment, realized through the usage of digital innovations and automation of the communication process.

The fundamental aim of the present work, is to make a review of the essence and characteristics of the chatbots, and on grounds of their imposing and development in the electronic transactions channels, their possible influence to be commented, on retail and outsourcing businesses, connected with customer service. For the fulfillment of the set aim of research, with a high degree of conditionality, we accept the assumption of uniformity in the servicing of inquiries, directed to the CB by employees and external customers, as the basic difference is not in the organization and technology of fulfillment, but in the range of the informational content and its confidentiality.

The continuous evolution of program securing, which assists fundamental and supplemental business processes, will allow that by the year 2020, over 80% of all enterprises to have introduced some variant of chatbot automation in their business activities (Insider Inc., 2016). Thus, globally, as of year 2021 the expenditures for licensing, servicing and introduction of new chatbot platforms, will reach 4,5 billion USD (Miller, Top, & Stapleton, 2017, p. 5). Also, in the year 2020, 85% of all customer relations will be performed without a human interaction (Gartner Inc., 2011), as in 2021 15% from these services will be completely processed by artificial intelligence (AI) (Huang & Bryan, 2018). The primary motive, standing behind the intelligent automation, in definite business processes and activities, is connected with the possible decrease to 75% of the engaged with them company costs (KPMG in the UK, 2016, p. 2), as even an economy of up to 90% is attainable, depending on the characteristics of the selected automated function (Deloitte, 2018, p. 5). One of the presumable directions of this optimizing is connected with the fact, that by the year 2026 intelligent robots could replace more than 100 million employees all over the world, whose assignment is work with or usage of information, which is one-third of the job positions in this field

(KPMG LLP, 2016, p. 14). Consequently, the introduction of CB technology into the informational servicing of employees and customers simultaneously, leads to a broad specter of positive changes for all participants, but is accompanied by possible business risks, especially for the employed in this activity. The latter is determined by the threats, connected with the loss of employment for the persons, performing information and consultation services, who are replaced by automated chatbot technologies. In this transformation process, gradually the positive features of the reduction of operative costs are attained, connected mainly with the compensation of the hired labor factor, and higher levels of consumer satisfaction are realized, by information provided in real time. In spite of that, situations are possible, in which the chatbot could not generate the correct or exhaustive answer, which a servicing physical person would give under such circumstances. That is why it is felicitous to provide an opportunity for the connection with a competent operator, who is able to assist the process until its successful informational securing and finalizing.

### **1. The essence and characteristics of chatbots**

According to the definition of the consulting company KPMG, “chatbots or digital assistants are a form of digital labor focusing on handling customer and employee requests in a conversational manner. Through the use of Natural Language Processing and Artificial Intelligence the bot can interpret user intent and undertake the necessary actions to respond accordingly” (KPMG Advisory, 2018, p. 2). Consequently, the chatbot offers a “conversational experience ... to mimic conversations with real people” (Deloitte, 2018, p. 6). This determines its main application in fields of systems for technical maintenance and advising of employees and customers, the acquaintance with and adaptation of the employee or customer to new products and services of the organization; processing of customer inquiries, complaints, guarantees and claims; assisted information searching, etc. These are all the activities and processes, where uniform inquiries of employees or customers could acquire standardized automated replies, without the necessity of engagement of human resources. Additionally, the range of the questions being asked and correspondingly the alternatives of their answers, could be gradually extended on grounds of self-learning CB systems, using artificial intelligence.

In the beginning of their appearance in the 60-ies of the XX century, the chatbots are limited in their technological capabilities, but today they are a characteristic feature of the digital transformation of business. The first computer program, which passes the artificial intelligence test of A. M. Turing is ELIZA. It imitates a human conversation through the comparison of questions from preliminary selected scripts, based on key words (Weizenbaum, 1966). Presently the test, suggested by A. M. Turing is defined as an instrument, through which it could be determined, if a definite computer is able to think in a way, imitating a human being (The Editors of Encyclopaedia Britannica, 2019). In order to accomplish this, it is necessary that at least three of ten participants, conducting a 5-minute conversation with the computer program, to be convinced, that the conversation has been led with a human. The continuous chatbot evolution, to present time, improves it not only as a program solution, but as a concept about its application in the business and the human day-to-day life. In that way in the presence, it develops on the concept for the creation of CB solutions with more and more extended cognitive abilities and a more skillful imitation of the human intelligence, which define its key characteristics as well (Table 1).

Table 1. Key characteristics of the CB

<b>Description</b>
The CB relatively guarantees, that each potential customer, who has accomplished a contact with the information system, will be serviced, independently of his/her personal characteristics and the formulation of the inquiry.

The CB has a unlimited admission capacity and can simultaneously service a big number of customers and their simultaneous inquiries, which could have a different purpose. The CB can secure multi-language maintenance and translation in real time.
The chatbot can formulate brief and/or exhaustive answers, with options of additional information by customer demand.
The CB can work in a non-stop mode or 24 hours per day, 7 days per week and 365 days per year, which depends completely on the operation of the computer system, where the CB software is installed and its accessibility, including through computer networks.
The CB can redirect inquiries to a real company officer, at the emerging of an information vacuum, at necessity of an assisting service by an employee, or at an express customer's demand.
The CB minimizes the risks, caused by incorrect interpretation or actuality of the information, as it has a continuous access to the constantly updated databases of the company.
The CB functions, as it stimulates the human communication, which is most frequently realized through applications for text messages, but it can be simultaneously equipped and even replaced by algorithms and technologies for the synthesizing of natural human speech, which is subject to an additional setting up by the user.

The requirement that the CB performs a computer processing of natural (human) language remains unchanged, in order to identify, transform, adapt and use completely the received linguistic information.

## **2. Types of chatbots**

Depending on the targets, placed behind the information service, realized by the chatbots and their technological development as a software environment, we differentiate the following several varieties (Deloitte, 2018, p. 12):

CB functioning on the basis of conversational scenarios or a program script. They are basis solutions, which finding key expressions and terms in the input inquiry return as a result preliminarily defined answers.

CB which can study, recognize and define the intention of the inquiring party. They are software solutions with abilities for machine learning, which has extended options and functionality for understanding consumer intentions, as they take the words from the made inquiry as a whole, and make an effort of extracting an implied meaning out of it.

CB virtual agents, which can lead a complete conversation with the inquiring party and try to understand what its purposes are. They work simultaneously with other program solutions and technologies for extraction of information about the user and the use of established cause and effect connections, which are a result of past experience and a multitude of real market situations, which develops based on the self-learning system and the perfection over time.

A humanoid adviser is a CB, which applies AI, imitating human intelligence. This is a software, which tries to understand and discover the reasons, in a way in which a human being would analyze them and place them in a real milieu.

## **3. Application of chatbots in the commercial business**

In any sales situation, in which the user has no easy and direct way to the searched by him/her product information, or such, connected with the condition of the exchange, the CB could be an exceptionally useful instrument. Through its usage, the consumer is able to direct questions in an

electronic as well as a real environment. This is accomplished through the application of personal computer systems and different smart devices, which could be autonomous or joined to a definite internal or global computer network. Its usage is in reply to the growing need, routine informational inquiries, which are connected with problems of the traditional consumption, to be able to be resolved comparatively fast and without the interference of the subjective factor of the servicing party. The CB can be secured with access to the whole information database, not only at the web site, but also with informational resources of the company, which are not company's confidential information and are not publicly shared. This makes "an organization's knowledge content, information architecture (IA), and system for organization and delivery foundational to the efficacy of its customer service chatbots" (Mindtouch, 2019, p. 4). In this way, through adequate algorithms and indexing processes, the CB is able to find the informational content from key words, expressions and the metadata contained in them, or with defined limitations of the information search. The securing of the CB with a systematically renewed database from key terms, expressions, common content characteristics, logical and hyperconnections, allows the finding of adequate reply suggestions and their direct and crossed relations with other information. Thus, standard commercial situations can be reduced to a clear and easily understandable sequence of questions, which to lead the information servicing party, to the desired end condition, without the necessity of human interference. Additionally, if the information, presented to the user is too voluminous, again through the CB, a target secondary search with given criteria can be performed, which leads to an answer to exactly defined and specific questions. In this connection, the algorithms for processing of information and searching in its content, are an object of company's confidentiality and can be connected with other consumer characteristics as well. This means that the offered feedback information by the chatbot, is adapted to the unique user characteristics, which are preserved as a customer profile, according to the normative requirements in effect relating to this matter. This functioning mechanism of the CB is exclusively useful for users, who do not have the necessary skills and competence to perform the searching of information to be connected with excess waste of time resources. Furthermore, through the functional ability of the chatbot to perform self-learning, which develops on the basis of conglomerated separate cases, it can discover unknown aspects of consumer interests and profiles of market behavior. Thus, the database with CB replies can be enriched with information from the real market environment and even generate knowledge of unknown and undetermined market possibilities. The last one is subordinated to the logic and principles of refining the information base, through the functioning of AI, and not on the basis of direct and mechanical input of the collected from a concrete sale information, and its direct usage in communication with other customers. Apart from that, there is a systematic necessity of an interference of experts with different professional and interdisciplinary knowledge and experience, in order for the new discoveries to be specified, of the self-learning CB technology. This is necessary, as the independently gathering knowledge automatic system of the CB can possibly formulate imprecise conclusions, which to be established as replies and to mislead the customers to false beliefs or to cause unwanted consumer reactions. This would be an unfavorable effect, which is a result from the limitations of the built-in algorithms for computer processing of the natural language of the party, placing the inquiries. Consequently, the processing of big volumes of information with the combining with extended possibilities of its profound studying, allows the CB to expand its capacity without direct external interference, similar to the self-learning process of human beings.

Depending on the motives, triggering consumer behavior, the CBs can adapt themselves to the requirements of the information seeking participants, as well as the ones, being interested in the economic characteristics of the exchange. For this consumer group, the main reasons for activating consumer interest are the product price; value and the connected with it delivery conditions; price discounts and the conditions for their effect, etc. Consequently, the CB is a universal concept, in which a program readiness can be provided for, in order to meet a broad range of probable

hypotheses for consumer demand, expectations and inquiries. In this way, the CB as a human-like or “an anthropomorphic information agent, has a positive influence mainly when the quantity of static information accessible at the web site is limited” (Sivaramakrishnan, Wan, & Tang, 2007, p. 69), though when the consumer is moved by utilitarian reasons for his/her visit, it is better other, more adequate web and promotional instruments to be applied, for the stimulation of his/her interest. CB as a system for informational customer self-service in retail, has its significance in the pre-sale phase, where it is possible to completely secure information, which to direct the user to the right product and ways for the order or the purchase to be fulfilled. Consequently, the application of the CB can lead to economies of labor resource, as it is able to cause discharging of the hired personnel for them to concentrate on basic sales activities and thus free themselves from routine information inquiries. Afterwards, the CB can provide extended customer service in the post-purchase phase, where to help resolving issues, connected with the product use, the return of unwanted products, the servicing of trade guarantees and claims, assessment of the purchase satisfaction, the offer of additional goods and services, etc. A very important option in electronic trade, is the possibility the CB to be assigned with the servicing of inquiries, relating to the courier and logistic activities, connected with the purchased products and basically with their tracking during their physical advancement in the direction to the end customer. Software and communication solutions can be applied here, for a remote contact between the courier operator and the customer with the intermediacy of the CB technology, which to be used for notification at newly emerged events, accompanying the status of the delivery, or for disposals at changes of the courier service parameters (redirecting of a recipient, correction of the delivery time, change of the delivery place, or other consumer instructions to the courier). The CB can certainly help the courier himself, which to make inquiries about unspecified delivery parameters, in its accompanying documents. Thus, the CB can, from the information system of the postal and courier organizations, supply and secure missing or supplementary data, which to lead to the concrete fulfillment of the delivery during emerged difficulties or lack of definite parameters.

The increased volumes of consumer information searches, combined with the aggressiveness of the personal promotional techniques for the attraction of customers, and the systematic necessity of optimization of the time and cost consumption of the personal service processes, produce a continuously growing pressure on the efficiency of the traditional customer service centers. Moreover, their intensive development through outsourcing during the past several years, transfers the risks and the growing requirements for an increased economic efficiency to the external service company. It engages with the necessity of continuous development of the competence and knowledge of its employees, which at one point in a natural way leads to its escalation to a partial or full automatization. Thus, “CB with artificial intelligence removes two competing advantages of the outsourcing companies: scale of available workers and lowered costs” (Swanson, 2018). The CB changes the concept of customer informational servicing not only by transferring this function to organizations and/or countries, where the performance of this activity is economically more profitable, but through their replacement by digital robots. This process can be certainly slowed down or transformed, if the employees of the outsourcing company improve their service model and develop the application of “soft skills” for communication, and the application of emotional intelligence in their activity. The latter demands special skills and competence, as well as the systematic passing through company training and courses for the employees. At the traditional customer service offices, the technological evolution, offered by means of CB, can assist the routine information inquiries of the participating parties, as it is even possible to free the operators, so that they could concentrate on personalized service of ad hoc and unique questions and necessities of the service consumers, or on defined economically important target market segments. In spite of these broad service possibilities, there is a conservative customers’ segment, who prefer the personal communication and because of their specific considerations purposefully evade the modern computer-communication technologies. Their behavior is motivated by the seeking of relations with

people, their preference of communication, and the obtaining of an individual approach to their own problems. This consumer segment is highly sensitive to changes in established and accepted by them models of communicative interaction, and they realize the transition to new technologies with difficulties, independently of their advantages and possible benefits. All of this imposes CB to develop, in order to be able to comprehend the emotional intelligence and the real economic needs of customers. That would allow that the CB, through complex algorithms of content analysis of the text inquiry, and, if available, the studying of speech, voice and facial signals, nonverbal signs, etc. of the party, looking for information, to be able to adequately handle situations of consumer dissatisfaction, impatience, disappointment, etc. In a situation like that, the CB should have at its disposal an approach, by which, through adequate communication, to try to win the customer's confidence and through a concrete tools arsenal, alternatives to be suggested of mutually beneficial relations with them. On this condition, not only the perception of the essence of the inquiry is of importance, but its emotional content, which to lead to a correct interpretation and an adequate response by the CB. The CB technology could as well increase the overall efficiency of the customer service units during time intervals of high intensity of the incoming inquiries current, by its assistance in the phase of concretization of the placed inquiry and the specifics of the information searching. Additionally, they can partially or completely replace the human factor during compulsory legislatively determined within the workday breaks at operation with computer systems, during the intervals of out-of-office hours of the customer service center, official non-presence days, because of various national holidays, etc. In this situation we can assume, that presently the CBs duplicate the activity of the conventional experts in informational customer service, but with the advancement of the development of technology and digitalization of information services they will turn into a dominating approach for incoming information inquiries. Furthermore, their improvement can lead to their broader application in the outgoing communication during the interaction with present and potential customers, and transform the CB technology into an active party in the initiation of the information contact.

### **Conclusion**

The application of the CB in retail and the activities for servicing of employees and customers, is one of the important introductions of the digital transformation. The expansion of their application will allow customers to receive faster and with a bigger comprehensiveness answers to routine problems and questions from personal and business day-to-day life. The expanding possibilities for the application of artificial intelligence in the CB technology will lead to more complete communication and broader opportunities for the establishing of situations for the automated satisfaction of the informational aspects of the economic and social interests of the participating parties.

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