THE BUSINESS IMPLICATIONS OF CHATBOTS

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Abstract: *Although chatbots have revolutionized the customer service globally, they are still considered to be a novelty in Serbia both by the companies and customers. In order to understand the current state of chatbots in business, we first examined the theoretical background in this respect, and then surveyed around 30 organisations in Serbia which deploy either Facebook Messenger, Viber chatbot, webpage chatbot, or any other chatbot platform functionality. The aim was to determine the level of satisfaction with the current use, to identify the key performance indicators, as well as the functionalities which require some improvements, ultimately mapping the business services which benefit the most from these virtual, conversational agents. The conducted research can be used to forecast the industry trends and sentiments regarding the business chatbots usage in Serbia, in terms of its future prospects in the digital customer experience.*

Keywords: *Chatbots, Facebook Messenger, Viber, Customer Experience, Serbia*

1. INTRODUCTION

What digital buyers today expect from the brands is a seamless omnichannel experience and instant gratification. And because customers are so demanding, businesses need to respond by shortening the interaction path with the exact mix of channels and intelligence to get the right information at the place, device and time that suits them most [1].

Nowadays, chatbots are becoming a focus of interest in solving this problem. These virtual agents, dialogue systems, chatterbots, or chatbots are machine conversation systems that interact with human users via a natural conversational language. The purpose of a chatbot system is to simulate a human conversation. Namely, the chatbot architecture integrates a language model and algorithms to emulate an informal chat communication between a human user and a computer, using a natural language [7]. To better understand chatbots, the starting point should be the concept of conversational interface, defined as an interface that a user can interact with by means of a conversation, via a spoken or typed natural language [2]. The terms Natural User Interface (NUI) and Conversational Interfaces are sometimes used interchangeably. A NUI is an interface where you interact by using natural inputs like speech, touch and hand gestures [2], while chatbot is an example of a conversational interface. It is an artificial entity that is designed to simulate an intelligent conversation with human partners through their natural language, and is considered to be one of the classical interfaces for natural language interactions between man and machines [3].

From the conversational aspect, there are three ways that chatbots can converse with the users: system-initiated chatbots (where the system leads the conversation), user-initiated chatbots (where the user leads the conversation) and mixed initiative, all with their pros and cons. Limitations of user-initiated dialogues are errors in speech recognition and understanding, since users can say anything they want. The limitation of system-initiated dialogues is that the user's input is limited, but the interaction is more efficient. The advantage of a mixed-initiated dialogue is that the system can guide the user, but the user is also free to say anything he wants and take initiative in asking questions. The limitations are that the system has to be technically advanced to keep track of its own structure/agenda, understand and answer the user's utterances correctly and remember the relevant spoken information [12].

1.1. Chatbot Anatomy

A chatbot analyses the user input and gives a suitable response using natural language processing (NLP) and artificial intelligence (AI). Most of the chatbot systems use some form of NLP by matching the user's input against a knowledge base of words and phrases, and select a suitable response based on the input and the context of the conversation [4]. Consequently, chatbots mainly consist of three parts:

1. An interpreting program, comprising an analyser and a generator for communicating with the user interface. The analyser reads the input dialog from the human partner and analyses the syntax and semantics of the sentence, acting as a pre-processor of the user input and using different normalization techniques (pattern fitting, substitution, sentence splitting). The generator processes the response given by the chatbot engine and generates an appropriate, grammatically correct sentence to display.

2. A chat engine as an interface engine, trying to match the pre-processed output of the analyser and identifying the suitable answer using pattern-matching algorithms with the help of the knowledge base.

3. A knowledge base that encapsulates the intelligence of the system, composed of keywords/phrases and responses associated with each keyword/phrase, extracted from XML, text files and databases.

Figure 1 illustrates the typical components of a chatbot and the relation between these components [3].
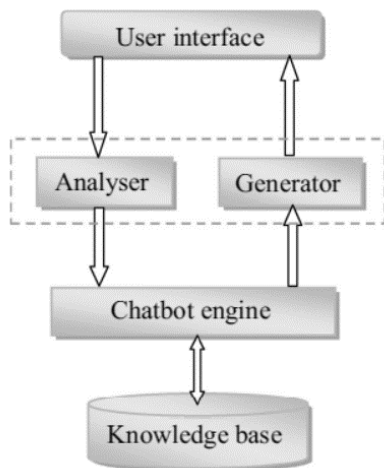

Fig. 1. *Typical components of a Chatbot*

1.2. From Eliza to Facebook Messenger

Chatbot technology emerged in the 1960's. The very first chatbot, named Eliza [5] by Joseph Weizenbaum, simulated a Rogerian psychotherapist. It was inspired by the ideas of the computer scientist Alan Turing [6] that someday, a machine can be as intelligent as the humans. Turin made the so-called "Turing Test" to check the presence of a mind, thought or intelligence in a machine: if a machine can fool a human and make the humans believe it is a human, the machine passes the test. The seventies and the eighties, before the arrival of graphical user interfaces, saw a rapid growth in text and natural-language interface research. Since that time, a range of new chatbot architectures have been developed, such as A.L.I.C.E. (Artificial Linguistic Internet Computer Entity or Alicebot), first implemented by Richard Wallace in 1995. Alice's knowledge about the English conversation patterns was stored in the Artificial Intelligence Mark-up Language (AIML) files, as derivatives of the Extensible Mark-up Language (XML) [7].

In terms of chatbots maturity, Smiers (2017) defines three levels:

1. Interaction, as the user experience (UX) of chatbots is different than for websites, since the interaction is done through textual input.

2. Intelligence, which describes the capability of a chatbot to understand and provide a relevant utterance which is in line with the intent of the user.

3. Integration, which is about the back-end of a chatbot and how well it is integrated with other websites, servers or services from other websites and applications.

When it comes to modern chatbots implementation, [15] identified the three main roles:
- Digital Assistant;
- Information Provider;
- General chatbot.

Based on that, the most common uses of chatbots in today's technology landscape are for the purpose of education [8], information retrieval [9], business and e-commerce [10], and for customer service [11], which is estimated to be 'the major beneficiary of chatbots' in the future [12]. The application of mobile messenger chatbots for commercial purposes is at the beginning of a development stage called 'conversational commerce'. Namely, a chatbot can recognize the buyer's intent and refine the offer based on the buyer's choices and preferences, helping customers sift through data and products to make decisions [18].

Social bots started to gain popularity among retailers and publishers following Facebook's decision to integrate chatbot capabilities into its Messenger functionality in 2017 [17]. Social bot is a computer algorithm that automatically produces content and interacts with humans on social media, trying to emulate and possibly alter their behaviour [13]. Another popular instant messaging bot is Viber chatbot, but there are also many other platforms in use for building own chatbots. Although these types of bots are designed to provide a useful service measured through user satisfaction, precision, recall, accuracy and task completion [11], they can sometimes be harmful, for example when they contribute to the spread of unverified information or rumours, or in the case of misinterpreting when a deviation from the pre-programmed script leads to customer frustration [13].

Although chatbots have revolutionized the customer service globally, they are still considered to be a novelty in Serbia both on the part of companies and customers, which explains the lack of research on this topic. The first experiments were made with Viber public accounts and automated Facebook Messenger functionality in 2016 [19], followed by more advanced solutions based on AI emerging in 2017. The following sections present the findings from the survey involving around 30 organisations in Serbia which deploy either Facebook Messenger or Viber chatbot.

2. METHODOLOGY

The aim of our research was to examine the level of chatbots use for business purposes in Serbia, based on the following research questions:

RQ (1): Are organisations in Serbia using chatbots?

RQ (2): How do users perceive chatbots?

RQ (3): What are the business implications of chatbots in Serbia?

For that purpose, an electronic survey administrated via the Survey Monkey platform was distributed in March-April 2018 to the organisations mapped in the cabinet research phase, which are either using Facebook Messenger, Viber chatbots or any other intelligent conversational platforms like RapidPro, Telgram, Signal and Chattler.

Due to the lack of official data about the organisations in Serbia using chatbots which are enabling two-way communication, the dataset for the survey sample was extracted from the media reports about the topic, desk research of Facebook Messenger and/or Viber Public Chat and personal connections from the marketing agencies. After omitting Viber public accounts and automated Facebook Messenger from the list, 28 companies deploying advanced conversational agents remained and 23 responded to our survey questionnaire.

The survey consisted of 10 questions, three of which were related to the better understanding of the gathered sample: name of the organisation, field of industry and the responder's working position. The remaining seven questions were related to the applied chatbot type, year of deployment, the level of business and client satisfaction, the business purpose of use, the applied key performance indicators (KPIs) and the functionalities to be improved in the future.

Furthermore, some of the results were intersected with the outcomes of the survey conducted by the marketing agency Homepage in 2017 about the same topic (chatbots use), but from the user perspective. The aim of this survey was to develop the communications strategy of the Weaver Notification Platform - the advanced chatbot solution of the software company Saga. The participants were adult citizens of Serbia, and questions were divided between those familiar with chatbots and the others without such experience, bringing in total 192 responses to the survey.

3. RESULTS AND DISCUSSION

The gathered survey sample shows that the majority of the participants came from the IT/ICT sector (25%), followed by the media (portals; 21%), financial sector (banking industry; 17%), and food and beverage sector (13%). A minority were from the sectors such as retail (home appliances and distribution of technical goods), oil industry, NGO and entertainment (music festival) (Figure 1).
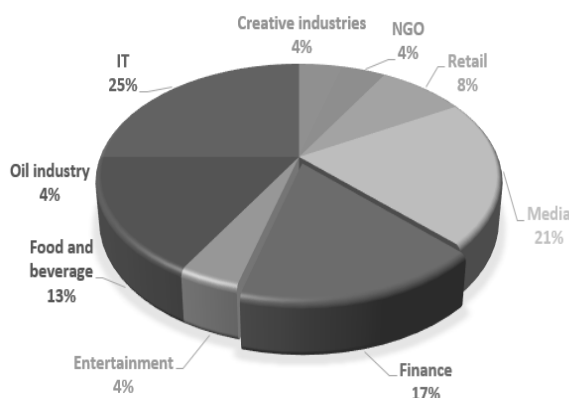

Fig. 2. *The sectoral use of chatbots (source: authors' survey)*

The persons who responded to the survey came from a variety of positions, including "digital marketing specialist", "head of e-commerce", "community/social media manager", "digital transformation manager", "head of digital banking", with the common keyword "digital", showing that the chatbots functionality is linked with the digital transformation, or supports the e-commerce business function. Based on that, we could conclude that the conversation and sales via new platforms such as chatbots are a response of the businesses to the demands and habits of new digital consumers.

Next, we were interested when the surveyed organisations implemented chatbots in Serbia, compared with the chatbot implementations worldwide. The year 2017 has seen an increase in chatbot usage, as more than a half (54.2%) of the surveyed participants marked it as a kick-off year. A third of them have started using chatbots even before 2017 (33.3%), which we consider to be advanced practice and a positive finding, having in mind that Facebook released its Messenger bot in the second half of 2016 [19], and that 2016 is considered as the year of global acceptance of chatbots in business. The remaining responses stated to have chatbots in their pipe-line for this year (12.5%).

When asking our participants about their satisfaction with the previous results in using chatbots, the majority of the organisations showed a rather positive sentiment (very satisfied and satisfied combined - 70.8%). The remaining third (29.2%) found their experience so far rather neutral (neither satisfying nor dissatisfying), whereas none of the organisations expressed their experience as dissatisfying. The mean level of chatbots satisfaction in the surveyed businesses was 3.9 (SD = 0.67), which shows a fairly high level of satisfaction. When combining our results with the survey conducted amongst chatbot users, two thirds of them (67.2%) stated that they already have a communicational experience with chatbots, and the remaining third (32.8%) was without such experience. The mean level of users' chatbots satisfaction was 3.37, which is slightly less than the businesses' satisfaction.

Most of the surveyed organisations deploy Messenger (70.8%), followed by Viber chatbots (41.7%), and a minority have chatbots as add-on on their website (12.5%). Individual cases showed the use of chatbot platforms like RapidPro, Telegram, Signal and Chattler (20.8%). Having in mind that this was a multiple-choice question, the gathered results led us to conclude that some of the surveyed organisations are using more than one conversational agent.

Furthermore, our survey showed that organisations in Serbia predominantly use chatbots for customer service (45.8%), as a marketing channel (41.7%) and for the purpose of online selling (29.2%). Somewhat less frequent means of chatbot usage include research and development (16.7%), distribution, processing and information on the status of the order (8.3%) and for recruitment of employees (8.3%). This question was also a multiple-choice question and showed that the functionality of deployed chatbots is multiple rather than single-functional. On the other hand, the survey from the users' perspective showed that more than half of the population who experienced communication with chatbots, used them to gather information (63%). Users are also occasionally searching products on websites via chat functionality (19.4%), as a substitute for call centres (15.7%), for making appointments (10.2%), for e-

commerce (10.2%) and for executing e-transactions (8.3%). When asked about the reasons for their communication by means of chatbots, the surveyed users mostly stated the following: to try conversational innovations (49.1%), easy and fast way of gathering information (29.6%), reaction to an advertisement (20.7%) and offered benefits or rewards (10.2%).

For the organisations participating in our survey, the top three key performance indicators (KPIs) in using chatbots from the business perspective were: improved customer satisfaction (66.7%), increased social media engagement (58.3%) and reduced response time (54.2%). The rest of the answers were related to the improved loyalty and cross/up-sales (both 25%), achieved savings in reducing customer service personnel (16.7%) and digitally transformed communication with clients (12.5%). In that respect, it is interesting to mention the results of the LiveWorld survey [14] on messaging apps and chatbots, where global marketers stated increased customer engagement to be the most often used KPI, followed by customer satisfaction, increased transactions, customer loyalty and reduced response time.

The majority of the surveyed organisations (75%) marked the humanization of chatbots as the trait they would desire to be enhanced in the forthcoming period. The rest of them marked functionalities such as UX (12.5%) and the security of client data (8.3%). From the customer perspective the answers were similar, as exactly one third (33.3%) said that UX needs to be improved and the dominant answer was that nothing can replace communication with a real human (47.4%), which implies that the increased degree of humanization of the chatbots is indispensable. Another third of the responders stated that the improvements should be in the form of the more beneficial and engaging content (29%).

A half of the surveyed organisations stated that their users reacted positively to their chatbots functionality (extremely positive and positive combined - 70.8%), and one third (29.2%) as neutral. These results somewhere coincide with the survey involving the users (average satisfaction rate was 3.37). It is important to mention that the level of satisfaction was affected by customers who never experienced communication with chatbots, due to the fact that they never came across any chatbots (51%) or never even heard about this functionality (39.2%). A less frequent answer was that they prefer communicating with a real human (17.7%), and only a minority (1.9%) stated to feel mistrust. Finally, the LiveWorld global survey on chatbots [14] showed that there was a significant difference between the tasks in the chatbot, where a simple task was perceived as more useful, with a better UX and higher user satisfaction. Hence, a simple task with a clear goal (problem-based) receives a significantly higher UX score than a more complex task with a more uncertain outcome (opportunity-based) in a chatbot. The following aspects were identified as potentially having influenced the user's opinions, such as: AI, the goal of the chatbot, visual and UI elements, the way the text is presented, security issues and usefulness.

4. CONCLUSIONS AND LIMITATIONS

The rapid evolution of technology and social media has brought significant changes to human communication. Since the efficiency of social networks depends mainly on the processing of their huge amount of collected data, they are all oriented not only towards the latest artificial intelligence but also towards the creation of a more evolved one. Advertising, digital marketing and customer service of social media is in the first line for this demand, and chatbots might be one of the solutions.

In Serbia, the sectors which are advancing in chatbots deployment are those who are following the pace of the digital transformation (banking) or have digitalized their sales function. Thus, Facebook Messenger and Viber chatbot are the dominantly used platforms, as they are generally known and simple to use. Moreover, organisations are satisfied with their new, fancy functionality, although the impression is that the users are still not aware, or introduced to this functionality, rather new for the Serbian market (RQ2). For those organisations keen to adopt chatbots in the future or increase the number of users, an educational campaign in the form of tutorials combined with the clear advantages from the user perspective would help.

From the business perspective, chatbots have multiple functions, the most common ones being customer service, marketing channel and e-commerce. However, users are rather opting for information gathering and customer service (RQ2). The low use of chatbots for sales purposes brings us to the conclusion that chatbots in Serbia are still at the trail-test level and not heading in the direction of advanced use.

The predominantly positive sentiment on the part of the users who experienced chatbots versus a rather high number of them who never heard or experienced this type of intelligent AI conversation, combined with the fact that Serbia is a country with higher rates of internet and social media usage, calls for action of both software companies and organisations deploying chatbots. Furthermore, an enhanced humanization of chatbots for the purpose of increased UX is also a desired activity. Whilst chatbots can serve as an efficient way to offer customers solutions to their problems, their future success will depend on how thoughtfully organizations leverage them to meet the customers' needs. After all, the business implication of chatbots in Serbia on delivering a great customer experience via new, modern ways of communication depends on it. Our conclusion (RQ3) is that this battle is waged in two fields: users will need to get familiar with the great functionalities of chatbots, and organisations need to keep improving the chatbot humanisation and UX.

The biggest limitation of the conducted research was the size of the sample, which is too small for drafting general conclusions. However, a small sample indicates the rather low level of chatbots in current business use, which brings us to the conclusion that chatbots are still not widespread on the Serbian market (RQ1).

Why is the situation as it is? This is an open question which we hereby invite other researches to focus on in the future.

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