Digital Transformation and Automation: Application and Effectiveness of Chatbots in Bulgarian Entrepreneurship

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Abstract: In view of the growing importance of digitalisation, this study examines the adoption and use of chatbot solutions based on artificial intelligence among Bulgarian entrepreneurs. The aim is to identify the main reasons for their implementation, the perceived benefits and challenges encountered, and the main areas of application. A survey was conducted among 401 business owners in Bulgaria. The results show that *38%* (154) of the surveyed entrepreneurs use chatbots and the analysis focuses on their data. The main factors driving implementation are increased efficiency, improved customer service and reduced costs. Improved operational efficiency and customer satisfaction were identified as the leading benefits. However, entrepreneurs face significant challenges, mainly related to the ability of chatbots to handle complex queries, the need for staff training and customer acceptance. Chatbots are most often used in marketing and sales, but they also have applications in customer service, internal processes and data analysis. In conclusion, despite the still relatively low adoption rate among all respondents, Bulgarian entrepreneurs with experience using chatbots see clear benefits related to efficiency and customer service. Successful expansion of this technology requires addressing current challenges, especially in terms of functionality and the human factor.

1 INTRODUCTION

The advancements in artificial intelligence (AI) and the global proliferation of chatbots (CBs) have led to their significant rise across various industries, highlighting their potential to improve customer service (CS), streamline operations, and drive business growth. CBs offer *24/7* availability, efficient processing of routine tasks, cost-effective solutions, and fast response times (McClune, 2024). In addition, modern AI CBs can continuously learn from interactions, provide personalised experiences, and automate multiple processes (SAP, 2024).

In a broad sense, CBs can be defined as software that accepts natural language as input and generates natural language as output by engaging in a conversation. Another definition emphasises their attempt to resemble a human-like character and defines them as interactive virtual characters whose mission is to assist people in high-profile environments. In addition to engaging in written conversations (text-based CBs), CBs can also imitate human speech (voice-based CBs) to improve the user experience and cultivate customer loyalty. CBs can be found on websites, social media, or instant messaging applications. They can be deployed within an organisation to support various services and processes, such as internal support systems, IT service management, training, or human resource management (Miklosik *et al.*, 2021). According to one of the most established developers of technological innovations, integrating AI CBs into business processes can lead to a *45%* increase in customer trust and loyalty through transparent and responsible AI practices (ESG with AI, n.d.).

At the same time, the Bulgarian entrepreneurial environment is characterised by a significant role of small and medium-sized enterprises (SMEs) as key drivers of economic growth (Ministry of Transport, 2020). The country's digital transformation efforts and the growing importance of technology adoption for competitiveness are evident (Digital Watch Observatory, 2020). However, a number of analyses highlight the relatively lower levels of digital skills

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and technological adoption in Bulgarian SMEs compared to the European Union (EU) average and identify them as both challenges and opportunities (Ministry of Transport, 2020). While CBs adoption is growing, the level of sophistication and degree of integration can vary significantly among Bulgarian SMEs. The emergence of local CBs platforms and language-specific AI models indicates an adapted approach to the Bulgarian market. This creates an opportunity to explore the specifics of CBs adoption and effectiveness in this context.

This study focuses on the need to understand the extent and effectiveness of CBs implementation among Bulgarian entrepreneurs. The main objectives include collecting data from business owners and managers through a questionnaire to assess their perspective on the use of CBs and their effect on various aspects of their business. The report is structured by first analysing the status and benefits of CBs implementation, as well as analysing sample indicators to measure their effectiveness. The research methodology and the design of a questionnaire that examines the benefits and challenges of and against the implementation of CBs in the Bulgarian context are presented.

2 THEORETICAL BACKGROUND

AI-powered systems have many potential applications in decision support, manufacturing automation, learning, communication, *etc.* Communication between online users and organisations is shifting towards interactions with AI-powered systems. CBs are just such an example of a technology being used in computer-mediated communication, where AI agents are increasingly taking on roles that humans once performed. The advantage of deploying AI-powered CBs is that they create the impression of intelligence as they become smarter with increased data and user interactions (Miklosik *et al.*, 2021).

CBs powered by AI are used in a variety of business areas, such as customer communication, marketing activities and sales processes, which leads to the optimisation of time and resources. In a study conducted by CBInsights and analysing the 12 most significant CS technologies, AI CBs are identified as a top priority for businesses. Since the challenges and current trends observed internationally are comparable to those in the Bulgarian business environment, local companies are expected to invest in this technology. The goal is to improve customer interaction and other operational aspects. Estimates show that most AI CBs can independently process between *60%* and *70%* of incoming inquiries (Umni, n.d).

Azmi *et al.* (2023) also define a chatbot as an AI application designed to simulate human conversation through text or voice interactions. It is typically used to provide automated customer support, answer frequently asked questions, assist with tasks, and engage in conversation with users naturally and conversationally. According to the authors, CBs can operate in two main types: rule-based and AI-driven. Rule-based CBs follow predefined rules and patterns to respond to user inputs; however, AI-driven CBs use machine learning algorithms to better understand and generate responses based on vast amounts of training data. CBs can complement business intelligence systems in several ways. In essence, CBs provide a natural language interface that allows users to interact with the business intelligence system using natural language. They can help users formulate queries, select appropriate visualisations, and interpret results, allowing users to extract information on their own.

This makes it easier for non-technical users to access and analyse data about the company or organisation. CBs can offer contextual information and suggestions during conversations or decision-making processes. Therefore, CBs could provide personalised analysis and recommendations according to user preferences, patterns, and behaviour. Routine tasks in a business intelligence system, such as generating reports, scheduling data refreshes, or monitoring key performance indicators (KPIs), can be easily automated by CBs, which allow for continuous learning from user interactions and improving responses using machine learning techniques (Interoperable Europe, 2024; Microsoft, 2025).

The pandemic has stimulated the adoption of digital services among Bulgarian businesses, which had not widely adopted CBs until then. This has become a necessity due to challenges such as the lack of employees and the demand for self-service options by customers. In the context of the EU digital agenda, digitalisation is becoming a top priority for Bulgaria and its business sector (Interoperable Europe, 2024). A survey shows that a significant part of companies (*47%*) intend to invest more in digital technologies than in the past year. About a third will maintain the same volume of investments, and a tiny percentage (*2%*) foresee a decrease. These data clearly

demonstrate increasing digital activity in the majority of industries (Umni, n.d.).

Available information shows a growing interest and adoption of CBs among Bulgarian enterprises, especially SMEs, driven by the need to optimise customer communication and improve business processes. There are concrete examples of Bulgarian companies using CBs in various sectors such as tourism, beauty services and e-commerce (Umni, n.d). In addition, the development of Bulgarian-specific AI CBs such as BgGPT shows a growing local capacity and focus (AI4Green, 2024). Also, the cost reduction and labour savings are significant motivators for the adoption of CBs among Bulgarian entrepreneurs. The need for 24/7 customer support and improved response times plays an equally important role (Umni, n.d). The automation of routine tasks and the release of human resources for more complex issues are other key factors. At the same time, the desire to improve customer engagement and provide personalised experiences is also driving the adoption of CBs (Maderis, 2024).

Many sources point to a growing adoption of CBs in Bulgaria (Ministry of Transport, 2020; SAP, 2024; AI4Green, 2024), including basic, rule-based CBs for handling frequently asked questions and simple queries. Alongside these, AI-based CBs with natural language processing are being implemented to facilitate more complex interactions. These CBs are finding applications in CS, sales, marketing and internal communication in Bulgarian SMEs (SAP, 2024).

However, the study shows that there is a gap between the global trend of CBs use and the specific context of Bulgarian SMEs, suggesting a potentially lower level of understanding. The global increase in CBs adoption is undoubtedly due to their numerous benefits (McClune, 2024), but lower digital skills in Bulgaria (Ministry of Transport, 2020) may affect the ease of CBs adoption and perceptions of their effectiveness.

The effectiveness of CBs in a business context can be assessed using several key dimensions. One of them is efficiency, which includes aspects such as response time, problem resolution rate, and capacity to handle a large number of queries. Another critical dimension is cost reduction, which can manifest itself as savings in CS and reduced employee workload. Customer satisfaction is also essential and can be measured through metrics such as user satisfaction and positive feedback. CBs can also influence employee efficiency through the automation of routine tasks and the ability to focus on more complex issues. Finally, the percentage of completed goals, such as customer inquiries successfully handled, leads generated, or sales made, is an essential indicator of CBs effectiveness.

There are specific quantitative KPIs that can be used to quantify the performance of CBs. These include the total number of interactions, the average chat duration, and the percentage of goals completed. Other important metrics include the number of misunderstood lines and the rate of escalation to a human (Behl, 2024). Conversion rate, retention rate, error rate, and return on investment (ROI) are also critical metrics. In addition, metrics such as bot experience score, bot automation score, and automated conversation cost can be tracked. Interaction volume, bounce rate, conversation length, and handling time also provide valuable information (Calabrio, n.d.).

3 METHODOLOGY

The research methodology is based on a survey conducted between *April 20 and May 10, 2025,* and aimed at owners of micro, small and medium-sized enterprises, as well as large companies with over 250 employees. The study sample is formed based on the number of owners of Bulgarian companies. According to data from the National Statistical Institute of Bulgaria (NSI, 2024), the total number of non-financial enterprises in Bulgaria for 2023 is 462,752. Therefore, the minimum recommended size of the study is 383 respondents, with a confidence level of *95%* and a margin of error of *5%.* It is important to emphasise that the minimum sample size does not guarantee a number of respondents that fully meet the scope of the study, such as companies that have implemented CBs solutions. At the moment, the latter is impossible to achieve, since there is no data on how many enterprises in Bulgaria have implemented CBs solutions.

The questionnaire was developed based on the main challenges, benefits and indicators for measuring the effects of implementing CBs identified in the theoretical background. This also determines the content of the main statements in the questionnaire, including the following topics: reasons for implementation, implementation process, perceived benefits and challenges, impact on business goals, and satisfaction with the work of the CBs. Respondents are invited to respond to the formulated statements on a scale from 1 to 5, where *1 is the lowest* and *5 is the highest* possible score.

Regarding the question exploring the areas of application of CBs – *"Where exactly in your company*

have you implemented CBs solutions?", the following options are included, with the possibility of selecting more than one:

- *Customer Service / Support*:

On the company website (to answer frequently asked questions, direct customers, collect information for requests); On social networks (*e.g.* Facebook Messenger, Instagram DMs – to answer inquiries, provide information); On a mobile application (if available – for support and navigation); For initial processing of customer requests before handing them over to an employee;

- *Sales / Lead Generation*:

On the website to qualify visitors and collect contacts; To *recommend* products/services based on customer needs; To schedule demonstrations or consultations; To process orders or reservations (less common for complex processes, but possible for standard ones);

- *Marketing*:

To engage website visitors (*e.g.* through interactive quizzes, collecting opinions); To promote new products/services or special offers; To segment the audience and personalise messages; To conduct surveys and collect feedback;

- *Internal processes / Employee support*:

IT support (to answer common technical questions, collect information about problems); Human Resources (HR) (to answer questions about leave, benefits, internal procedures; to onboard new employees); To access internal information and databases (*e.g.* to check availability, project statuses);

- *Data collection and analytics*:

For automated collection of opinions and feedback from customers; For analysis of the most common queries and problems;

- *Other (please specify)*:

This option is very important to capture specific or innovative applications that you did not foresee;

- *We have not implemented chatbot solutions.*

The survey was distributed through email newsletters from various professional networks, social networks, communication channels, and personal contacts of the study authors. The main research questions (RQ) that the study seeks to answer are:

RQ1: What are the *main reasons* for implementing chatbot solutions?

RQ2: What *benefits and challenges* do Bulgarian entrepreneurs identify?

4 RESULTS

The survey included 401 respondents. According to the size of the organisation, 122 *(30.4%)* represent companies with less than 10 employees, 187 *(46.6%)* – with between 11 and 50 employees, 69 *(17.2%)* – with between 51 and 250 employees, and 23 *(5.7%)* – with over 250 employees. Therefore, the main profile of the survey participants is that of representatives of micro and SMEs in Bulgaria.

The organisations that have not yet implemented CBs solutions are mainly representatives of micro-companies – 82 (*33%*), small organisations – 97 (*39%*), medium-sized enterprises – 49 (*20%*), and 19 large companies (*8%*). Probably the micro and small enterprises cannot secure access, underestimate or at the highest level ignore CBs solutions as opportunities for improved performance. It is also possible that, according to the specifics of their activities, as well as the current level of success achieved, these organisations do not currently need CBs solutions in their activities.

Of those who have implemented CBs solutions, 40 (*26%*) are representatives of micro companies, 90 (*58%*) are representatives of small organisations, 20 (*13%*) are medium-sized enterprises, and 4 (*3%*) fall within the definition of large companies.

No respondent chose the opportunity to indicate an option other than those already suggested for the question *"Where exactly in your company have you implemented CBs solutions?"*. Of the total number of respondents, 247 *(62%)* stated that they have not yet implemented CBs solutions in their activities. With the possibility of selecting more than one answer, the remaining 154 *(38%)* respondents indicated different areas of application (Figure 1). The data shows that Bulgarian entrepreneurs perceive CBs primarily as tools for improving external communication and operations, with marketing and lead generation being the leading application areas. While CS remains an important aspect, it is not the dominant function.

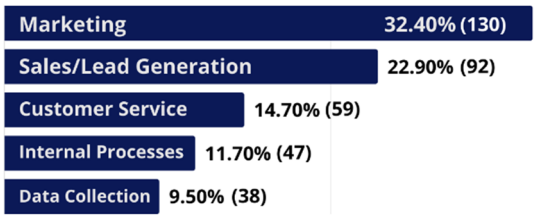

Figure 1: Areas of application of CBs according to Bulgarian entrepreneurs. *Source*: Own development.

Table 1: Descriptive statistical analysis of the data generated in the study. *Source*: Own development.

Descriptive statistical analysis – number of responses* (N), minimum value (Min), maximum value (Max), average value (Mean), standard deviation (Std. Deviation)					
	N	**Min**	**Max**	**Mean**	**Std. Deviation**
To what extent did the following factors influence your decision to implement a CBs?					
Cost Reduction	154	2	5	3,98	,718
Improving CS	153	2	5	4,09	,729
Increasing Efficiency	154	2	5	4,10	,697
Task Automation	154	2	5	4,12	,660
Competitive Pressure	154	1	5	3,96	,740
To what extent do you agree with the following statements about the benefits of implementing a CBs?					
Reduce CS costs	154	1	5	3,56	,758
Increase the efficiency of business operations	154	2	5	3,75	,811
Automate routine tasks efficiently	154	2	5	3,63	,741
Improve customer satisfaction	153	2	5	3,69	,719
To what extent do you agree with the following statements about the challenges of implementing a CBs?					
We encountered difficulties integrating it with existing systems	154	1	5	3,44	,870
The CBs struggled with complex queries	154	1	5	3,80	,820
Maintaining the CBs' knowledge base required significant effort	154	1	5	3,54	,864
Our employees needed significant training to use and manage the CBs	154	1	5	3,63	,885
Customer adoption of the CBs was lower than expected	154	1	5	3,61	,843
To what extent did the CBs contribute to achieving the following business goals?					
Increased Sales	154	1	5	3,32	,830
Improved Lead Generation	154	1	5	3,55	,768
Improved Customer Retention	153	1	5	3,46	,835
Reduced Operating Costs	153	1	5	3,48	,828
Improved Employee Productivity	153	1	5	3,43	,809
Please answer to what extent...:					
…are you satisfied with the level of integration of the CBs with your existing systems?	152	1	5	3,31	,893
…were the available resources (*e.g.* budget, technical expertise) sufficient for the implementation of the CB?	154	1	5	3,50	,865
…was the process of implementing the CB in your organisation easy?	154	1	5	3,37	,893
…are you satisfied with the overall performance of the CB?	152	1	5	3,42	,917
…are you satisfied with the ability of the CB to understand and accurately respond to customer inquiries in Bulgarian?	154	1	5	3,46	,894
…are you satisfied with the information and data provided by the CB 's analytics?	153	1	5	3,38	,874

**The number of responses (N) in Table 1 may differ from the actual number of respondents (N=154), as respondents were given the option to answer or not to the relevant question/statement, according to their business environment.*

The use of CBs applications for internal processes and analytics is still in its infancy, suggesting potential for future growth and diversification in the Bulgarian business environment. This distribution reflects the general trends in global CBs adoption, where the initial focus is often on marketing and sales funnel automation.

The descriptive analysis of the survey data, presented in Table 1, shows that Bulgarian entrepreneurs are implementing CBs primarily to improve task automation, increase efficiency, and improve CS. Competitive pressure and the desire to reduce costs are also strong drivers, but there is also greater diversity in the responses of Bulgarian entrepreneurs.

Although there is even more dispersion in the answers, the next section of statements/questions supports this data to some extent. Respondents do not clearly identify one of the benefits mentioned. With the lowest support, but still close to the others, is the reduction of costs. The fluctuations here may be the result of the fact that technological innovations, which in themselves require significant investment, are unlikely to lead to cost reductions generally. Or at least not as quickly as, for example, improving the efficiency of business operations, which stands out with the highest degree of support. Based on the data generated by the study, it is possible to search for and discover interesting correlations (Table 2) that could reveal important insights into the impact and outcomes of CBs' implementation.

Table 2: Relationship between reasons for implementation and achieved business goals. *Source*: Own development.

		Improved Customer Retention	**Improved Lead Generation**	**Increased Sales**	**Improve customer satisfaction**
Improving CS	Pearson Correlation	,805**	,768**	,850**	,770**
	Sig. (2-tailed)	,000	,000	,000	,000
	N	153	153	153	153
** Correlation is significant at the 0.01 level (2-tailed).					

		Reduce CS costs	**Increase the efficiency of business operations**	**Automate routine tasks efficiently**	**Increased Sales**	**Improved Employee Productivity**
Task Automation	Pearson Correlation	,762**	,802**	,749**	,846**	,788**
	Sig. (2-tailed)	,000	,000	,000	,000	,000
	N	154	154	154	154	153
** Correlation is significant at the 0.01 level (2-tailed).						

Table 3: Regression Model Summary: Impact of Achieved Business Goals on Chatbot Integration Satisfaction. *Source*: Own development.

Model Summary[b]					
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
1	,940[a]	,883	,879	,310	,570
a. Predictors: (Constant), [Improved Employee Productivity], [Improved Lead Generation], [Increased Sales], [Improved Customer Retention], [Reduced Operating Costs]					
b. Dependent Variable: [To what extent are you satisfied with the level of integration of the CBs with your existing systems?]					

Table 4: Analysis of variance (ANOVA) of the regression model: Impact of achieved business goals on satisfaction with chatbot integration. *Source*: Own development.

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	106,392	5	21,278	220,724	,000[b]
	Residual	14,075	146	,096		
	Total	120,467	151			
a. Dependent Variable: [To what extent are you satisfied with the level of integration of the CBs with your existing systems?]						
b. Predictors: (Constant), [Improved Employee Productivity], [Improved Lead Generation], [Increased Sales], [Improved Customer Retention], [Reduced Operating Costs]						

The correlation analysis presented in Table 2 examines the relationships between two main reasons for implementing CBs – "*Improving CS*" and "*Task automation*" – and various achieved business goals. For the analysis, Pearson correlation coefficients (r) were calculated, with the statistical significance of all correlations assessed at the p<.01 level (two-tailed). The results reveal that the drive to improve CS is strongly and statistically significantly associated with multiple positive business outcomes. A robust positive correlation was found between "*Improving CS*" and "*Increased sales*" (r=.850, N=153, p<.001), suggesting that efforts in this direction contribute significantly to growth in commercial activity. Similarly, substantial positive relationships were reported with "*Improved Customer Retention*" (r=.805, N=153, p<.001), "*Improved Lead Generation*" (r=.768, N=153, p<.001), and "*Improved Customer Satisfaction*" (r=.770, N=153, p < .001). These findings underscore the pivotal role of focusing on customer experience in implementing CBs to achieve a broad range of desired business objectives directly related to the customer base.

In parallel, the analysis demonstrates that task automation, as a motive for implementing CBs, is also strongly and statistically significantly associated with achieving key operational and financial goals. A robust positive correlation was found between "*Task Automation*" and "*Increase in the efficiency of business operations*" (r=.802, N=154, p<.001), which is a direct reflection of the expected benefits of automation. Significant positive relationships were also found with "*Reduce CS costs*" (r=.762, N=154, p<.001), "*Effective automation of routine tasks*" (r=.749, N=154, p<.001), and "Improved employee productivity" (r=.788, N=153, p<.001). It is also

noteworthy to observe the strong positive correlation with "*Increased sales*" (r=.846, N=154, p<.001), which suggests that optimising internal processes through automation indirectly contributes to revenue growth.

To examine the impact of achieved business goals on satisfaction with the level of chatbot integration, a multiple linear regression analysis was conducted. In this model, the dependent variable is " *To what extent are you satisfied with the level of integration of the CBs with your existing systems?*". Five achieved business goals were included as independent variables (predictors): [Improved Employee Productivity], [Improved Lead Generation], [Increased Sales], [Improved Customer Retention], and [Reduced Operating Costs].

The results of the model summary are presented in Table 3. The model demonstrates a strong multiple correlation between the predictors and the dependent variable, with a correlation coefficient of R=.940. The most important indicator, the coefficient of determination (R^2), is .883. This value indicates that approximately 88.3% of the total variance in satisfaction with the level of chatbot integration is explained by the five achieved business goals included in the model. The adjusted coefficient of determination (Adjusted R^2) is .879, which is a more conservative estimate and confirms the high explanatory power of the model. The standard error of the forecast (Std. Error of the Estimate) is .310, which indicates the average magnitude of the error in the model's predictions. The value of the Durbin-Watson statistic is 0.570, which may indicate the presence of positive autocorrelation in the residuals, an aspect that warrants further study.

To assess the overall statistical significance of the regression model, an analysis of variance (ANOVA) was conducted, the results of which are presented in Table 4. The observed F-statistic is 220.724 at 5 and 146 degrees of freedom (F(5,146)=220.724). The corresponding significance level is p<.001. Since this p-value is significantly less than the accepted significance threshold of α=0.05, the null hypothesis that all regression coefficients (except the constant) are equal to zero is rejected.

This conclusion confirms that the regression model as a whole is statistically significant. Collectively, the achieved business goals included in the model make a statistically significant contribution to explaining the variance in satisfaction with the level of integration of the chatbot with existing systems. The high explanatory power of the model (R^2=.883) combined with its overall statistical significance (p<.001) strongly suggests that achieving these business goals is a powerful predictor of higher satisfaction with the integration aspects of chatbot solutions.

In summary, the results of the correlation analysis between the variables in Table 2 strongly indicate that both the orientation towards improving CS and towards task automation in implementing CBs are associated with significant achievement of the respective business goals. All the correlations examined are strong, with coefficients ranging from .749 to .850, and are highly statistically significant. It is essential to note that although these correlations suggest strong associations between the variables, they do not establish causal relationships, but rather indicate that these phenomena are observed simultaneously and in a similar direction within the studied population.

5 DISCUSSION

Bulgarian entrepreneurs identify the ability of CBs to process complex queries as the biggest challenge. This is particularly important in the context of the Bulgarian language, as satisfaction with the ability of CBs to understand and respond in Bulgarian has until recently been rated as relatively low. Other significant challenges include maintaining the chatbot's knowledge base, staff training, and customer acceptance. Integration with existing systems is a challenge, but less pronounced than the others, which indirectly indicates that CBs development most likely follows relatively universal and easily applicable implementation principles.

Of interest here is the identified problem with user acceptance of CBs. The answers vary significantly, and the predominant rating is between 3 and 4. This reported non-acceptance by users may be due to high expectations on the part of entrepreneurs, problems with the language capabilities of the respective chatbot, or overly complex requests (queries) from customers. In all three cases, entrepreneurs should improve the information security of their digital platforms. For example, suppose users are forced to send overly complex queries through chatbot systems. In that case, the corresponding online application (website, social network, *etc.*) does not offer the necessary quantity and quality of information to satisfy the needs of users without the need for automated queries. In any case, it is essential to identify not only the rejection itself (which is obviously already done by some respondents), but also the reasons that led to the rejection.

The overall satisfaction with CBs is moderate to high in terms of their contribution to business goals (lead generation, customer retention, sales, costs, productivity). The diversity in the answers is also understandable, given that each business unit pursues different business goals. The majority report improved customer acquisition and retention, which is the primary mission of chatbot solutions. Cost reduction and improved employee efficiency are also reported as significant results of the implementation of CBs solutions. Accordingly, the lowest support is for increased sales, and the reasons for this can again be sought in various directions. It is possible that the company in question does not have a correct sales tracking system in place or, by default (or due to insufficient understanding), the capabilities of CBs are limited solely to a communication tool.

On the other hand, satisfaction here with regard to sales can be defined as low and even unsatisfactory, given that Bulgarian entrepreneurs indicate that the main area of application is precisely sales, not only attracting potential customers (Figure 1). Therefore, although chatbot solutions generally perform the functions expected of them, there is a discrepancy between the goals set and achieved with the help of CBs.

The *"Please answer to what extent..."* section contains more general questions related to the experience with CBs. In terms of satisfaction with the level of integration of the chatbot with the existing systems, an average value of 3.31 is reported. This indicates moderate satisfaction, especially considering that the integration itself is shown as not that challenging. Satisfaction with the information and data provided by the chatbot's analytics and with the chatbot's ability to understand and accurately respond to customer inquiries in Bulgarian are also rated with average values. Satisfaction with the analytical data is moderate. The assessment of language capabilities confirms that there are significant problems with understanding and responding in Bulgarian, especially with complex inquiries, as reported in the previous questions.

An interesting fact is that only satisfaction (with an average score of 3.5 / Table 1) that the available resources were sufficient for the implementation of a chatbot solution, theoretically exceeded the average values and tends to a good rating. Despite significant variance in respondents' answers, this response shows that entrepreneurs approach the implementation of technological solutions relatively well-off financially.

The study also shows that the implementation of CB solutions in the modern business landscape is motivated by a wide range of strategic goals aimed at optimising processes, improving customer experience and achieving competitive advantages. Respondents from Bulgaria identify "*Cost Reduction*", "*Improving CS*", "*Increasing Efficiency*" and "*Task Automation*" as the leading motives for implementing CBs. These data correspond to general global trends, where the automation of routine processes and cost optimisations in the field of CS are often the primary drivers for investments in AI and chatbot technologies. These findings also reveal significant similarities with global trend results, providing valuable context for understanding regional trends.

According to Umni (n.d.), a leading developer of chatbot solutions for the Bulgarian market, as of 2020, only *30%* of companies worldwide consider themselves to be lagging in implementing innovative technologies. Notably, this percentage was even lower for Bulgaria, with only *25%* of companies feeling the need to invest in digital tools. The company concludes that this relative digital conservatism is one of the reasons for the accelerated rise of AI CBS outside Bulgaria. They also emphasise that, against the backdrop of general market conservatism and still limited knowledge of the technology in the country, the use of AI CBs provides a significant opportunity for Bulgarian companies to differentiate themselves from their competitors. Supporting this growing trend, the current study finds that *38% of respondents have already implemented chatbot solutions*. These solutions are mainly used in the field of marketing and sales, but they also play a significant role in CS, internal processes, and data collection and analysis.

Research suggests that CBs can bring significant benefits to companies, especially in the area of CS. According to a Gartner study, approximately *30%* of the companies surveyed have already implemented or have plans to use CBs. A report by CapGemini also confirms this trend, indicating that almost half of the top hundred companies in the banking and insurance sectors have already implemented CBs. In Norway, where this study is conducted, several large corporations and government organisations have implemented CBs in recent years as part of their digitalisation strategies. As a result of this process, there has also been an increase in the number of local chatbot platform providers in the country (Zhang *et al.*, 2021).

In the Romanian context, academic studies (Anton *et al.*, 2024; Clim, 2025) also emphasise the leading role of efficiency and optimisation in customer interactions as key motivators for the

adoption of chatbot solutions. Research in the Romanian banking sector shows that banks are adopting CBs "*to improve CS by offering fast and accurate answers to their queries*", aiming for a "*positive impact… on customer satisfaction*". This goal has been successfully achieved, demonstrating that improving CS is a leading motive and a notable result in Romania. Furthermore, the implementation of CBs "*increases the efficiency of operations*" by "*automating routine tasks*" and "*reducing waiting times and personnel costs*". More broadly, a survey of Romanian SMEs confirms that "*increasing the efficiency of business operations*" and "*reducing costs*" are the primary drivers for implementing AI technologies, including CBs, which also contribute to enhancing "*customer interactions*" and "*customer satisfaction*". These results demonstrate a strong correlation between the strategic motives for implementing CBs in Bulgaria and Romania, explicitly focusing on operational efficiency, cost reduction, and customer experience optimisation.

The use of chatbots in Croatia is expanding dynamically in both the public and private sectors. During the COVID-19 pandemic, the healthcare chatbot "Andrija" was used by over 30,000 citizens, with over *75%* expressing satisfaction (Petričević & Mustić, 2022). In the corporate sector, 65% of Croatian companies implement chatbots for customer service, automating around half of queries (EOS Group, 2021). Students at the University of North actively use AI chatbots such as ChatGPT and Copilot for training, while a survey of employees in IT companies showed that 95.7% have used ChatGPT, and over 30% use it regularly (Szombathelyi *et al.*, 2023; Horvat *et al.*, 2025). Despite the lack of nationally representative data, these studies point to a growing use of and trust in chatbots in Croatia, in line with global trends in AI. Users appreciate their speed, efficiency, and accessibility, although concerns about security and data privacy remain.

At the same time, the businesses in Croatia are also actively researching and investing in AI and chatbot solutions. One notable example is the Croatian startup Splix.ai, which successfully raised almost €2 million in a pre-seed funding round. This company is developing a chatbot security platform based on AI, which highlights the growing emphasis on security and trust challenges in implementing these technologies (Kostanic, 2024). This demonstrates not only the adoption of CBs but also the development of the ecosystem to support their secure and efficient operation in the country.

In the context of user engagement, Croatian research highlights that the primary reasons users choose to use CBs are their convenience, speed, and 24/7 availability. The use of CBs can lead to higher user satisfaction. These results suggest that companies implementing CBs are likely seeking to enhance CS and reduce costs by automating routine tasks, aligning with trends observed in other countries in the region (Dobrinić *et al.*, 2021; Horvat *et al.*, 2025).

A comparative analysis of results between Bulgaria and other Balkan countries, such as Romania and Croatia, is essential due to the shared economic and socio-cultural context in the region. This commonality of factors ensures higher relevance of comparisons to markets with different maturity and stages of digital transformation, such as those in Western Europe.

Such cross-country comparisons enable the identification of specific regional trends in the adoption of technologies, such as CBs. They can be used to establish whether the motivations for implementation and the achieved results are universal for the Balkans or whether there are unique factors influencing the success of chatbot solutions in specific countries.

Furthermore, such a comparison provides valuable benchmarking for businesses in the region, enabling them to compare their achievements with those of competitors or similar markets. This can contribute to better strategic positioning and adaptation of chatbot solutions to local needs and challenges. Finally, given the often limited specialised scientific literature for smaller markets in the region, comparative analysis helps to build a more comprehensive picture and compensate for this lack of local data.

The analysis performed allows answering the formulated research questions. Regarding the first *RQ1: What are the main reasons for implementing chatbot solutions?* the study shows that the main reasons for implementing chatbot solutions by Bulgarian entrepreneurs are related to operational optimisation (efficiency, automation, cost reduction) and improving market position (improving CS, competitive advantage), with risk management also appearing to play a significant role. Bulgarian entrepreneurs identify key benefits such as increased operational efficiency, improved customer satisfaction and automation of routine tasks. At the same time, they face significant challenges, mostly related to the processing of complex queries by the chatbot, the need for staff training, customer acceptance and maintaining the knowledge base. This

also provides a satisfactory answer to the second research question – *RQ2: What benefits and challenges do Bulgarian entrepreneurs identify?*

Based on this data, the authors conclude that the Bulgarian entrepreneurs and CBs developers should focus on:

- *Improve the understanding and processing of complex queries*, primarily in Bulgarian. This may include investments in more advanced AI models specifically trained for Bulgarian, or hybrid systems that route complex queries to human operators;
- *Optimise the processes for maintaining the chatbot knowledge* base to reduce the effort required to update it.
- *Develop more effective employee training programs* on the use and management of CBs.
- *Strategies to improve customer acceptance of CBs* by emphasising the benefits and convenience they offer and ensuring a seamless user experience.

Limitations of the study

This study has certain limitations that should be taken into account when interpreting the results. First, the lack of detailed information about the field of activity of the surveyed companies and the specifics of their operation (*e.g.*, predominantly online or offline presence, geographical location – city/rural) limits the possibility of a more nuanced analysis of the factors influencing the adoption and effectiveness of CBs solutions in different business contexts. Similarly, the study does not collect data on the specific type of CBs used (*e.g.*, rule-based, AI, hybrid) and the duration of their implementation, which could affect the reported effectiveness.

Secondly, a limitation arising from the method of distribution of the questionnaire survey should be noted. The approach used does not guarantee complete coverage of the entire population of Bulgarian entrepreneurs using CBs technologies, which may introduce a certain degree of selective under-exhaustion and affect the representativeness of the sample. Therefore, the results should be considered indicative of the surveyed group, and generalisations for the entire entrepreneurial community in the country should be made with due caution.

Additionally, during the statistical analysis, a variation in the number of respondents included (N) was observed across the different correlation calculations. In the majority of the analyses, the number of cases was N = 154, but in specific correlation pairs, it decreased to N = 153. This difference is a result of applying a method for handling missing data known as pairwise deletion.

The pairwise deletion method assumes that each correlation coefficient is calculated by including only those respondents who have valid data for both specific variables involved in the given calculation. Unlike "listwise deletion", which excludes the entire respondent if they are missing even one response in the whole set of variables, pairwise deletion allows the use of a larger amount of available information. In this case, the variation of one respondent (154 *vs.* 153) indicates that one respondent provided a response for one of the variables but omitted a reaction for the other variable included in the correlation. Adopting pairwise deletion has its advantages, as it maximises the use of available data, especially when the number of missing values is small and scattered. However, it is essential to note that, although insignificant in this case, it can potentially lead to the calculation of correlations based on slightly different samples, which requires caution in interpretation, especially if the number of missing data points is larger or not random. In the present study, given the minimal difference in N and the high statistical significance of the correlations, this approach is not expected to affect the validity and reliability of the conclusions drawn significantly.

Applicability

The present study contributes to expanding the scientific knowledge on digital transformation in the Bulgarian entrepreneurial sector by providing initial empirical data on the level of adoption and subjectively assessed effectiveness of chatbot (CBs) technologies. It identifies the main areas of application of these tools and, despite its methodological limitations, lays the foundation for future, more in-depth research on the factors determining the successful integration and return on investment in automated communication solutions in the specific national context.

In practical terms, the study's results offer valuable guidance for Bulgarian entrepreneurs. These data can help them make informed decisions about investments in chatbot technologies, focusing on the proven benefits that arise from improved CS, task automation, and increased efficiency. The identified implementation challenges, such as integration difficulties and the need for knowledge base maintenance, allow entrepreneurs to anticipate potential obstacles and proactively plan resources and strategies to overcome them. Understanding user expectations and perceptions of CBs, including factors that drive their satisfaction, can help create more effective and user-centric solutions, ensuring a higher level of adoption.

For chatbot solution providers, the study provides clear guidance on the specific needs and areas of interest in the Bulgarian market. The high correlation between addressing challenges and overall chatbot satisfaction highlights that developing solutions that are easy to integrate, effective in handling complex queries, and supported by an intuitive knowledge base is key to market success.

Providers can use these results to adapt their products and services, offering more targeted functionalities, improved implementation services, and tailored training that meets the current needs of Bulgarian companies. This will enable them to establish stronger partnerships and drive broader chatbot adoption.

For policymakers, this report provides an empirical basis for understanding the dynamics of digital transformation in the Bulgarian entrepreneurial sector. The findings can inform the development of government strategies and programs to support businesses in implementing innovative technologies. Policies can be aimed at stimulating investments in automated communication solutions, ensuring access to training programs to address technical challenges, and increasing digital literacy. Supporting the research and development of solutions tailored to the local context and language-specificities (such as the Bulgarian language) can also be a priority to ensure the maximum applicability and benefit of chatbot technologies for the Bulgarian economy.

Furthermore, the study highlights the need for further research into good practices and challenges in the effective use of CBs, which is beneficial for consultants and training organisations.

6 CONCLUSION

The growing global importance of CBs contrasts with the slower adoption rate and potentially lower level of understanding in the Bulgarian context, which is influenced by factors such as digital skills and specific market conditions. However, there are clear signs of growing interest and adoption of this technology among Bulgarian enterprises, driven by the potential to reduce costs, improve customer service and increase efficiency.

The proposed questionnaire aims to collect valuable data to understand the reasons for implementation, the process, perceived benefits and challenges, as well as the impact on business objectives and daily work. The analysis of the benefits and challenges of implementing CBs in Bulgaria reveals that despite significant potential advantages, there are also country-specific barriers related to technical expertise, language and cultural characteristics. The consideration of the human factor underscores the importance of adopting CBs by both employees and customers. Ensuring adequate employee training and effective customer communications is crucial for the success of these technologies.

Statistical analysis further supports these findings, demonstrating strong and significant correlations between successfully overcoming challenges and high satisfaction with various aspects of chatbot solutions. It was found that companies that coped better with integration difficulties, managed complex queries, and maintained a knowledge base experienced greater satisfaction with the chatbot's implementation and overall performance. Regression analysis revealed that achieved business goals, such as improved employee productivity and reduced operating costs, collectively explain a significant portion of the variance in satisfaction with chatbot integration, highlighting the direct relationship between achieved results and a positive perception of the technology.

In conclusion, CBs represent an essential tool for the digital transformation of Bulgarian entrepreneurs. To realise their full potential, careful consideration of the specific conditions of the Bulgarian market is necessary, along with continuous monitoring and evaluation of their effectiveness.

Future research should focus on gaining a deeper understanding of the specific needs and impact of CBs in various sectors of the Bulgarian economy, as well as on conducting longitudinal studies to track the long-term effectiveness and return on investment. The proposed recommendations and overcoming the study's limitations will enable, on the one hand, more in-depth analyses of the topic, and on the other hand, informed business decisions in this rapidly evolving field.

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