

Digitalization of Business Processes Based on Chatbot Implementation¹

Yuliia Rozghon

Researcher,
Sumy State University, Ukraine
ORCID: <https://orcid.org/0009-0007-7531-2649>

Leonid Melnyk

Doctor of Economics, Professor of Economics, Entrepreneurship,
and Business Administration Department, Sumy State University, Ukraine

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Abstract. *The main aspect of the review is a comprehensive analysis of the development and use of chatbots in the modern world. The article explores the practical aspects of using chatbots in various industries, such as retail, banking, agriculture, and tourism. The authors analyze the specifics of using chatbots in each of these areas, identifying key challenges and opportunities. Based on the analysis of scientific publications and real cases, the authors identify the key advantages and challenges associated with using chatbots. Special attention is paid to the analysis of the impact of chatbots on business processes, customer service and interaction with users. The paper also looks at the potential for chatbots to further develop and integrate with other technologies such as artificial intelligence. Also, the algorithm for successfully introducing a chatbot into the business process for proper functioning and the ROI calculation option to evaluate the integration result is considered. This study provides a comprehensive assessment of chatbots' economic impact on various economic sectors, analyzing their impact not only on efficiency but also on changing consumer behaviour and the competitive environment.*

Keywords: Chatbots, business, economics, automation, optimisation, costs, customer service, customer loyalty, productivity, competitiveness, ROI.

JEL Classification: M21, J24

1 Introduction

In the modern digital world, business models are continuously evolving under the influence of new technologies, which compel companies to adapt to the new market realities. One of the key tools for transforming business processes and customer interactions is chatbots, which are based on artificial intelligence algorithms. The use of chatbots enables the automation of a significant portion of communication processes, reducing customer service costs and enhancing the efficiency of enterprises.

Integrating chatbots into business models opens up new opportunities for personalizing services, providing round-the-clock customer support, and ensuring a swift response to inquiries. This is especially relevant given the growing consumer expectations for speed and quality of service. Moreover, chatbots can serve as an analytical tool,

collecting and processing data to gain a better understanding of user behavior, which aids in making more informed business management decisions.

Researching this topic is extremely important, as the implementation of chatbots alters not only business processes but also consumer expectations, market competition, and overall business strategies. It is crucial to understand how these technologies can be leveraged to optimize business models, improve customer interaction efficiency, and ensure competitive advantages. Such an approach will facilitate the development of effective strategies for sustainable growth and successful business transformation in the face of global changes.

2 Analysis of Recent Research and Publications

In contemporary research, scholars analyze various aspects of chatbot applications in business

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and economics. In particular, the works of Gupta U. et al. (2020), Rossmann A. (2020), and Shataeva T. (2024) examine the effectiveness of automating customer service through chatbots. The authors analyze the technology's impact on cost reduction and the acceleration of customer interactions.

The studies by Khudolii Y. et al. (2023), Kashina M. (2024), Matyash D. (2023), Khudolii Yu.S. (2023), and Krychenko A. (2024) explore the opportunities for service personalization enabled by chatbots, allowing businesses to enhance customer satisfaction. These studies emphasize the importance of adapting chatbots to individual user needs and analyze the factors influencing consumer technology adoption.

Regarding the risks associated with implementing artificial intelligence, the works of Bondar H. (2023) and Amos Z. (2023) investigate challenges related to data protection, ethical considerations, and potential errors in chatbot operations. These issues are crucial for understanding the long-term impact of chatbots on business processes and company reputations.

Against the backdrop of rapid advancements in artificial intelligence, automation of business processes, and growing demands for interactive technologies, chatbots are becoming an integral tool for transforming business models. Their ability to optimize communication processes, enhance operational efficiency, and improve user experiences provides new opportunities for businesses, provided that an optimal implementation algorithm is followed. Additionally, it is essential to consider the development trends of these technologies, particularly the influence of artificial intelligence on the flexibility and personalization of services, as well as the scalability potential of solutions across various economic sectors.

The article **aims** to identify the practical implications of implementing chatbots for businesses and develop recommendations for their effective usage. This research is focused on evaluating chatbots' potential as a tool for transforming business models.

3 Presentation of the Main Material of the Research

The use of chatbots in business is rapidly evolving due to their ability to optimize operational processes, reduce costs, and enhance customer service levels, making them an essential component of the modern digital economy. An analysis of the economic impact of chatbots across various sectors of the economy reveals how the automation of customer-facing and internal processes alters cost structures,

increases productivity, and contributes to the competitiveness of different industries.

The implementation of chatbots in *retail* leads to radical changes in consumer behavior. Personalized recommendations available around the clock and the swift processing of orders create an unprecedented level of convenience. This, in turn, enhances customer loyalty to the brand, as consumers feel that their needs are being acknowledged and met. The growth of online sales, stimulated by chatbots, contributes to increased revenues and transforms the competitive landscape. Companies such as H&M and Sephora utilize chatbots to provide personalized style and cosmetic recommendations, as well as to streamline the product return process (Shetty, 2024; Infotech, 2024). Amazon employs the Alexa chatbot for voice search and purchasing, further enhancing customer convenience (Alexa, 2024). These examples illustrate how chatbots assist retailers in increasing average transaction value, enhancing customer loyalty, and optimizing operational costs.

The banking sector actively utilizes chatbots to automate routine operations, such as answering frequently asked questions, processing simple payments, and handling loans. This enables a reduction in customer service costs and improves the efficiency of banks (Efficiency, 2023). Banks worldwide are actively implementing chatbots for customer engagement. For instance, Capital One uses the Eno chatbot to respond to inquiries about account balances, process payments, and address other financial matters (Eno, 2024). Citibank has developed a chatbot that assists customers in opening accounts, applying for loans, and conducting other banking transactions online (Citi, 2024).

In the tourism industry, chatbots are used for booking hotels, flights, and tours, as well as providing information about destinations and attractions. The speed, convenience, and accessibility of such services significantly simplify the travel planning process. Additionally, chatbots can analyze large volumes of data on customer preferences and offer personalized travel products. This allows travel companies to enhance their competitiveness and increase revenues (Hyland P., 2024). Companies like Expedia and Booking.com utilize chatbots to simplify the booking process and provide personalized recommendations (ChatGPT, 2023; Booking.com, 2017). Airlines such as KLM and Lufthansa employ chatbots to assist passengers during flights and address issues arising during travel (KLM, 2017; Lufthansa, 2024). However, for effective chatbot utilization in tourism, it is essential to consider the cultural characteristics of different countries and to provide multilingual support.

The implementation of chatbots in *agriculture* opens new opportunities for optimizing production processes. Chatbots can provide farmers with advice on plant care, yield forecasts, and monitor soil conditions and climatic factors. Additionally, chatbots can be utilized for marketing agricultural products and engaging with suppliers and customers. By adopting such solutions, farmers gain access to current information about weather conditions, agricultural product prices, and best farming practices. The company John Deere has developed a chatbot that helps farmers track the status of their machinery, receive technical support, and plan farm operations (Case, 2023; Chatbots Based on; 2024).

Chatbots have become an essential tool for businesses as they can stimulate innovation in products and services. One of the key advantages of chatbots is their ability to gather real-time feedback from users. This allows companies to quickly respond to the needs and desires of consumers. Feedback can be collected through surveys, questions, and comments, making the data collection process simple and convenient.

By analyzing the collected data, companies can identify trends and patterns that may indicate consumer needs. For example, if a large number of users express a desire for a new feature in a product, the company can swiftly begin working on its implementation. This not only enhances consumer satisfaction but also helps maintain competitiveness in the market. Chatbots can also integrate with analytical tools, aiding in data visualization and informed decision-making. They can automatically collect data on product usage, analyze feature effectiveness, and generate reports. This information can serve as a foundation for further product improvement.

Additionally, chatbots can act as intermediaries between consumers and the company, ensuring two-way communication. This allows users to share their impressions and suggestions without waiting long for a response from customer support. The speed at which chatbots respond significantly enhances the efficiency of feedback. It is important to note that chatbots can be configured to address specific questions related to a product or service, making them a valuable source of information for development teams. They can assist in testing new ideas by conducting surveys or gathering reactions to prototypes. This enables businesses to implement innovations more quickly and with less risk.

Chatbots also open up new opportunities for cross-selling and upselling, offering users new products based on their preferences and purchase history. This not only helps increase sales but also fosters consumer loyalty. Over time, companies can

fine-tune chatbots for deeper analysis of consumer experiences and forecasting future trends. Moreover, chatbots can serve as tools for market testing, allowing businesses to swiftly gather feedback on new products or services. With this capability, companies can adjust their strategies according to consumer needs, thereby reducing the risks of failure.

Thus, the implementation of chatbots in business processes not only optimizes communication but also significantly enhances opportunities for innovation. They provide unique capabilities for data collection and analytics, assisting companies in staying at the forefront of their industry. By integrating chatbots, enterprises can ensure continuous development and improvement of their products and services. As a result, businesses that actively leverage chatbots can adapt more rapidly to market changes and meet consumer demands.

Analyzing responses from top experts (Future, 2021; Chatbots: Key, 2024; How to Increase, 2024), it can be asserted that in the future, conversational bots will have a positive impact on their organizations across various aspects, particularly in enhancing interactions with customers and employees (Figure 1).

First and foremost, 61% of experts noted that bots help increase employee productivity by automatically tracking scheduled tasks. This reduces the workload on employees and allows them to focus on more important tasks. Additionally, 60% of respondents indicated that chatbots can resolve customer inquiries more quickly by interacting with other bots, which facilitates faster customer service. This significantly improves service quality, as customers receive responses more promptly. Chatbots are capable of providing a more personalized approach to users—57% of respondents highlighted this as a significant advantage. Personalization is a key factor in customer retention and enhancing their interaction experience with the company. Furthermore, bots contribute to improved communication efficiency within the company, as also noted by 57% of respondents. They help automate certain internal processes and facilitate communication between different departments. These three advantages of chatbots, highlighted by experts, can be considered the primary benefits for businesses in the future.

On the other hand, bots positively impact the process of attracting new customers and retaining existing ones. Approximately 54% of respondents stated that bots can effectively assist customers during the purchasing process through phone calls. This enables companies to process orders more quickly and improve customer interaction. Chatbots can also significantly reduce communication errors,

The positive impact of chatbots on business

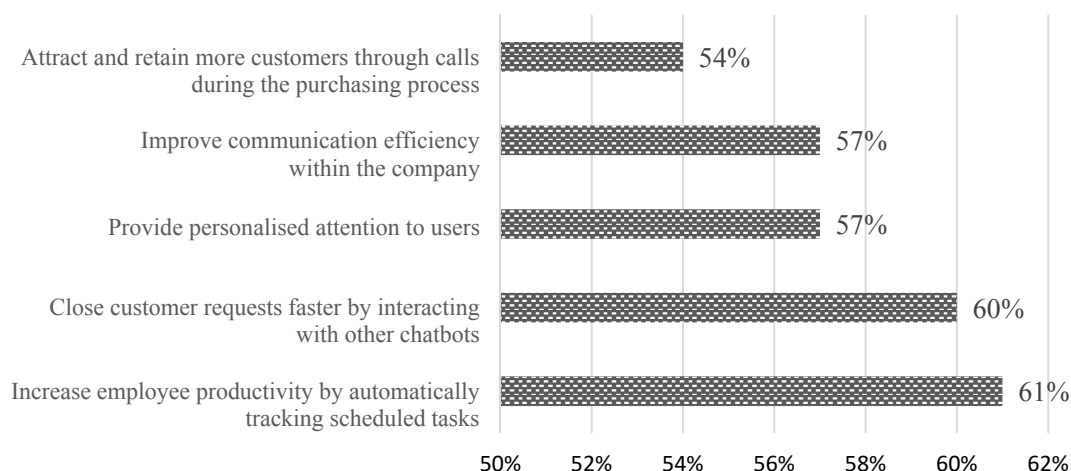


Figure 1 Positive Impact of Chatbots on Business According to Top Experts

making them an important tool for businesses. The use of bots allows companies to provide customers with access to services 24/7, thereby increasing customer loyalty. Through the automation of many processes, bots become indispensable in businesses striving to remain competitive in the market. Experts see chatbots as a means to enhance the efficiency of all operational processes and improve overall service quality.

Considering that the implementation of chatbots in business offers significant advantages, including increased productivity, improved customer service speed, and personalized attention, it is essential to follow a structured approach for successful integration. The toolkit of chatbots forms a complex and diverse ecosystem, which includes various technologies and resources aimed at creating, developing, and optimizing interactive bots. Based on publications by Reynoso, 2023; Dudziak, 2023; Kalinin, 2023; Bay, 2018; Using, 2023; Engage, 2023; Digital, 2023; What Is a Digital, 2023; Oracle Digital, 2023, the authors developed an algorithm for implementing a chatbot in business (Figure 2).

To implement a chatbot in business, it is important to start with a thorough market analysis and understanding the company's needs. At this stage, it is necessary to determine how exactly a chatbot can improve business processes, such as facilitating communication with customers or automating internal operations. Tools like SWOT analysis (evaluation of strengths, weaknesses, opportunities, and threats) and PEST analysis (analysis of political, economic, social, and technological factors) should be utilized. This helps to understand the challenges the company may face during the chatbot implementation

and the opportunities it may create. After this, clear goals can be outlined: automating customer support, improving supply chain management, or optimizing human resources management.

The next important step is selecting a platform for creating the chatbot. Among the most popular solutions are IBM Watson Assistant and Dialogflow, which offer convenient tools for developing and configuring bots. The choice of platform should be based on the business's needs: it is important to consider whether integration with existing systems, such as ERP (Enterprise Resource Planning), or support for multiple languages for serving international customers is necessary. After choosing the platform, it is advisable to proceed to programming the chatbot's logic, selecting an appropriate programming language, such as Python or JavaScript (Node.js), to create a flexible and effective solution that can quickly respond to user inquiries.

At the final stage, the chatbot should be integrated into the company's internal business processes. Frameworks like Rasa or Botpress can be used for this, allowing the addition of complex features, such as natural language processing using tools like NLTK, TensorFlow, or PyTorch. It is also important to configure the chatbot to perform specific business tasks: inventory management (SCM), purchase order processing, sales support, or human capital management (HCM). Integration with communication channels, such as Facebook or Telegram, will ensure continuous communication with customers. Completing all these steps will allow the business to effectively implement the chatbot, increase productivity, and improve customer experience.

Algorithm for implementing a chatbot in business

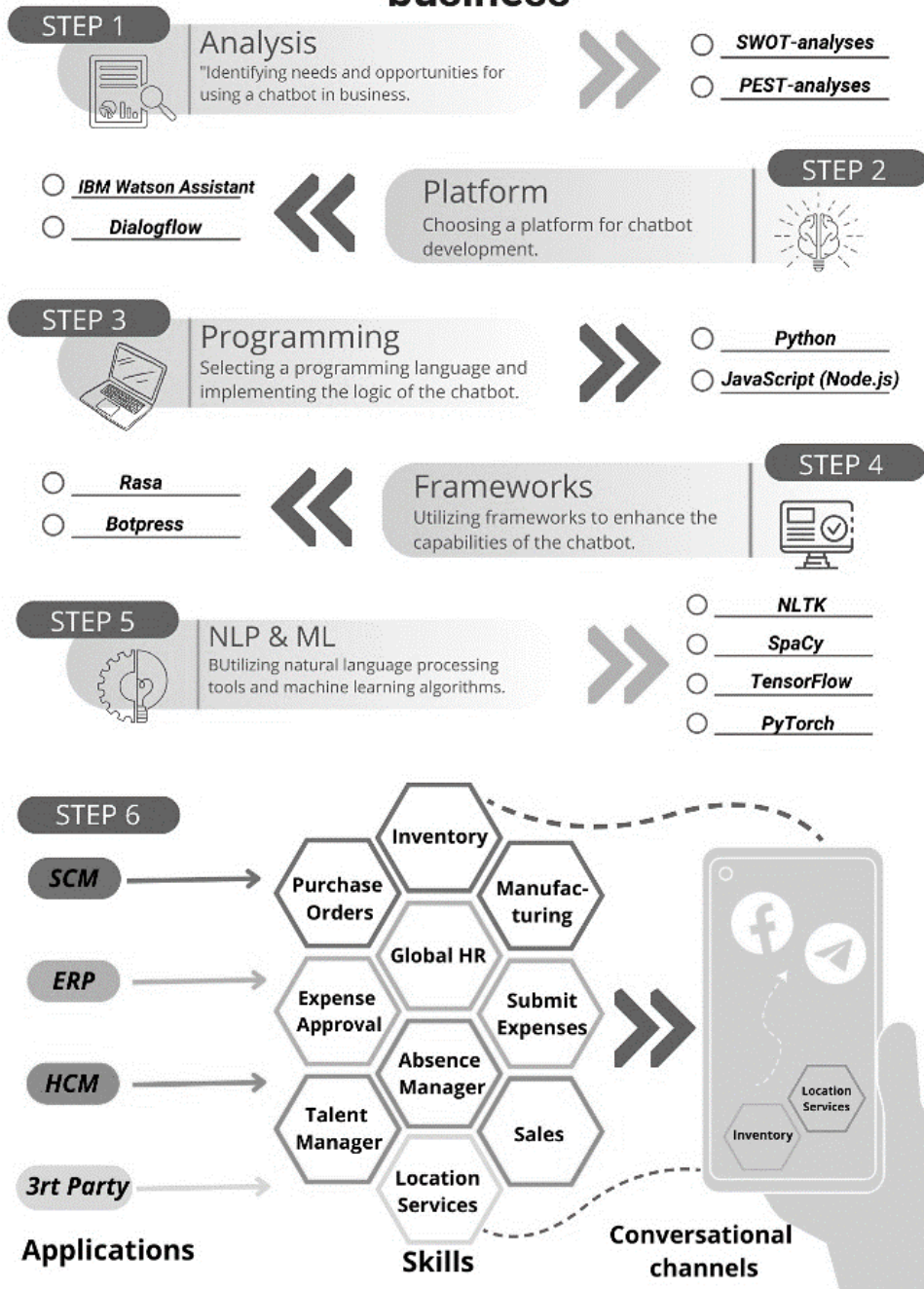


Figure 2 Algorithm for Implementing a Chatbot in Business

Source: Compiled by the authors based on (Reynoso, 2023; Dudziak, 2023; Kalinin, 2023; Bay, 2018; Using, 2023; Engage, 2023; Digital, 2023; What Is a Digital, 2023; Oracle Digital, 2023)

Evaluating the return on investment (ROI) in chatbots can help companies understand how effectively their resources have been spent on their development and implementation. When determining ROI, it is important to consider both direct and indirect benefits that a chatbot provides. Direct benefits may include savings on customer service costs, reduced query processing time, and

an increase in the number of queries handled. Indirect benefits may encompass improved brand reputation, increased customer satisfaction, and higher loyalty. To assess the ROI of chatbots, it is important to track several key performance indicators that can indicate how effectively the system operates. Some of the main ones identified by the authors to be considered are listed in Table 1.

Table 1 Criteria for Evaluating Chatbot ROI

Indicator	Description
Cost Reduction	Measures the savings on customer service expenses compared to traditional methods
Response Time	The average time it takes for the chatbot to respond to a customer inquiry; a shorter time indicates higher efficiency
Number of Requests Processed	The number of inquiries the chatbot handles over a specific period; this helps determine the system's productivity
Customer Satisfaction	Measured through surveys or feedback; a high satisfaction level indicates the effectiveness of the chatbot
Conversion	Measures how the chatbot impacts conversion rates (e.g., number of sales or subscriptions)
Repeat Inquiry Frequency	Determines how many times customers return to the chatbot for additional information; a low frequency may indicate that the bot effectively meets inquiries
Query Resolution Delay	The time taken to resolve an inquiry; the shorter the delay, the higher the chatbot's effectiveness

Source: Table created based on sources (1500+ players, 2024; How, 2024)

The evaluation of ROI for chatbots represents a crucial step for companies aiming to optimize their business processes and enhance customer service. By tracking key performance indicators, organizations can gain insights into the impact of chatbots on their operations and determine whether the costs associated with their development and implementation are justified. Considering both financial and non-financial benefits enables companies to make informed decisions regarding further automation of their processes.

4 Conclusion

The analysis of the study demonstrates the significant potential of chatbots in transforming business processes. Automation of customer service, enhancement of marketing campaign effectiveness, and optimization of internal operations are just a

fraction of the benefits they offer. The implementation of chatbots in business opens up new opportunities for growth. These intelligent agents not only automate routine tasks but also create personalized experiences for customers. With the advancement of artificial intelligence technologies, chatbots are becoming increasingly sophisticated, capable of performing more complex tasks and making independent decisions.

However, alongside these opportunities arise challenges, such as ethical considerations, cybersecurity, and regulation. For successful utilization of chatbots, companies must develop clear strategies, invest in staff training, and collaborate with experts.

The future of chatbots appears promising: from integration with metaverses to the development of emotional intelligence.

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