**QUALIZEAL**

# Empowering Business Chatbots through NLP, Generative AI, and Data Democratization –
# A QualiZeal Report

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# Executive Summary

This paper explores the role of NLP and AI-based chatbots from a business perspective, focusing on GenAI and Data Democratization. It examines their integration and effectiveness and provides a review of QEBot.ai™'s new feature, INVESTigate, which rates user stories for testing purposes.
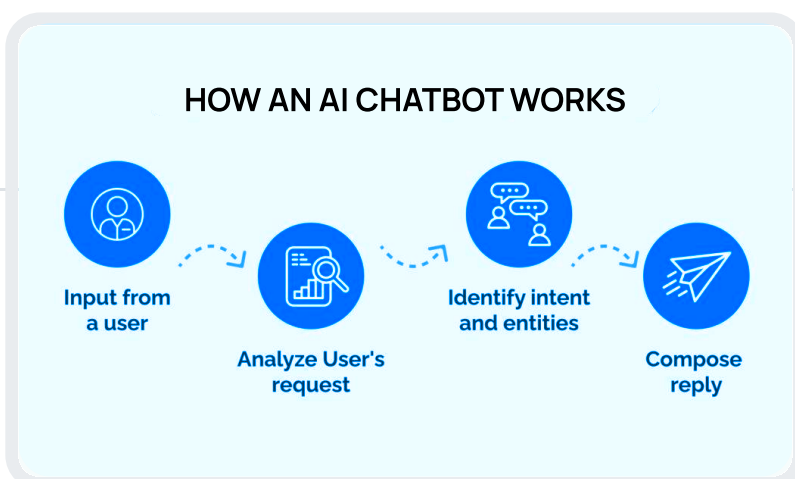
# The Increasing Usage of NLP Through AI-Chatbots in Businesses

## Introduction to NLP

Natural language processing (NLP), is a subset of artificial intelligence, focused on understanding and generating language. Using computational linguistics and machine learning, it analyzes the meanings and usages of words, phrases, or sentences. Although NLP models were once simple applications with pre-programmed responses, it has now expanded to utilize statistics and deep learning. Through the data fed, the model identifies a probable chance of each word's definition, and its intent within a sentence. Deep learning models are given substantial amounts of data in varying formats (for example, speech or text), while also using neural networks. These neural networks essentially mimic how a human brain makes choices.

## Application of NLP to create AI-based Chatbots

NLP helps power chatbots, which is a software built to interact with users while modelling human communication. As demonstrated in the image below, an AI-based chatbot first requires an input from a user. These chatbots then utilize NLP to examine and interpret the input, by identifying aspects such as context and intent. Afterwards, the chatbot creates a relevant response which best fits the customer's situation. A key aspect of AI-based chatbots is their ability to learn from each conversation. Over time, they can improve their responses and capabilities, becoming more intelligent after every interaction.



HOW AN AI CHATBOT WORKS

Input from a user

Analyze User's request

Identify intent and entities

Compose reply

◄Source:
https://smartapp.technology/blog/ai-chatbots-in-education/

# Advantages and Disadvantages of Employing Chatbots in Businesses

## Benefits

### 🔵 Improving customer service

- Produce immediate responses based on defined answers already in their database.
- Speak to multiple customers at once, at all times of day. Saves costs by having fewer staff, with the remaining spending more time on complex issues the chatbots cannot yet answer.

### 🔵 Increasing sales

- Personalize services to individual customers through a specific user's historical data. If a customer typically purchases from a certain brand, suggesting products from that brand first saves time and creates a more positive experience.
- Recommend products that other customers with similar activity view. A human may not be able to identify these trends as quickly or efficiently as the bot.

### 🔵 Improving marketing

- Analyze past user behavior and their preferences to send targeted promotions/sales that they may believe the user may be more prone to use.

## Drawbacks
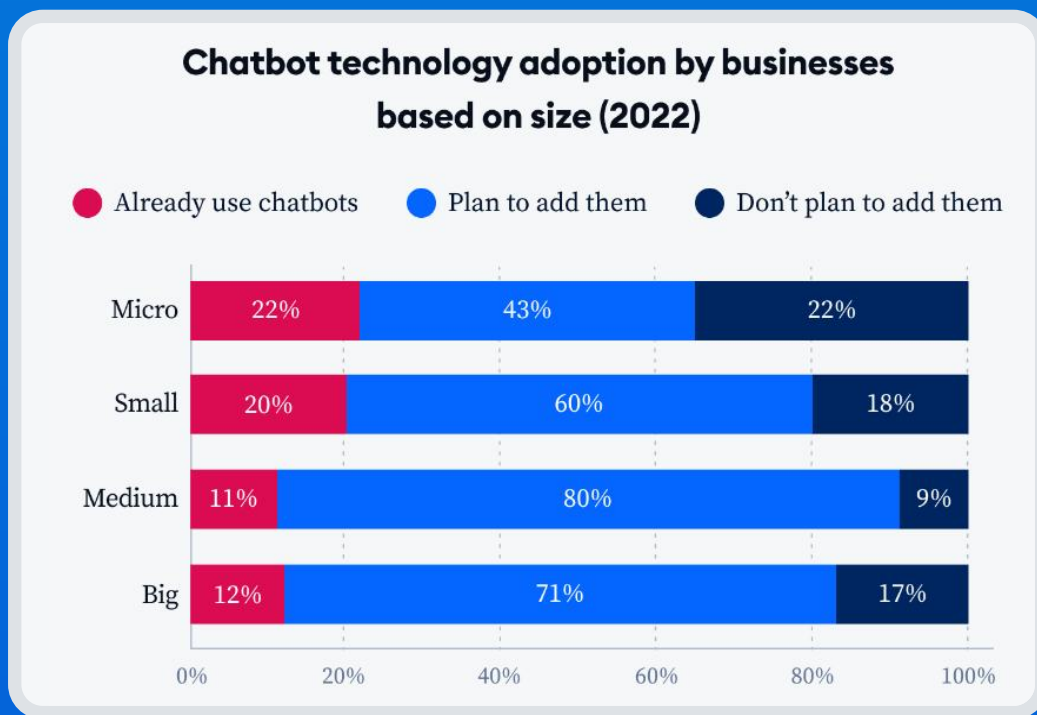
### 🔴 Incorrect responses

- Susceptible to errors and supplying false information, leading to confusion, frustration, and other consequences, such as hurting a company's reputation.

### 🔴 Lack of emotional intelligence

- May struggle with understanding emotions and tones. Not always efficient with an already upset customer.

### 🔴 Data security issues

- Accidentally reveal sensitive customer data, such as bank account or credit card information.
- Susceptible to hackers, leading to consequences like phishing attacks. Chatbots could send links meant to be promotions but end up revealing their information.

**Chatbot technology adoption by businesses based on size (2022)**

● Already use chatbots    ● Plan to add them    ● Don't plan to add them

| Size | Already use chatbots | Plan to add them | Don't plan to add them |
|------|------|------|------|
| Micro | 22% | 43% | 22% |
| Small | 20% | 60% | 18% |
| Medium | 11% | 80% | 9% |
| Big | 12% | 71% | 17% |

◄Source:
https://whatsthebigdata.com/chatbot-statistics/

# The Future of AI-Based Chatbots in Businesses

Many believe that chatbots have the possibility to benefit both the customer and the business. As demonstrated on the graph above, there will be an increased growth in chatbot in businesses. Although the current usage is low, by 2028, the global retail spending on chatbots is predicted to reach **72 billion (Juniper Research)** Although there are still issues within AI-based chatbots, as their utilization continues to increase, improvements will be made.

# Growth of Generative AI through Data Democratization

## What is Data Democratization?

Breaking down the walls of data is the driving purpose behind a quickly growing business practice called data democratization. Data democratization is widely known as the practice of making data accessible to non-technical professionals within an organization. In addition to increasing accessibility, it includes implementing tools and technologies that aid in interpreting and accessing this data and finally implementing a data-driven and data-literate culture, where employees value the importance of data.

## The History

In years past, the data regarding a company was seen as a private and treasured matter, one to be protected and seen by the eyes of highly technical professionals only. While such practice protected security and accuracy, this segregation over complicated processes and most importantly prohibited the making of data-driven decisions. Today, however, the democratization of data within organizations has become more valuable than one could estimate.

## Why is Democratization useful?

- **Decision-Making:** Data democratization allows all employees, regardless of their technical background, to access and analyze data, enabling informed decision-making across all levels of an organization.
- **Innovation:** By providing access to data, employees can identify trends, uncover new opportunities, and innovate, contributing to business growth and competitive advantage.
- **Efficiency:** When data is accessible to everyone, teams can work more efficiently, reducing reliance on technical professionals
- **Collaboration:** With shared access to data, departments can collaborate more effectively, combining strategies and achieving common goals.
- **Transparency:** Open access to data ensures that information is transparent, fostering a culture of trust and accountability within the organization.

## Intersectionality

This transparency and accessibility have propelled the growth in innovation, specifically in Artificial Intelligence. Generative AI is developed and consequently dependent on the information on which it is trained. Meaning, the larger and more detailed a data set, the more informed the AI can be. The integration of gen AI and data democracy is steadily growing and has appeared in many industries.

# Use Cases:

### Customer Interactions

AI-powered customer analysis revolutionizes company-client engagement. Using generative AI and diverse datasets, businesses enhance communication and significantly boost engagement. This technology swiftly analyzes vast amounts of customer data, creating personalized recommendations based on past behaviors. For example, Dell Technologies used Persado-AI to increase marketing engagement by analyzing customer interactions, sales, and historical patterns.

- Identifies intricate patterns within customer actions
- Tailors offers and campaigns to specific customer groups in real-time
- Allows companies to adapt marketing strategies dynamically
- Enhances overall efficiency
- Increases Customer interaction
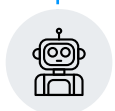
### Internal Chat Bots

Currently, Amazon has shown its mastery in leveraging AI through its internal chatbot, Amazon Q, which plays a pivotal role in enhancing workplace efficiency and collaboration. Trained on extensive internal data spanning various departments, Amazon Q serves as a central well of knowledge, providing seamless information exchange within the organization.

- Optimizes operational efficiency
- Cultivates a culture of transparency within the organization.
- Companies benefit from improved productivity and enhance decision-making capabilities.

Using these tools companies create deeper connections with customers, anticipating their needs, and catering to their behavior.

# Conclusion

Our research findings show that this intersectionality between Generative AI and Data democratization is opening doors to new possibilities, findings, and advancements. With the steady growth in data accessibility and the cultural shift towards data literacy, the conditions needed for generative AI to prosper are ideal.

We've found that the bounds of our innovation are limitless and only expand the more we understand and share information. As we reflect on these advancements, We are both excited and optimistic about the future possibilities that await us.

# INVESTigate-

## A feature of QEBot.ai™

# Why Is This Technology Needed?

Companies worldwide utilize thousands of user stories to enhance collaboration, improve products, and reduce risks caused by miscommunication. The new **INVESTigate** feature by QEBot.ai™ aims to save time, money, and educate staff and customers on creating optimal user stories by providing specific and helpful recommendations.

### How INVESTigate Works

INVESTigate rates the value of an individual user story based on six parameters:
- Independent: The story should be self-contained and not reliant on other stories.
- Negotiable: The story should be flexible, allowing for discussion and adjustments.
- Valuable: The story should provide clear value to the end user.
- Estimable: The story should be well-defined to estimate the effort required.
- Small: The story should be small enough for completion within a single iteration.
- Testable: The story should be clear enough to allow for testing against defined criteria.

### Current Features

- Rates input user stories based on six parameters.
- Provides access to examples of both good and poorly written user stories.
- Offers tailored recommendations on improving user stories.
- Exports data for easy feedback consolidation and rating.

- Implement sentence restructuring recommendations for improved ratings.
- Provide visibility into specific sentence contributions to ratings.
- Develop a clear, accessible rubric outlining criteria for grading.
- Create a slideshow illustrating different values and corresponding definitions for an introductory user.

# Analysis of The Data

Good user stories, both handwritten and AI-generated, generally perform better than bad ones. AI-generated good stories averaged 3.915 (78.2%), outperforming handwritten good stories at 3.69 (73.8%). However, AI-generated stories scored lower in the "Small" parameter. The discrepancy may be due to AI's tendency to overexplain or introduce unrealistic scenarios. Both good and bad stories scored well in the "Valuable" parameter, indicating that even "bad" stories can be valuable in some aspects.

| Parameter Averages | Good User Story | AI Generated Good User Story | Bad User Story | AI Generated Bad User Story |
|---|---|---|---|---|
| Independent | 3.833333333 | 3.833333333 | 2.5 | 2.666666667 |
| Negotiable | 3.833333333 | 4 | 2.666666667 | 3.166666667 |
| Valuable | 5 | 5 | 4.5 | 4.666666667 |
| Estimable | 3 | 3.833333333 | 2.333333333 | 2.333333333 |
| Small | 3 | 2.833333333 | 2.833333333 | 2.5 |
| Testable | 3.5 | 4 | 2.666666667 | 3.166666667 |
| Total Average | 3.694444444 | 3.916666667 | 2.916666667 | 3.083333333 |



Parameter Averages
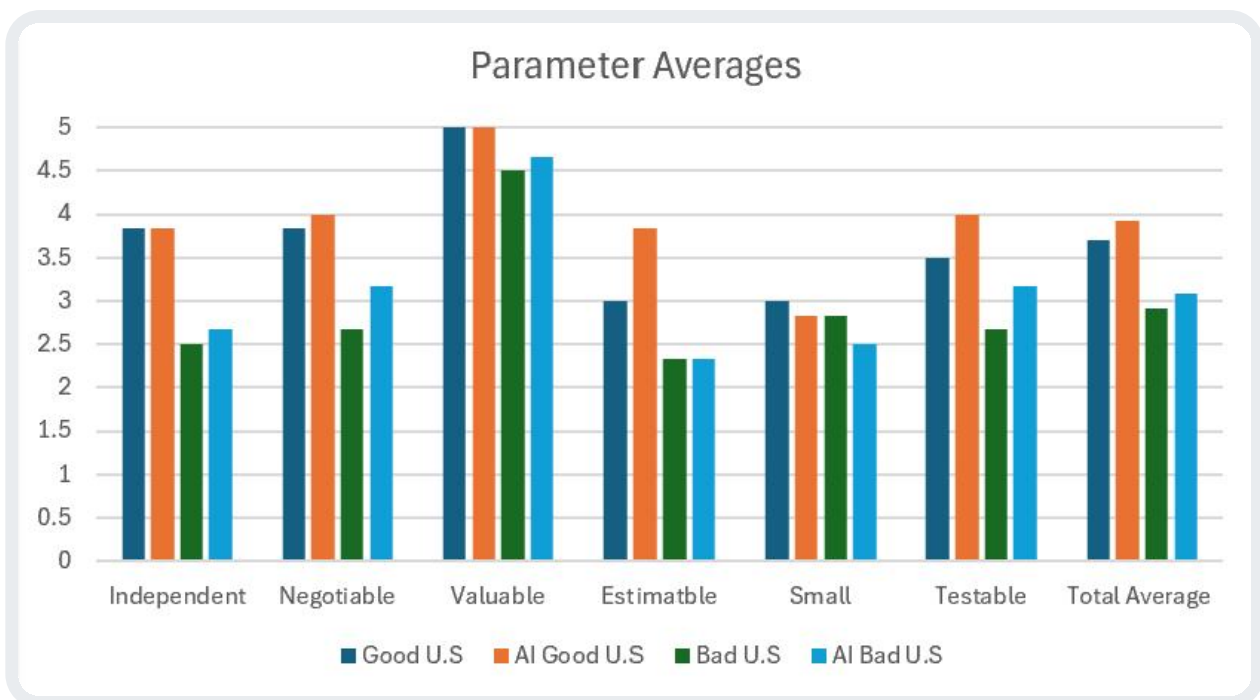
# Future Concerns of GenAI

As Gen-AI technology evolves, several key concerns need to be addressed:

- **Lack of Direction:** AI development can become unfocused without clear goals and guidelines. Setting specific objectives and ethical standards is crucial.
- **Data Privacy Issues:** AI systems need a lot of data, which raises privacy concerns. Protecting user data, obtaining informed consent, and following privacy regulations are essential.
- **Upskilling Employees:** Workers need new skills to work effectively with AI. Continuous training and development programs can help employees adapt.
- **Emotional Intelligence:** AI lacks the ability to understand and respond to human emotions. Improving AI's emotional intelligence can enhance human-AI interactions but must be done ethically.
- **Bias and Fairness:** AI can inherit biases from its training data, leading to unfair outcomes. Using diverse datasets and implementing bias correction techniques can help.
- **Ethical Decision-Making:** AI systems may face situations requiring ethical judgment. Integrating ethical frameworks into AI and involving ethicists and policymakers can guide responsible AI decisions.
- **Security and Safety:** AI systems can be vulnerable to attacks. Implementing strong security measures and designing AI for safety can reduce risks.
- **Impact on Employment:** AI could lead to job losses. Planning for workforce transitions and promoting reskilling initiatives can help mitigate negative effects.
- **Responsibility and Accountability:** Determining who is responsible for AI decisions can be complex. Clear guidelines for accountability are needed.

Addressing these concerns requires collaboration among technologists, ethicists, policymakers, and society. By considering these issues, we can develop AI that is both effective and aligned with human values.

## Final Thoughts

Applying ethical principles in AI development is crucial. Throughout QualiZeal's product development, including the INVESTigate feature, our team prioritized diversity, conducted thorough testing, monitored progress, and maintained transparency with customers and staff. These efforts ensure our products align with our core values and ethical standards. Ethical considerations must be integrated into every stage of AI development to build systems that are not only innovative but also responsible and fair. By doing so, we can harness the full potential of AI while minimizing risks and ensuring its benefits are widely distributed.

# Acknowledgements

# /Appendix

- NLP: Natural Language Processing.
- GenAI: Generative Artificial Intelligence.
- INVESTigate: A feature of QEBot.ai™
- Data Democratization: Making data accessible to everyone in an organization, regardless of technical expertise.
- Data Literacy: The ability to understand, analyze, and communicate data effectively.