The Impact of ChatGPT on Enterprise Competitive Intelligence Systems

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Abstract: This study explores the impact and transformation brought about by artificial intelligence content generation technology on enterprise competitive intelligence systems, aiming to enhance intelligence support for competitive advantage. Starting with the formation of ChatGPT and the evolution of AI-generated content (AIGC) technology, the research analyzes the technical features and trends of ChatGPT comprehensively. The study provides a holistic examination of ChatGPT's influence on the entire process of enterprise competitive intelligence. In areas such as competitive intelligence support, information gathering and organization, analysis and prediction, as well as service and communication, ChatGPT significantly improves system efficiency and intelligence levels through its natural language processing technology. However, the introduction of ChatGPT also presents new challenges, including issues related to semantic understanding, information security, and model bias. While enhancing the capabilities of enterprise intelligence processing, careful consideration is required to address these challenges and ensure the reliability and security of the system. The study acknowledges limitations due to the limited practical application of ChatGPT in enterprise competitive intelligence systems, and the conclusions drawn are preliminary reflections on its impact on competitive intelligence work. Overall, this research provides valuable insights into the role of artificial intelligence in the field of enterprise competitive intelligence and emphasizes the challenges and limitations that need to be considered in its application.

1. Introduction

ChatGPT, developed by OpenAI, is a natural language processing tool based on artificial intelligence technology [1]. Since its release on November 30, 2022, it took only five days to surpass 10 million registered users. In less than two months, the user count exceeded 100 million, making it one of the most rapidly growing applications in history [2]. This phenomenon not only profoundly reshapes perceptions of artificial intelligence but also fuels a global surge in the popularity of the next generation of AI technologies. With its robust self-learning capabilities and outstanding performance, ChatGPT surpasses traditional AI functionalities, successfully integrating human knowledge and providing a high-quality natural language interface with broad intellectual capabilities. This indicates that the new era of general artificial intelligence, represented by ChatGPT, is swiftly entering the realm of societal labor, poised to have profound impacts across industries.

As ChatGPT rapidly gains popularity, scholars are actively researching its influence across various domains. In the field of education, Frieder et al. tested ChatGPT's performance in mathematics using the GHOSTS natural language dataset, revealing its ability to comprehend mathematical problems [3]. In healthcare, experiments conducted by NOV et al. involving interactions between ChatGPT, doctors, and patients demonstrated responses comparable to those of doctors, suggesting potential applications in medical diagnosis [4]. In communication, Guo attempted to integrate ChatGPT into ordered importance communication systems, resulting in lower error rates and more reliable semantic communication compared to existing systems [5]. In the intelligence field, Li Rong et al., starting with ChatGPT, analyzed its potential impact on open source intelligence work. They proposed that ChatGPT has the potential to enhance the efficiency of open source intelligence search, acquisition, and processing, recommending corresponding technological strategies for intelligence agencies to adapt to this technological shift [6].

Competitive intelligence involves gathering information and conducting research on the competitive environment, competitors, and strategies. Enterprise competitive intelligence systems, primarily driven by human intelligence and utilizing information networks, aim to enhance a company's competitiveness. With advancements in key technologies such as natural language processing, machine learning, and data mining, artificial intelligence provides powerful tools for enterprises to adapt to competitive environments. As the latest representative of artificial intelligence, ChatGPT possesses advanced natural language processing technology, automated data collection and analysis capabilities, and real-time feedback mechanisms, expected to have a profound impact on intelligence systems. However, to delve into ChatGPT's influence on enterprise competitive intelligence systems, a comprehensive consideration of the opportunities and challenges it may bring is essential.

To address these questions, this paper takes the formation of ChatGPT and the evolution of AI-generated content (AIGC) technology as its starting point. Adopting a holistic perspective on the entire process of constructing enterprise competitive intelligence systems, the study analyzes the impact of ChatGPT on four intelligence subsystems: competitive intelligence support, collection and organization, analysis and prediction, and service and communication. This analysis aims to assist enterprises in fully leveraging ChatGPT's potential, optimizing data collection, information analysis, and strategic planning, making more intelligent decisions, and flexibly responding to intense market competition to maintain a competitive advantage.

2. Evolution of AIGC Technology and Formation of ChatGPT

2.1 Evolution of AIGC Technology

AIGC, or AI-generated content technology, encompasses the generation of various content types, including text, images, audio, and video, through artificial intelligence. The core idea is to empower computer systems with the ability to generate and create content, mimicking, deriving, and creating media content similar to human creativity. The rise of AIGC technology is closely linked to the integrated development of information technologies such as the internet, big data, and artificial intelligence [7]. In an environment of rapid growth in digital content, AIGC technology has undergone a qualitative breakthrough, evolving from limited, templated imitation to intelligent, flexible, and multi-source multi-modal content generation [8].

The development of AIGC technology began in 2010, initially focusing on the research and development of natural language generation and image generation technologies for generating automatic summaries, reports, image captions, and simple images. With advancements in deep learning, generative models became more powerful and flexible, with neural network models and recurrent neural networks used to generate more complex text and image content. In 2018, the GPT

model achieved significant breakthroughs in high-quality text content generation through large-scale pre-training, marking a major milestone in text generation technology. The rise of adversarial networks in 2019 made it possible to generate realistic images, widely applied in areas such as art, design, and video games, signifying a notable advancement in image generation technology. In the early 2020s, multimodal generation technology enabled models to handle various media data types, such as text, images, and audio, generating content in multiple forms, greatly simplifying the creation of media content. AIGC technology is now widely applied in various fields, including advertising, media, e-commerce, education, and gaming.

2.2 Development of ChatGPT

ChatGPT, introduced by OpenAI, is a natural language processing model focused on generating conversations and answering user questions, essentially a manifestation of AIGC technology. Building on the foundation of learning human language and related knowledge, ChatGPT possesses intelligent content creation capabilities, able to autonomously generate specific content. The development of ChatGPT is closely related to the evolution of the GPT model. GPT-1 and GPT-2, based on the Transformer architecture, achieved text generation capabilities, while the GPT-3 model, through extensive pre-training, possesses enhanced general language abilities. The subsequent GPT-3.5 optimized model performance and quality through RLHF and FSL. Based on GPT-3.5, ChatGPT is a conversational generation model, focusing on using natural language processing technology to generate dialogues and chat text. The GPT-4, released in March 2023, incorporates "hybrid training" technology, combining supervised learning with reinforcement learning, improving model performance. Multimodal learning enables GPT-4 to handle both image and text data, generating responses with longer contexts [9].

2.3 Understanding ChatGPT

Understanding ChatGPT involves six aspects: (1) Presentation as a dialogue system, answering questions and providing relevant information and advice through conversation. (2) Essence as a generative language model, learning language context, grammar, and context through pre-training to generate text in accordance with language patterns. (3) Core technology as the Transformer architecture, possessing a deep learning model capable of handling global dependencies in input sequences [10]. (4) Attribute as AIGC, focusing on natural language processing but broadly encompassing the generation of multimedia content such as language, images, and audio [11]. (5) Compared to traditional AI products, ChatGPT has more knowledge, comprehensive contextual understanding, exceptional generative capabilities, and greater versatility [12]. (6) Performance may be less accurate in tasks requiring deep understanding and reasoning, lacking precision in specific tasks, potentially generating ambiguous or inaccurate answers [13].

3. Impact of ChatGPT on Enterprise Competitive Intelligence Systems

With the advent of VUCA, the complexity of the business environment continues to increase [14]. In this context, the role of enterprise competitive intelligence systems becomes crucial, requiring businesses to keenly observe the market, identify changes in competitors and the competitive environment, and rapidly adapt and formulate effective strategies [15]. An enterprise competitive intelligence system is a human-machine combined competitive strategic decision support and consulting system driven by human intelligence, utilizing information networks, and aiming to enhance the competitive advantage of enterprises. From the perspective of the entire process of enterprise competitive intelligence, the workflow can be roughly divided into five stages: defining

intelligence tasks, collecting intelligence information, analyzing intelligence information, producing intelligence products, and intelligence services and delivery. These stages can be categorized into four intelligence subsystems: competitive intelligence topic support subsystem, competitive intelligence collection and organization subsystem, competitive intelligence analysis and prediction subsystem, and competitive intelligence service and communication subsystem [16].

3.1 Impact of ChatGPT on the Competitive Intelligence Topic Support Subsystem

The primary task of the competitive intelligence topic support subsystem is to assist enterprises in selecting and defining research topics for competitive intelligence to support strategic decision-making. With its natural language processing technology, ChatGPT can quickly and accurately extract key information from vast information streams, providing enterprises with more targeted and practical topic suggestions. Compared to traditional systems, ChatGPT, through learning large amounts of text, understanding semantics and context, allows for more flexible and dynamic adaptation to industry changes, market fluctuations, and evolving enterprise needs, providing more flexible and forward-looking topic choices to capture opportunities and challenges in the market changes [17].

Another key task of the competitive intelligence topic support subsystem is knowledge discovery, uncovering hidden patterns and correlations from a large amount of information. The introduction of ChatGPT makes knowledge discovery more advanced and efficient, with its deep learning capability enabling the identification of information connections and the discovery of potential patterns, providing profound industry insights for enterprises. ChatGPT's advantage in cross-domain knowledge mining lies in its adaptability to different domain requirements, offering enterprises more comprehensive and cross-disciplinary competitive intelligence, aiding them in gaining a comprehensive understanding of the market and expanding into different domains.

Furthermore, effective information refinement is essential for providing meaningful insights to enterprises. ChatGPT, through deep learning from extensive academic literature and industry reports, can identify key points of knowledge, integrate them into a comprehensible form, and provide enterprises with a more comprehensive and profound background knowledge. This deep understanding not only captures key information for specific topics but also grasps information associations and trends, allowing enterprises to consider market development directions and potential competitive situations more comprehensively when formulating strategic decisions.

3.2 Impact of ChatGPT on the Competitive Intelligence Collection and Organization Subsystem

The primary task of the competitive intelligence collection system is to obtain comprehensive information from multiple channels to gain in-depth insights into the market, competitors, industry trends, etc. The introduction of ChatGPT significantly enhances the breadth and depth of information collection. Traditional collection methods may be limited to keywords or manually selected channels, while ChatGPT, through learning from a large amount of text, automatically identifies and collects information from multiple channels, including news, social media, academic literature, etc., achieving extensive information collection. The deep learning capability of ChatGPT equips the system with the ability to conduct in-depth information mining, understanding the semantics and context of the text, allowing the system to better grasp complex information such as industry dynamics and competitor strategies, enhancing the depth of information collection.

Moreover, the introduction of ChatGPT makes competitive intelligence organization more automated and precise. Its natural language processing ability allows the system to automatically organize unstructured information into structured data, reducing the burden of manual organization. ChatGPT, through learning from text, can recognize key elements in the information, classify and

organize them intelligently, achieving smart information organization. This automated process improves efficiency while reducing the risk of human errors. The system more accurately classifies and labels information, generating reports that are intuitive and operationally useful for enterprises.

In the business environment, the timeliness of information is crucial for decision-making. The introduction of ChatGPT makes the competitive intelligence collection and organization system more responsive to changes in information, achieving an improvement in real-time capabilities. ChatGPT automatically updates its model, adapting to new information and industry dynamics in a timely manner, enabling the system to provide the latest intelligence more promptly. The characteristics of deep learning allow the system to predict and identify trends in information, providing enterprises with predictive intelligence. This helps enterprises discover market changes and adjustments in competitor strategies earlier, providing powerful support for maintaining a competitive advantage in the market.

3.3 Impact of ChatGPT on the Competitive Intelligence Analysis and Prediction Subsystem

The key to competitive intelligence analysis lies in a deep and comprehensive understanding of the collected information. ChatGPT, through learning from extensive text, can understand and generate natural language, enabling the system to comprehend and process complex competitive intelligence texts more comprehensively. The deep learning technology of ChatGPT allows the system to identify implicit patterns and trends in the information, surpassing the limitations of traditional analytical methods. The system can better understand industry dynamics and competitor strategies, providing enterprises with more profound insights. This in-depth analysis helps enterprises better respond to the ever-changing market environment and make more accurate strategic decisions.

In terms of competitive intelligence prediction, the application of ChatGPT makes predictions more accurate and reliable. Its deep learning model can learn from a large amount of historical data, identify patterns and trends, and provide more precise predictions for future developments. By learning from extensive data, ChatGPT captures complex relationships, enhancing the accuracy of predictions. The system can use natural language texts generated by ChatGPT to describe possible trends and scenarios, providing enterprises with more vivid and intuitive prediction results.

3.4 Impact of ChatGPT on the Competitive Intelligence Service and Communication Subsystem

ChatGPT empowers intelligence services with stronger personalization through its natural language processing and generation capabilities. The system can generate personalized intelligence reports, answer specific questions, and even interact with users in a conversational manner based on user needs and preferences. This service model improves the efficiency and accuracy of user information retrieval. Additionally, ChatGPT can understand users' natural language queries, allowing users to express their needs more freely without cumbersome instructions or specific search terms, enhancing the flexibility of information retrieval. This personalized service model not only meets diverse user needs but also increases user satisfaction with information, providing enterprises with competitive intelligence services that better align with actual needs.

In terms of information dissemination, ChatGPT improves communication efficiency. The system can automatically generate easily understandable and expressive natural language texts, making intelligence communication more vivid and intuitive. Whether for internal team communication or external decision-maker reports, ChatGPT can generate key information texts, reducing communication misunderstandings and obstacles. Moreover, by automatically generating reports, it reduces the burden of manual organization and writing, improving efficiency, and ensuring consistent understanding of competitive intelligence across various levels within and outside the enterprise.

The intelligent characteristics of ChatGPT make decision support more flexible and intelligent.

The system can interact with users through natural language, answering users' questions about competitive intelligence and providing real-time explanations and suggestions. This instant and intelligent decision support allows decision-makers to make strategic decisions more rapidly. ChatGPT can also learn from user feedback and behavior, continuously optimizing the information and suggestions provided. This personalized and intelligent decision support enables the system to better adapt to user needs, providing enterprises with support that is more closely aligned with actual situations.

4. Challenges and strategies ChatGPT brings to enterprise competitive intelligence systems

4.1 Challenges Introduced by ChatGPT to Enterprise Competitive Intelligence Systems

The integration of ChatGPT into enterprise competitive intelligence systems aims to enhance the efficiency of information collection, analysis, and service provision. However, along with the convenience brought by innovation, enterprises also face a series of challenges.

Firstly, there are challenges related to semantic understanding and information accuracy. Despite ChatGPT being trained on general text, it still has limitations in understanding industry-specific terminology and domain knowledge. When dealing with particular industries, technical issues, or complex contexts, the model may generate misunderstandings, resulting in insufficient professionalism and accuracy in the generated intelligence [18]. Additionally, the sensitivity to context makes it challenging for ChatGPT to accurately grasp the contextual relationships of information in lengthy texts or complex scenarios, leading to a lack of coherence in the generated intelligence.

Information security and privacy represent another significant challenge introduced by the adoption of ChatGPT. While the model's efficiency in processing information allows for swift handling of large volumes of sensitive data, it also brings along the risk of information leakage [19]. In the context of competitive intelligence systems, the text generated by the model might inadvertently disclose sensitive information. This risk is particularly heightened when integrating with other systems or sharing data with external partners, potentially causing damage to the enterprise's reputation and legal liabilities.

The introduction of ChatGPT also involves potential biases and distortions in the model's learning from data. Since the model's training relies on extensive textual data, the presence of imbalances or biased viewpoints in the data may result in the model conveying these biases when generating intelligence. This could lead to the system providing unfair or distorted competitive intelligence, impacting the objectivity of enterprise decision-making [20]. Therefore, regulatory oversight and adjustments to ChatGPT are crucial to ensure that the knowledge it acquires is not unduly influenced by biased data.

4.2 Strategies for Enterprise Competitive Intelligence Systems in Addressing Challenges Introduced by ChatGPT

When integrating ChatGPT and similar artificial intelligence into enterprise competitive intelligence systems, although it enhances information processing efficiency, challenges arise in semantic understanding, information accuracy, information security, privacy, biases, and interpretability. To mitigate the negative impacts of these challenges, enterprises can adopt a comprehensive set of strategies [21].

Optimizing Semantic Understanding and Information Accuracy: Enterprises should focus on domain-specific training for AI systems to ensure comprehension of industry-specific terms and contexts. Establishing reinforcement learning mechanisms to continuously enhance the system's semantic understanding is an effective approach to guarantee information accuracy. Regular data

quality checks and updates are also critical steps in maintaining semantic accuracy [22].

Comprehensive Protection of Information Security and Privacy: Issues related to information security and privacy directly impact an enterprise's reputation and customer trust. To ensure the introduction of ChatGPT does not pose security risks, enterprises should implement multilayered security measures, including data encryption, access control, and network monitoring. Establishing a robust regulatory compliance framework is essential to ensure the competitive intelligence system operates in accordance with relevant laws and regulations, with a commitment to legal, transparent handling of user data. Additionally, fostering industry cooperation and sharing security experiences contribute to building a trustworthy artificial intelligence ecosystem [23].

Enhancing Bias Handling and Interpretability: Artificial intelligence systems may be influenced by biases in training data, resulting in unfair outcomes. Enterprises should actively participate in the training processes of AI models, monitoring and correcting potential biases. Simultaneously, improving the system's interpretability makes the decision-making process more transparent, enabling users to understand the logic behind the system's outputs [24].

5. Conclusion

In the current era of big data, the application of artificial intelligence technology provides crucial support for the intelligent acquisition of competitive intelligence in enterprises. Faced with the challenge of vast amounts of information, leveraging the power of artificial intelligence enables businesses to intelligently extract key insights from complex data, thereby continuously enhancing their competitiveness in the fierce market competition. Through a thorough analysis of the impact of introducing artificial intelligence into enterprise competitive intelligence systems, it is evident that the application of artificial intelligence technology has the potential to significantly improve enterprises' capabilities in large-scale intelligence knowledge acquisition and intelligence levels.

However, it is essential to recognize that ChatGPT is still in the early stages of technological development, and there are relatively limited applications in enterprise competitive intelligence practices. Therefore, this discussion on the potential impact of artificial intelligence on enterprise competitive intelligence work primarily stems from a practical perspective in the context of daily intelligence operations.

It is worth noting that enterprise competitive intelligence systems extend beyond information systems to include interpersonal networks and organizational structures. In future research, a comprehensive consideration of various factors is necessary to gain a more holistic understanding of the operation of competitive intelligence systems. Striking a balance across different levels of systems is crucial to enable enterprise competitive intelligence to better fulfill its role in decision-making and market responsiveness.

References

[1] OpenAI. ChatGPT: Optimizing Language Models for Dialogue. Retrieved from https://openai.com/blog/chatgpt/ on November 30, 2022.

[2] Liu Lei, Li Lingyan, Xu Mowei. Reflections on the Impact of ChatGPT on Internal Auditing in Enterprises. China Internal Audit, 2023(08), 18-23.

[3] Frieder, S., Pinchetti, L., Griffiths, R.R., Salvatori, T., Lukasiewicz, T., Petersen, P.C., Chevalier, A., Berner, J. Mathematical capabilities of ChatGPT. arXiv preprint arXiv:2301.13867 (2023).

[4] Nov, O., Singh, N., Mann, D.M. Putting ChatGPT's medical advice to the (Turing) test. medRxiv (2023).

[5] Guo, S., Wang, Y., Li, S., Saeed, N. Semantic communications with ordered importance using ChatGPT. arXiv preprint arXiv:2302.07142 (2023).

[6] Li Rong, Wu Chensheng, Dong Jie, et al. The Impact and Countermeasures of ChatGPT on Open Source Intelligence Work. Information Studies: Theory & Practice, 2023, 46(05), 1-5. DOI: 10.16353/j.cnki.1000-7490.2023.05.001.

[7] Li Baiyang, Bai Yun, Zhan Xini, et al. Technical Features and Morphological Evolution of AI-generated Content

(AIGC). *Library and Information Knowledge, 2023, 40(01), 66-74. DOI: 10.13366/j.dik.2023.01.066.*

[8] Zhan Xini, Li Baiyang, Sun Jianjun. *Scenario Application and Development Opportunities of AIGC in the Era of Data Intelligence Fusion. Library and Information Knowledge, 2023, 40(01), 75-85+55. DOI: 10.13366/j.dik.2023.01.075.*

[9] Ray P P. *ChatGPT: A comprehensive review on background, applications, key challenges, bias, ethics, limitations and future scope [J]. Internet of Things and Cyber-Physical Systems, 2023.*

[10] Gill S S, Kaur R. *ChatGPT: Vision and challenges [J]. Internet of Things and Cyber-Physical Systems, 2023, 3: 262-271.*

[11] Cao Y, Li S, Liu Y, et al. *A comprehensive survey of ai-generated content (aigc): A history of generative ai from gan to chatgpt [J]. arXiv preprint arXiv:2303.04226, 2023.*

[12] Nazir A, Wang Z. *A Comprehensive Survey of ChatGPT: Advancements, Applications, Prospects, and Challenges [J]. Meta-Radiology, 2023: 100022.*

[13] Tyson J. *Shortcomings of ChatGPT [J]. Journal of Chemical Education, 2023, 100(8): 3098-3101.*

[14] Johansen B, Euchner J. *Navigating the VUCA world [J]. Research-Technology Management, 2013, 56(1): 10-15.*

[15] Ain N U, Vaia G, DeLone W H, et al. *Two decades of research on business intelligence system adoption, utilization and success–A systematic literature review [J]. Decision Support Systems, 2019, 125: 113113.*

[16] López-Robles J R, Otegi-Olaso J R, Porto-Gómez I, et al. *Understanding the intellectual structure and evolution of Competitive Intelligence: A bibliometric analysis from 1984 to 2017[J]. Technology analysis & strategic management, 2020, 32(5): 604-619.*

[17] Fitria T N. *Artificial intelligence (AI) technology in OpenAI ChatGPT application: A review of ChatGPT in writing English essay[C]//ELT Forum: Journal of English Language Teaching. 2023, 12(1): 44-58.*

[18] Antaki F, Touma S, Milad D, et al. *Evaluating the performance of chatgpt in ophthalmology: An analysis of its successes and shortcomings [J]. Ophthalmology Science, 2023: 100324.*

[19] Sebastian G. *Privacy and Data Protection in ChatGPT and Other AI Chatbots: Strategies for Securing User Information [J]. Available at SSRN 4454761, 2023.*

[20] Rice S, Winter S R, Rice C. *The Advantages and Limitations of Using Chatgpt to Enhance Technological Research [J]. Available at SSRN 4416080.*

[21] Firaina R, Sulisworo D. *Exploring the usage of ChatGPT in higher education: Frequency and impact on productivity [J]. Buletin Edukasi Indonesia, 2023, 2(01): 39-46.*

[22] Liu Y, Han T, Ma S, et al. *Summary of ChatGPT-Related Research and Perspective towards the Future of Large Language Models [J]. Meta-Radiology, 2023: 100017.*

[23] Gill S S, Kaur R. *ChatGPT: Vision and challenges [J]. Internet of Things and Cyber-Physical Systems, 2023, 3: 262-271.*

[24] Motoki F, Neto V P, Rodrigues V. *More human than human: Measuring ChatGPT political bias [J]. Public Choice, 2023: 1-21.*