

Research on the Impact of ChatGPT on the Accounting Industry and Countermeasures

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Abstract: On March 14, 2023, following ChatGPT3.5, OpenAI released GPT4, which can read maps, calculate taxes, and take exams. As of March 15, the number of users has exceeded 200 million, gradually affecting people's lives and work. At the same time, Baidu Index shows that the TGI (1) index of ChatGPT in the financial industry was as high as 130.18 in February, indicating that the activity of ChatGPT topics is very strong and the attention is very high among people involved in finance and economics. In view of this, the impact of ChatGPT on the accounting industry should be objectively analyzed, and ChatGPT should be reasonably used to promote the development of the accounting industry and optimize the professional education of accounting.

Keywords: ChatGPT, AI empowerment, Accounting industry development, Accounting professional education.

1. ChatGPT Introduction

Based on the information released by OpenAI, Elon Musk and others founded OpenAI in San Francisco in 2015. In 2016, they released their first open-source project, OpenAI Gym Beta, which is a toolkit for developing and comparing different reinforcement learning algorithms. It allows testing in various experimental environments, making it easier for researchers and developers to develop and compare different reinforcement learning algorithms. On May 24, 2017, OpenAI also open-sourced OpenAI Baselines, which is a set of optimized implementations for reinforcement learning algorithms.

In June 11, 2018, OpenAI introduced the renowned GPT (Generative Pre-trained Transformer), which is the first version of the ChatGPT algorithm. GPT combined the transformer architecture with unsupervised pre-training techniques and achieved better results than existing known algorithms. This algorithm marked the exploratory pioneer of OpenAI's large language models. Since then, OpenAI has released various versions, including GPT-1, GPT-2, and GPT-3.

On November 30, 2022, OpenAI released the ChatGPT system, which is a natural language generation model based on artificial intelligence technology. This version of ChatGPT is equivalent to GPT-3.5 and showcases its powerful capabilities. Its nearly perfect performance led to over a billion monthly active users within just two months, making it one of the fastest-growing consumer applications in history.

On March 14, 2023, OpenAI officially launched the multimodal large model GPT-4. Compared to the previous GPT-3.5 version, it can more accurately address complex problems, has a wider range of general knowledge and problem-solving abilities, is more creative and collaborative, can handle text containing over 25,000 words, allowing for long-form content creation, extended conversations, document search, and analysis, and it can also process image content with significantly improved accuracy.

In the domestic context, in March 2023, Baidu conducted internal testing of a ChatGPT-like system called "Wenyanyixin". It can be foreseen that more organizations will introduce products similar to ChatGPT in the future. As

ChatGPT-like products continue to be introduced and rapidly evolve, they are expected to have a significant impact on our lives and work, including the field of accounting. Therefore, based on user and scholar feedback from both domestic and international sources, along with an analysis of the accounting industry, the reasonable utilization of ChatGPT can promote the development and optimization of the accounting profession and education.

2. A Brief Introduction to ChatGPT's Functions and Its Positive Impact on Accounting

On March 14, 2023, OpenAI released its latest version, GPT-4, which can be integrated into various systems such as chatbots, search engines, and e-commerce websites. It possesses the capability to generate, edit, and iterate creative and technical writing tasks, along with advanced reasoning abilities and the ability to provide factual answers. GPT-4 also boasts a broader knowledge base and enhanced problem-solving skills, enabling it to handle more complex multilingual texts. Furthermore, GPT-4 can assist researchers and developers in rapidly building and testing various natural language-related applications.

Notably, GPT-4's performance on standardized tests is impressive. It achieved a score of 1410 out of 1600 on the SAT (the U.S. college admissions test), which is at a level competitive with admission to the top 50 universities in the United States. It has also passed simulated law exams, scoring in the top 10% of test-takers. This rapid learning curve, compared to GPT-3.5, which scored in the bottom 10%, underscores its robust learning capabilities. GPT-4 can also navigate the intricacies of tax laws, calculating the tax liability for a married couple and providing a step-by-step explanation of the calculation, making it transparent and accessible to users. In "AI programming assistant" mode, GPT-4 can effortlessly write code, generate a website, or even create a Discord-based bot. In the event of errors or the inclusion of erroneous code, it automatically rectifies mistakes and generates corrected code. With the capacity to process texts exceeding 25,000 words, GPT-4 can easily distill the core content of lengthy articles, among other tasks.

In summary, GPT-4 is an artificial intelligence-driven natural language generation model that finds applications in various domains, including the field of accounting. Drawing from OpenAI's demonstrations and feedback from domestic and international testing, the potential positive impacts of GPT-4 on the accounting industry are explored.

2.1. Improve work efficiency

2.1.1. Reduce costs and improve work efficiency

After testing, it has been demonstrated that GPT-4 is capable of calculating the tax liability for a married couple based on tax laws. Furthermore, it can meticulously articulate the step-by-step rationale behind the calculation, making it available for review and verification[1]. This showcases that GPT-4 can emerge as a significant force in the fields of finance and tax consultancy, to some extent challenging the traditional practices in the financial and tax consulting industry.

However, there exists a considerable disparity in the financial literacy levels among Chinese residents, with an overall lower level of financial knowledge[2]. Consequently, individuals often find it challenging to accurately describe and inquire about the issues they encounter. People tend to explore unfamiliar domains when conducting information searches, often unaware of the breadth of knowledge available[3]. Thus, when searching for unfamiliar knowledge, clients may not always formulate high-quality questions that precisely address their needs when interacting with ChatGPT.

Financial and tax professionals equipped with solid expertise can leverage ChatGPT to enhance their efficiency. Traditional financial consulting services typically involve professionals painstakingly generating advisory reports for clients, incurring significant costs and longer turnaround times. Consultants can utilize AI systems based on natural language processing, such as ChatGPT, to facilitate improved communication and engagement with clients. In their daily work, consultants only need to understand the needs and requirements of their clients, combining their professional knowledge to provide expert advice and services more rapidly. This can significantly enhance the overall customer experience and satisfaction, bolster client loyalty, and enhance the reputation of the consultancy.

2.1.2. Software integration increases productivity

GPT-4 has the capability to integrate seamlessly with other systems, facilitating data exchange and communication. For instance, it can be integrated with email systems to automate email responses. In e-commerce platforms, ChatGPT can be interwoven with order systems to handle user inquiries and order requests. On March 13, 2023, Microsoft integrated Office software with ChatGPT, introducing plugins for enhanced assistance with Word, PowerPoint, and Excel, significantly boosting office productivity[4]. Therefore, within enterprises, ChatGPT can also integrate with financial application software or management systems, enabling more efficient identification and processing of financial data and enhancing financial management practices. Employees would then primarily oversee and make judgments, greatly increasing the efficiency of financial personnel within the organization.

2.2. Improve the quality of work

Auditors often face limitations imposed by regulations and conditions in their work tasks, and the high time pressure can

lead to audit discrepancies, ultimately compromising audit quality[5]. Traditional financial consulting and audit services may require extended periods to process data, necessitating significant human resources investments. Auditors working in high-pressure environments can experience a deterioration in audit quality. Additionally, the accounting industry's specialization and complexity demand continuous knowledge and skill updates from auditors.

In the future, auditors can benefit from using ChatGPT to swiftly acquire and comprehend various tax policies and legal regulations, better understand and interpret financial reports, and conduct financial data analysis. ChatGPT possesses text analysis capabilities, capable of handling texts exceeding 25,000 words, making it adept at summarizing the core content of lengthy articles. Furthermore, it can expedite error analysis in compliance with auditing standards through automated data processing, providing detailed reports to facilitate auditing tasks.

2.3. Promote personnel training

Big data auditing demands multifaceted professionals who not only possess knowledge in accounting and auditing but also excel in big data technology[6]. Accounting professionals should equip themselves with skills related to new technologies, including proficient use of financial software, computer programming, and big data statistical analysis[7]. However, learning computer programming can be challenging. It involves understanding algorithms and simultaneously contemplating how to implement a particular step using programming languages, which statements are more efficient, which data should be processed, introducing parameters, and algorithm design, among other complex aspects. The demands on programming skills are high when these multifaceted issues interweave.

ChatGPT can be utilized for various tasks, including code creation, which has the potential to significantly transform the software development and usage landscape within the technology industry[8]. ChatGPT can discover and rectify errors in computer code[9]. According to feedback from testers and its role, GPT-4 can create a ping-pong game in 60 seconds, write and debug an entire Snake game in 20 minutes, and more advanced developers are leveraging GPT-4's powerful AI code editor, capable of converting Python functions into intricate yet correct C++ code. This means that GPT-4 users can simply make requests in the GPT-4 interface and receive the corresponding programming code, enabling them to generate relevant programs to fulfill their functions. This significantly reduces programming complexity and enhances the efficiency of cultivating multifaceted talent.

2.4. Promote the development of the industry

ChatGPT can assist accountants in fostering innovation and creativity. The accounting industry is continually evolving and changing, requiring accountants to continuously update and enhance their services and products. By using ChatGPT, accountants can more quickly acquire and understand various new technologies and tools, applying them effectively to their work, thereby offering improved services and products. This can enhance industry competitiveness and innovation, better meeting the needs and requirements of clients, and driving industry development.

Promoting internationalization of auditing and corporate expansion. Against the backdrop of global economic integration, the wave of corporate internationalization

continues to advance. Accounting firms, as intellectual capital-intensive enterprises, play a crucial role in providing international audit services for global capital flows and economic development[10]. In other words, as globalization deepens and diversifies, the accounting industry must contend with legal, regulatory, and cultural differences in different countries and regions. It also needs to provide personalized and differentiated services to various clients and businesses. Currently, Chinese enterprises face obstacles and risks when investing overseas, including language barriers, cultural differences, legal disparities, lack of international management talent, and more[11]. Therefore, the accounting industry needs to enhance its understanding and adaptability to internationalization and diversity, cultivate cross-cultural communication and collaboration skills, and elevate the level of service professionalism and personalization.

Traditional financial consulting services may be limited by language barriers and differences in international laws, making it challenging to fully understand client issues and requirements. However, GPT-4 supports multilingual communication and learning of international laws. By analyzing clients' language, it can better comprehend client needs and issues, providing more accurate solutions. This can promote the internationalization of auditing and corporate expansion, thus contributing to the economic development of China.

3. Potential Risks and Threats

While ChatGPT can bring significant convenience to financial work, it is essential not to overlook some of its drawbacks and potential threats.

3.1. Inadequate Accuracy of Conversation Content

ChatGPT's training data is collected from the internet, which means that its training data may contain some inaccurate or misleading information. Therefore, this model may not always produce accurate or unbiased results. For example, if the model is trained on biased data, it may generate biased results[12]. In other words, when ChatGPT provides a correct answer and users repeatedly input incorrect information to ChatGPT, the model may accept the incorrect information. This situation could potentially lead to ChatGPT providing inaccurate answers to financial-related questions, thereby reducing the quality of the conversation. Over time, it could also result in a decline in critical thinking and creativity among financial professionals.

3.2. Bias in Language Models

Due to ChatGPT's training data being sourced from the global internet and user-generated information, it may be influenced by certain societal and cultural biases. Additionally, the model may not always discern subtle distinctions in specific domains, leading to inaccurate results[12]. These factors can potentially result in ChatGPT providing unjust, discriminatory, or biased answers when addressing certain accounting questions, thereby diminishing the quality of the conversation. This is a concern that professionals in the accounting industry should be mindful of.

3.3. Risk

Emerging technologies bring immense benefits to individuals and society, but they can also entail significant

risks, and ChatGPT is no exception. For instance, it may potentially infringe on intellectual property rights, rely on unlawfully sourced data, challenge ethical boundaries, expose business secrets, or even involve sensitive personal information and privacy concerns. ChatGPT could pose certain security risks and vulnerabilities. Moreover, the decisions made by artificial intelligence systems can be prone to errors, and once a mistake occurs, it can be challenging to ascertain responsibility, as it is difficult to assign blame to algorithms over humans[18]. In other words, in the event of problems leading to economic losses, it can be challenging to trace and determine the responsible parties. This is also a matter of concern for professionals in the accounting industry.

3.4. Users are required to strengthen their professional knowledge

ChatGPT also carries the risk of making errors. Currently, ChatGPT has several issues and makes fundamental mistakes. It can only satisfy "incremental information" needs and cannot meet the demands for "critical decision-making." When it comes to "significant financial decisions," it might provide suggestions, but these may not necessarily be suitable decisions. This is because, within the framework of contingency theory, a company's internal and external environment is constantly changing. This implies that accounting professionals require a solid foundation of financial knowledge and keen professional judgment to effectively oversee and make decisions, even when relying on artificial intelligence.

3.5. Use threshold

When conducting information searches, it is often an exploration into unknown territory, and individuals may not necessarily be aware of the knowledge that exists in a particular domain before initiating a search[3]. The process of obtaining knowledge and information through ChatGPT largely depends on an individual's cognitive and logical abilities. When users pose questions about a completely new field, they need to have a certain level of understanding and grasp of the knowledge context to effectively guide, inquire, correct, delve into, and summarize. Rather than merely possessing knowledge, it is more akin to comprehending the "skeleton" of knowledge. The answers provided by ChatGPT are highly correlated with a user's own knowledge quantity, depth, and breadth. For example, a novice in finance and a seasoned financial professional would approach the same unknown question quite differently when using ChatGPT to obtain answers.

4. Coping Method

4.1. Personal aspect

The emergence of artificial intelligence has sparked discussions about the potential replacement of human roles across various industries, and the accounting sector is no exception. According to the 2018 Asia Talent Trends Report by Randstad, 80% of surveyed employees in the accounting and finance fields across Asia expressed concerns about the impact of artificial intelligence on their work, with 57% anticipating that their positions would be influenced by AI and new technologies within a few years[13]. It can be envisioned that in the era of advanced artificial intelligence, the scope of work that financial robots can take over from accountants will further expand. With the advent of ChatGPT,

its influence may also be extended. However, ChatGPT has issues such as inadequate accuracy of conversation content and language model biases. It still lacks human intuition, judgment, and ethics, and cannot completely replace financial professionals. Moreover, within the contingency theory framework, a company's internal and external environment is constantly changing, necessitating complex thinking, problem-solving abilities, and innovation. This places higher demands on financial professionals, who must possess not only supervisory and decision-making skills but also a solid foundation of accounting and financial knowledge. They also need interdisciplinary and cross-departmental learning capabilities to enhance their proficiency in using ChatGPT and similar systems. ChatGPT should be utilized as an auxiliary tool to enhance work efficiency and quality, fostering a complementary and cooperative relationship rather than one of substitution and opposition.

4.2. Colleges and universities

In 2021, the Ministry of Education introduced a significant change to the professional catalog by adding "big data" to the names of various traditional finance and accounting disciplines for the first time. This emphasized the importance of interdisciplinary fusion and highlighted the impact of the evolving technological landscape on finance-related fields in the context of digital transformation in talent development. It also aimed to instill the concepts of data thinking and digital assets. However, prior to the release of the new professional catalog, most financial and economic institutions had not yet introduced courses related to big data technology. As a result, how to effectively promote the transformation of traditional finance-related disciplines in the era of big data remained largely unexplored. Consequently, there is a severe shortage of new, hybrid audit professionals in the short term[14]. ChatGPT can serve as an auxiliary tool for programming, assisting users in tasks such as code writing, testing, and debugging. Integrating ChatGPT into university classrooms represents a significant opportunity to foster the development of interdisciplinary, hybrid professionals by combining the capabilities of AI with traditional education methods.

4.3. Company and organization

Leveraging the advantages of ChatGPT, the central issue of scientific management is to enhance labor productivity. The key to improving labor productivity lies in science and technology. The fusion of the innovation chain and the industrial chain is essential, with the primary focus being on establishing the role of enterprises as innovation leaders[15]. Therefore, companies should actively encourage employees to learn how to use ChatGPT-like systems and utilize them to reevaluate and optimize their workflow processes. If ChatGPT can assist in completing relatively simple, repetitive tasks efficiently, work can be expedited, allowing employees to focus their energy and time on decision-making and supervision. This approach can accelerate innovation within the industry chain and potentially drive breakthroughs in numerous technologies. Leveraging the advantages of ChatGPT, the central issue of scientific management is to enhance labor productivity. The key to improving labor productivity lies in science and technology. The fusion of the innovation chain and the industrial chain is essential, with the primary focus being on establishing the role of enterprises as innovation leaders[15]. Therefore, companies should actively encourage employees to learn how to use ChatGPT-like

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4.4. Government and related organizations

Zhou Hui, Deputy Director of the Network and Information Law Research Office at the Institute of Law of the Chinese Academy of Social Sciences, emphasized the importance of grasping and adapting to the trends and patterns of development in new technologies and applications. He highlighted the need to strengthen regulatory mechanisms, innovate regulatory methods, and strive to promote the better service of the high-quality development of the economy and society through new technologies and applications[16]. Considering that ChatGPT may raise concerns related to intellectual property infringement, unlawful data sourcing, challenges to academic ethics, theft of trade secrets, and even the involvement of sensitive personal information and privacy, it is advisable for the government, academia, financial accounting and auditing associations, legal professionals, educators, researchers, and representatives from the business community to organize relevant forums. These forums can facilitate discussions on how to use ChatGPT legally and transparently while also establishing legal regulations or reaching consensus on participation rules. This will help establish accountability mechanisms, allowing us to enjoy the benefits of artificial intelligence while effectively managing risks and issues.

5. Conclusion

In conclusion, systems like ChatGPT represent a significant advancement in artificial intelligence. These AI conversation tools, based on large-scale model technology, possess natural language understanding and generation capabilities that will have profound and far-reaching effects on the finance and accounting industry. They offer more intelligent language communication and services, replacing some roles in the finance and accounting sector while also creating new opportunities, demands, professions, and technologies.

Therefore, we should actively embrace the advantages of ChatGPT, enhance our skills and qualities, and become proficient users of systems like ChatGPT. On the other hand, we also need to earnestly address the ethical, bias, moral, and security issues that ChatGPT may bring. It is essential to establish more robust security mechanisms to ensure fairness and sustainability in its applications.

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