

Lecture Notes in Mechanical Engineering

Numan M. Durakbasa
Kemal Güven Gülen *Editors*

Sustainable Green Conversion


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Lecture Notes in Mechanical Engineering

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Editors

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Editors

Numan M. Durakbasa
Institute of Production Engineering
and Photonic Technologies
TU Wien
Vienna, Austria

Kemal Güven Gülen
Department of Industrial Engineering
Namık Kemal University
Tekirdağ, Türkiye

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*This book is dedicated to the memory
of Prof. Dr. Güneş Gençyılmaz,
with respect and gratitude...*

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Unveiling the Transformative Influence of ChatGPT on Service Sector



Melike Zehir and Mustafa Kemal Yılmaz

Abstract The study examines the implementation of a new technological setting in the business environment, focusing on the service sectors that are most likely to be affected by ChatGPT. Initially potential use cases in the selected sectors are identified, then the use case-specific efficacy of ChatGPT-4 in generating coherent responses by devising a series of questions are assessed. According to the results, some service sectors will be affected from ChatGPT more than the others as it influences managerial, and operational work differently at the strategic, and functional levels. In e-commerce and digital marketing, financial and healthcare sectors, ChatGPT provides directly or potentially applicable outputs, beyond sole suggestions. In education and management consulting sectors, the outputs are directly applicable. In the IT and cybersecurity sectors, the majority of outputs are definitive solutions, while in the tourism, travel, and hospitality sectors, many outputs serve as suggestions that guide users toward potential solutions. The study also provides valuable insights about use of ChatGPT in overcoming the challenges faced by firms in the service sector.

Keywords ChatGPT · Generative AI · Management · Use cases · Service sector

1 Introduction

Generative Artificial intelligence (AI) has taken assistive technology to a new level by providing powerful capabilities to nontechnical users, and offering a wide range of applications for firms [1]. ChatGPT (Chat Generative Pre-trained Transformer) is one of the most revolutionary AI-powered chatbot launched in December 2022. It enables users to discuss with the AI by inputting prompts [2]. By enabling the automation of many tasks, it produces human-like replies and interactions to queries.

M. Zehir (✉) · M. K. Yılmaz
Ibn Haldun University, Istanbul, Türkiye
e-mail: melike.zehir@ihu.edu.tr

M. K. Yılmaz
e-mail: mustafa.yilmaz@ihu.edu.tr

Goldman Sachs (2023) [3] predicts that generative AI could boost global GDP by 7% (nearly USD 7 trillion) and increase productivity by 1.5% over the next decade, while OpenAI projects of ChatGPT are expected to generate USD 1 billion in 2024.

ChatGPT has the potential to create new opportunities and challenges for companies, transforming working environment and the interaction of people with technology. The system employs transformer-based neural networks to make predictions from given inputs. By leveraging both natural language processing and machine learning algorithms, it can accurately and quickly interpret and respond to user queries. This allows for text-based interactions between the user and the artificial intelligence system and it can be applied to produce various content i.e., text, audio, images and videos [4]. It enhances creativity and innovation in services by effective integration of human and machine intelligence and skills [5]. Many firms across different sectors, including e-commerce, healthcare, finance, education, tourism, use it for several purposes. It offers numerous advancements over traditional chatbots. Unlike other search engines, it interprets conversational questions in natural language, and learns from its interactions with users over time.

Emerging digital technologies lead to transformative changes in the interactions of users with service systems [6]. Many firms integrate GPT to exemplify its transformative potential. Microsoft Bing uses ChatGPT-4 to enhance the user experience of its search engine, while Stripe, a financial platform, deploys this tool to protect chatrooms from fraudulent activities [7]. Morgan Stanley adopted ChatGPT-4 to enhance the efficiency of its in-house technical support operations while Salesforce use it to furnish tailored suggestions [8]. Microsoft Office 365 integrate ChatGPT-4, enabling the creation of entire PowerPoint presentations through a single text prompt, along with the ability to summarize lengthy documents in Word [9].

ChatGPT may have far-reaching implications for companies in different sectors. For instance, educational institutions may employ it to provide customized teaching assistance to the students, and students can get quick answers for their queries. Entertainment companies become more interactive through virtual assistants that understand user preferences. ChatGPT offers better suggestions based on the preferences of users, enabling them to explore new content that people may enjoy doing. Financial institutions may provide customers automated advice on investment decisions based on real-time data analysis and the risk profiles of clients. Healthcare companies may offer smarter patient care solutions by using predictive analytics that can detect patterns in medical data. Mass media may produce news by using the features of ChatGPT. GPT-enabled chatbot also allows employees to complete complex tasks more efficiently without spending much time navigating complicated menus. Thus, anyone that knows coding or not, may use this AI tool, paving the way for new innovations across sectors.

Although there are many studies held on ChatGPT, studies that investigate the applications of ChatGPT in businesses are notably limited. Most of these studies have a rather narrow focus, primarily concentrating on the enumeration of ChatGPT's advantages and drawbacks. This limited scope leaves a significant gap, particularly on how ChatGPT functions in service-sectors. The present study fills this gap in three dimensions. First, it goes beyond the advantages and disadvantages of ChatGPT and

explores its potential applications in service-sector firms. This approach provides a comprehensive view, enabling stakeholders to make more informed decisions. Second, it deepens the discourse by examining the utility of ChatGPT across different sub-sectors and using sector-specific questions that consider unique sectorial dynamics. Finally, this study provides valuable insights for service-sector firms on the potential use of ChatGPT to improve corporate performance and manage complicated issues.

We structure the remaining parts of the study as follows. Section 2 reviews the literature. Section 3 provides the methodology. Section 4 presents evidences on the potential uses of the ChatGPT across selected service sectors. Section 5 argues the limitations and challenges of ChatGPT. Section 6 discusses the ability of ChatGPT-4 to address the use cases in the selected service sectors. Finally, the last section concludes and discusses the implications of the study.

2 Conceptual Framework and Literature Review

ChatGPT allows computers to understand human speech and respond in a natural-sounding way. It relies on a type of neural network that learns from past conversations and additional information provided by users. This learning approach makes it more accurate than other chatbots that use fixed rules for responding. ChatGPT is also designed to quickly adapt to new topics and different types of conversations based on user input. With the use of reinforcement learning, the system improves its performance over time as it processes new data.

ChatGPT fits for real-world applications. It reduces mistakes caused by misunderstandings or wrong interpretations on either side during interactions. There is an increasing number of studies that explore the impact of ChatGPT on diverse areas, ranging from education [10] to health [11], media [12] to tourism [13], environmental science [14] to academia and libraries [15], supply chain [16] to intelligent driving [17], human resource management [18] to real estate valuation [19], finance [20] to organizational behavior [18], advertisement [21] to intellectual property law [22].

In the management field, ChatGPT serve as a new context for the operations of firms. The employment of algorithms significantly advances the optimization of decision-making [23, 24]. ChatGPT also play a vital role in knowledge management. Recent studies show that ChatGPT can be used for information retrieval [25], text mining [26], and document summarization [27]. ChatGPT also provides innovative opportunities for shaping customer-firm relationship, by offering quick and customized answers to the inquiries. Firms can provide 24/7 customer services by using ChatGPT. In this sense, ChatGPT improves customer interaction by providing uninterrupted services, and responding to inquiries on real-time. These experiences increase the loyalty of customers [28, 29]. However, the results may vary from one sector to another. Thus, a close look into how the experiences of customers with services provided by ChatGPT influence their relationship should be explored at sectorial level.

Most of the studies held in management field so far have provided preliminary insights into the application of ChatGPT in supply chain [16], digital leadership and technology integration [30], human resource management [18], organizational behavior [31], corporate performance [1] and technology acceptance [32]. Fred-erico (2023) [16] focused on how ChatGPT plays a role in enhancing customer satisfaction, operational efficiency, and cost reduction. ChatGPT optimizes communication with customers and suppliers, automates tasks like tracking shipments and managing orders, and supports data analysis throughout the supply chain process [33, 34]. Karakose et al. (2023) [29] test the quality of the outputs provided by this tool for detailed prompts about digital leadership and technology integration in terms of accuracy, and conciseness. Budhwar et al. (2023) [18] employed diverse perspectives to observe the applications of regenerative AI in human resources management. Dasborough (2023) [31] examined the impact of ChatGPT on organizational behavior. Kopplin (2023) [32] explored the acceptance of ChatGPT in co-working spaces. Table 1 presents a summary of the selected studies.

Although ChatGPT have significantly contributed to firms there are relatively limited studies held on the service sectors. Most of the prior studies focus on health and education sectors. Thus, there is a need to conduct an in-depth analysis to reveal the quality of the outputs provided by ChatGPT in the service sectors. In this context, several questions should be answered. Can the user follow the output of ChatGPT as supportive advice or guidance aiding to decision-making? Can the user directly use the output, empowering the user's skills, speed, and productivity? Is the output of ChatGPT directly integrated with the use cases, or is there a need for further efforts for data integration, system access, and authorization to implement the output? The answers to these questions represent an important gap to be filled in the literature.

3 Methodology

ChatGPT offers various services in different sectors. However, a comprehensive investigation is necessary to identify the most suitable use cases and evaluate their adaptability. This study reviews the primary service sectors that could integrate ChatGPT into their business based on prior studies. It presents the possible cases in which ChatGPT can be used in the selected service sectors. For the use cases, prompts demanding clear, solid and detailed examples are prepared. We assign various tasks to ChatGPT-4, the most recent version of the selected regenerative AI tool, including planning based on scenario, making predictions, generating reports, creating algorithms, and producing content. It is explicitly requested that ChatGPT-4 provide clear and specific answers. After analyzing the responses of ChatGPT-4 to these tasks, we pose additional follow-up questions, and assign more tasks to get deeper into the subject matter. This process also involves evaluating the proficiency of ChatGPT-4 in handling these complex situations. Finally, the outputs of GPT-4 are categorized according to their applicability based on the criteria that if the provided output,

Table 1 The prominent relevant works in the literature on generative AI applications in business fields

Category	Authors	Sector	Method	Focus area
Marketing	Paul et al. (2023) [35]	Various	Conceptual	The influence of ChatGPT on consumers, its advantages and potential pitfalls
	Dwivedi et al. (2023) [36]	Hospitality and tourism	Conceptual	Practices, challenges, and establishment of a research plan for implementing generative AI
	Gursoy et al. (2023) [37]	Hospitality and tourism	Conceptual	Transformative impact of ChatGPT, its benefits, challenges, and potential to reshape customer interactions, decision-making, and service delivery processes
Finance	Hofert (2023) [38]	Finance	Correlation analysis	ChatGPT capabilities in addressing potential issues related to correlations in financial and insurance risk modeling
Human resource management	Budhwar et al. (2023) [18]	Various	Conceptual	Employment relations, employee well-being, engagement, human resource management outcomes
Organizational behaviour	Dasborough (2023) [31]	–	Conceptual	The effects of ChatGPT on organizational behavior
Technology integration	Karakose et al. (2023) [30]	Education	Comparative analysis	Digital leadership and teachers’ technology integration
Supply chain	Frederico (2023) [16]	Logistic	Conceptual	Research on ChatGPT and the gap in supply chain area
	Burian (2023) [33]	Logistic	Conceptual	Applications that can enhance supply chain management
	Nunez (2023) [34]	Logistic	Conceptual	Main advantages of ChatGPT

- Is a suggestion or guidance that the user should follow to adapt to its own processes,
- Is a direct solution that can be used without any further adaptation efforts,
- Is a solution that can be easily integrated into the existing processes if the required authorization and/or availabilities (such as access to past social media post data for sentiment analysis of a company or access to financial information of a customer to access their credibility and other) are provided to the tool.

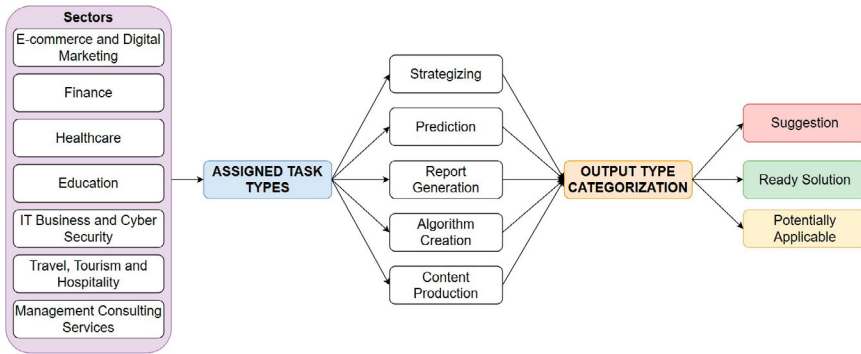


Fig. 1 The details of the methodology employed in the present study

The responses of ChatGPT-4 are categorized by consulting with industry experts to ensure a comprehensive analysis. This allowed us to clarify the extent to which the answers provided by ChatGPT-4 are applicable to the specific questions that we asked. The results provide valuable insights for companies and market professionals in the selected service sectors to prioritize sector-specific use cases for effective regenerative AI deployment, integration and utilization. Figure 1 depicts the research methodology.

4 The Potential Uses of Chatgpt in the Selected Service Sectors

ChatGPT offers an automated way to manage customer relationships and improve internal operations for companies. It provides predictive analytics to come up with new products to meet the needs of customers, enabling firms to develop new strategies on real-time, giving them more control over marketing campaigns, and allowing to optimize their operations. Firms integrate ChatGPT into their workflow to provide quick solutions to the clients to enhance customer satisfaction. They develop distinctive experiences for new clients, boost customer engagement, and build trust with the aid of ChatGPT. They also access new markets, run efficient marketing campaigns, and set up closer relationship with existing and prospective clients [2]. ChatGPT aids to identify what makes a firm successful by examining its marketing tactics, clientele, and product attributes. It makes recommendations for the best channels a firm may use for a campaign and modify campaign tactics to improve outcomes in real-time. The following part discuss the potential uses of ChatGPT on the selected service sectors.

A. E-Commerce and Digital Marketing

Firms that engage in e-commerce heavily depend on customer service. Customer support could be costly and time-consuming with traditional methods i.e., phone calls, emails, while by the capabilities of ChatGPT, firms can quickly and accurately respond to the queries of customers, and offer a more interactive encounter, without incurring additional cost, improving customer experience [39]. Companies may craft personalized offers based on data collected during conversations to increase online sales. ChatGPT also help e-commerce firms better understand the needs of users that speak different languages. This ability allows companies to access to new markets and increase sales abroad. Other benefits of integrating ChatGPT into an e-commerce business can be summarised as follows:

- Sales and upselling: ChatGPT can act as virtual sales representatives, suggesting related products or upselling opportunities, thus increasing average order value.
- Lead generation and conversion: ChatGPT can engage website visitors and convert them into leads by providing information and guiding them through the sales process.
- Reduced cart abandonment: By addressing customer concerns promptly and providing real-time support, GPT chatbots can help reduce cart abandonment rates.
- Integration and customization: GPT chatbots can easily be integrated with the existing e-commerce platforms and be customized to match the brand's style. They enhance word-of-mouth referrals, and improve consumer satisfaction in shopping [40]. They also generate customized recommendations, i.e., product suggestions, promotional content, shopping insights, based on the consumer's past behavior and preferences [41, 42].
- Reduced costs: ChatGPT-driven chatbots and conversational agents has the potential to enhance the quality of services and boost productivity [43]. They offer a cost-effective mean of customer service and assistance, managing multiple interactions simultaneously without human intervention [41].
- Enhanced advertising strategies: ChatGPT enables the creation of compelling promotional content that deeply resonates with consumers, ultimately resulting in elevated levels of engagement and improved conversion rates [44].

ChatGPT has the potential to make revolutionary changes in digital marketing. Firms may develop effective digital marketing campaigns, and engage with the target audience by using the capabilities of this AI-powered tool. ChatGPT may help firms create materials for social media updates, blog entries, and may recommend text in marketing materials for facilitating the work of digital marketers. It can identify the preferences of customers by analysing big data. By this way, firms may better understand what customers want, provide quick solutions to their problems, offer proactive suggestions, and may execute successful campaigns.

ChatGPT speed up response times, facilitate customer support, reducing the workload of customer representatives. In this sense, ChatGPT acts as an efficient alternative for call centers. Firms save time and offer a customized experience by automating

customer services on real-time. ChatGPT can also be used with analytics to make digital marketing campaigns more effective. It increases efficiency, and improve customer engagement, leading to better decision-making, cost savings and greater scalability when entering into new markets.

B. Finance

ChatGPT allow financial institutions to cut the costs of customer services and to respond customers more quickly and accurately. It leads to automate tasks like checking account balances and answering account queries, allowing customer representatives to focus on more complex issues. It also enables financial institutions to engage with each customer based on their past interactions over time. By this way, customers could get tailored recommendations and personalized offers for their financial needs in line with their risk tolerance, and investment background [45]. Thus, ChatGPT assist financial institutions in making prudent decisions, and fostering customer loyalty and trust.

ChatGPT can help detect fraudulent activities to prevent financial losses in financial institutions by analyzing the patterns of customer interactions. Financial companies can employ this tool to inspect client information, produce credit ratings, and make better lending decisions. In this context, ChatGPT can analyze the credit records of a borrower, and market conditions for mitigating the risk associated with an investment or loan. It also ensures that financial institutions comply with regulations, and generate regular reports. However, marketing communication in these institutions may not solely rely on ChatGPT, but human involvement is still needed to verify the trustworthiness of personalised offers. Finally, since ChatGPT is powered by machine learning algorithms that are constantly improved through continuous training with new datasets, the accuracy level in these institutions stays high in responding to new questions, making sure that the clients of the institutions always get reliable answers quickly.

Financial intermediaries may use ChatGPT to select the best stocks that will outperform traditional investment funds and to give more accurate investment advice to their customers. In a recent study held by Lopez-Lira and Tang (2023) [46] the authors found that ChatGPT outperforms traditional sentiment analysis methods and could predict the stock price movements of specific companies more accurately. For instance, JP Morgan uses IndexGPT, its trademark product, that tap cloud computing software using AI for analyzing and selecting securities tailored to the customers' needs. Morgan Stanley use ChatGPT to get answers to the queries of financial advisors. The engineers of Goldman Sachs use ChatGPT to create codes.

C. Healthcare

ChatGPT has a significant impact on healthcare sector. It can speed up and improve many tasks in healthcare business, such as keeping medical records and taking care of patients. For instance, ChatGPT could be employed for data entry into electronic health records, saving time, increasing information accuracy, and helping doctors and nurses to more quickly and simultaneously access patient records. Additionally,

the system can make it easier for hospital employees to talk to each other by simplifying routine tasks like scheduling appointments and filing documents. This allows staff to spend more time on important jobs. ChatGPT can also be tailored for early detection of disease outbreaks by regularly updating its training data from diverse sources [11]. This will improve the AI's ability to spot infectious disease patterns and trends. To reduce errors and biases in ChatGPT's responses, it's crucial to use accurate, diverse, and high-quality data for training, and to update the model regularly. It's also beneficial to have human experts check the information generated by the AI. To make ChatGPT useful for healthcare professionals and researchers who speak different languages, it's important to train it with multilingual datasets and add translation features. Working with language experts to adapt the system will enhance its accessibility.

Healthcare companies, particularly those focusing on telemedicine services by virtual visits to doctors over video conferencing platforms, benefit more from ChatGPT. Patients could get direct and real-time physical and emotional care from virtual assistants powered by ChatGPT, making easier for them to get answers for their treatment plans. This opportunity may reduce the stress of people, particularly those that face with difficult and urgent health issues. Furthermore, ChatGPT could reduce expenditures associated with physical visits due to the lack of additional personnel or physical space compared to traditional medical facilities, making ideal to use ChatGPT services for rural people whose access to quality medical care is limited.

However, when dealing with patient care, it's crucial to manage conversations carefully to protect medical privacy. Using ChatGPT's features, healthcare providers can more easily handle tasks like filling out patient forms, all while making sure they meet legal standards during each interaction. Finally, healthcare experts can use ChatGPT to help diagnose and treat diseases more accurately. They can collect data from conversations with patients to spot patterns that will help them make better decisions.

D. Education

ChatGPT has the most significant impact on education sector, leading to several opportunities and challenges for different parties. On the one side, it provides students personalized learning experiences and allows them to write assignments. On the other side, teachers and academicians can use ChatGPT to make course plans and shape their lectures for each student based on their skills, and give them immediate feedback. ChatGPT also enables teachers to grade the assignments more quickly. Thus, it offer benefits that improve teacher-student interactions and class productivity in all grades. ChatGPT may produce unique academic articles by employing an incredible capacity to fast search online and powerful writing abilities [2]. On the institutional level, ChatGPT could be employed as an automated virtual assistant that can answer questions about course content and campus services in an educational institution.

However, ChatGPT leads some challenges in education sector. Since it processes information from text input it reduces the originality of work, and tends to be

uncreative. Therefore, students should master critical, and creative thinking through learning and making practices. Another challenge of ChatGPT is that if the training data contains biases the results of the search for an assignment may contain inaccurate outcome. Therefore, educational institutions should address these challenges to ensure that the use of ChatGPT in education is ethical, and effective. ChatGPT also affect educational technology firms that provide homework help as a service, as well as digital and physical textbook rentals. For instance, the stock of EdTech Chegg has dropped by – 50% as ChatGPT is making their business obsolete. The company has been hit hard by the recent advancements in AI as more students turned to ChatGPT for studying and learning. Its net profit margin dropped by 92% in 2022.

E. IT and Cyber Security

A closely related field to digital transformation is the use of ChatGPT in the IT business and cyber security. ChatGPT has significant effects on software development in IT companies. Developers use it to create text generation and code completion systems, making software applications more interactive and user-friendly. ChatGPT is also a valuable tool for proofreading and bug fixing. Depending on the programming language, it can show sample code structures, and give developers more time to work on improving core features. NLP capabilities of ChatGPT allow it to analyze existing source codes more accurately than humans. Finally, it can generate new source codes based on samples that already exist. By this way, developers can create more sophisticated chatbots that can respond to user queries.

ChatGPT has a significant impact in the field of cyber security to detect and prevent cyber-attacks. It helps identify phishing emails and detect malware, where it can pinpoint malicious code by analyzing the language used in the code [47]. Moreover, ChatGPT can be used to generate secure passwords that are difficult to guess. It helps debugging programs and highlights cyber vulnerabilities, improving the development of software with enhanced cyber security [48]. ChatGPT can also be employed in developing strategies to combat cybercrime [49]. It can improve the cybersecurity skills of workforce and minimize negative impacts of future similar attacks [50].

F. Tourism, Travel and Hospitality

The implementation of ChatGPT in the tourism, travel and hospitality sectors have dramatically changed how companies in these sectors operate to enhance customers experience [51]. Firms use ChatGPT to meet the requirements of travellers that search for information, construct itineraries, select suitable timetables, and evaluate alternative services in travelling. Travellers can get quick information to shape travel experiences. Meanwhile, AI-generated texts are used to improve back-end operations and marketing campaign. When ChatGPT is combined with voice assistants it will offer smarter services [52].

On the supply side, ChatGPT can assist travel and tourism firms with customer phasing. By allowing travellers to use AI to create a trip itinerary and find hotels, the time-consuming process of sifting through numerous options can be reduced. ChatGPT can also provide travel recommendations for activities, hotels, restaurants,

and other value-added travel services, as well as give advice on local customs, and visa requirements. It can assist with booking and reservation inquiries and provide information about availability and pricing. It offers personalized recommendations based on the interests of travellers. ChatGPT can evaluate alternative routes and transportation options for travellers and travel agencies. By offering multilingual support, it can communicate with travellers in multiple languages, helping to improve their experience. Finally, it can generate marketing content and detailed descriptions for attractions, hotels, and facilities, and develop destination content on websites and social media to attract more visitors.

Some examples may provide evidence on the adoption of ChatGPT by travel companies. In February 2023, Singapore-based online travel agency (OTA) Trip.com launched TripGen, allowing the company's mobile app users to get recommendations on flights, hotels, and other travel services. Kayak, owned by Booking Holdings and Expedia announced the introduction of plugins powered by ChatGPT, while eDreams ODIGEO started a partnership with Google's Bard. The rapid implementation of these tools by major OTAs shows the significant interest in using Generative AI for trip planning.

G. Management Consulting Services

ChatGPT has significant impact on consulting services. It enables consultants to provide quicker, and more personalized services and insightful advice to the clients by collecting, analyzing and interpreting large data volumes. Chatbots can conduct surveys, collect feedback, and provide support, while virtual assistants can automate repetitive tasks and provide recommendations [47]. ChatGPT allows consultants to collaborate and share knowledge more efficiently, creating new opportunities for innovation in the consulting sector.

Table 2 presents human insight and manual work needed in different activities performed by the management consultants, and summarizes the potential impact of ChatGPT on these activities. In Table 2, the tasks that need human insight are not repetitive and still require the expertise of consultants. However, certain activities would become more efficient by using ChatGPT. For example, ChatGPT can help streamline research work. However, posing the right questions and understanding the interplays between the answers would need human insight (Fig. 2).

5 Limitations and Challenges of ChatGPT

Although ChatGPT offers remarkable advantages, it has also some limitations. One of them is the potential for bias in its responses [35]. AI and chatbot models frequently face allegations of exhibiting bias and discrimination [41]. Thus, ChatGPT has the potential to reinforce biases inherent in its training data, leading to prejudiced results and it is imperative to consider both the training data and prompts employed to ensure that the outputs of the model remain impartial and equitable [48]. To minimize these problems, curating the training data carefully and continually monitoring the

Table 2 The potential impact on ChatGPT on human insight and manual work required activities performed by the management consultants

Activity	Tools used	Human insight and ingenuity	Repetitive and manual work	Impact of ChatGPT
Problem identification	Interviews, surveys, meetings	High	Low	Low
Data collection and analysis	Surveys, financial statements, data visualization software	Medium	Medium	Medium
Research and benchmarking	Industry reports, research databases, benchmarking software	Medium	Low	Medium
Solution development	Mind-mapping software, prototyping tools, business modeling software	High	Low	Medium
Recommendation and implementation	Project management software, communication tools	Medium	Medium	Medium
Monitoring and evaluation	Performance metrics, surveys, data visualization software	Low	Medium	High
Communication and presentation	Presentation software, Communication tools	High	Low	Low
Project management	Project management software, scheduling tools	Medium	Medium	Medium

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responses of ChatGPT to identify and correct potential biases is essential. Furthermore, the responses of ChatGPT are restricted by the domain knowledge it has acquired through its training data. Thus, it may need help for highly specialized topics. Another drawback of ChatGPT is its tendency to generate information that might not be accurate. This becomes particularly important when consumers seek reliable insights about products, as doubts can arise regarding the reliability of the AI [49].

ChatGPT need more emotional intelligence. In human conversation, ChatGPT may experience difficulties in recognizing and responding to emotional clues. This can result in insensitive responses that may frustrate users. Therefore, it may be essential to

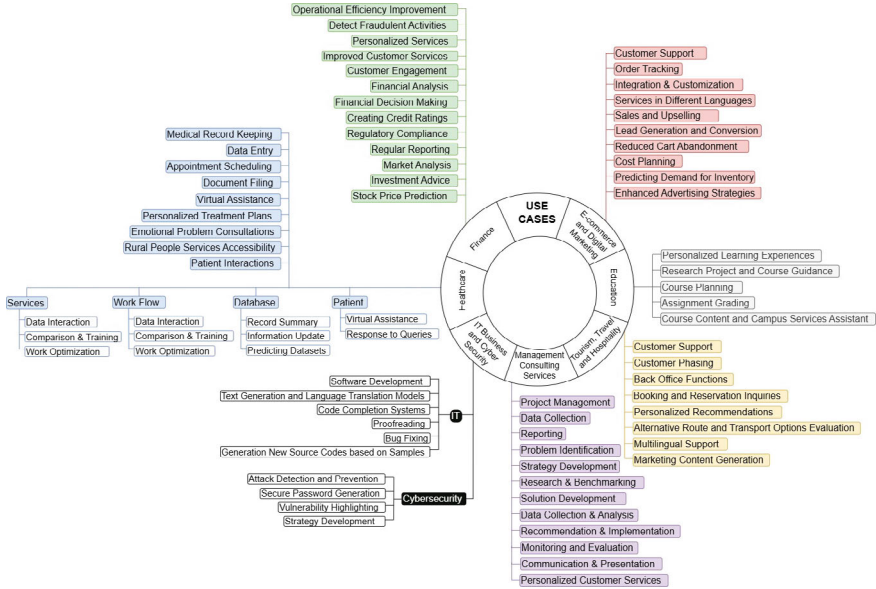


Fig. 2 The detailed identified subfields ChatGPT can serve under each considered sector

incorporate additional programming to help ChatGPT better understand and respond to emotional clues for creating an empathetic user experience. ChatGPT has also the limitation of offering limited dialogue options to users that can restrict their ability to engage in meaningful conversations. It generates responses based on statistical patterns of its training data, but it can sometimes misunderstand the context of the prompts it receives, leading to inappropriate answers [50]. A closely related issue to this limitation is that ChatGPT may be unable to understand the context of a conversation and thus, may give inaccurate answers. This could result in negative interactions with consumers that may harm the brand reputation.

Other challenges of ChatGPT include privacy and security. ChatGPT has the capability to gather data from interactions with consumers, raising concerns related to privacy [51]. ChatGPT also possesses the capability to create convincing and high-quality malicious content such as phishing emails and social engineering attacks [52]. Although safeguarding measures are implemented, they can be bypassed by altering the wording of the queries. This issue highlights the complexity of maintaining security in the AI systems. Though many companies assess ways in which ChatGPT could be used in the business environment some firms ban the use of ChatGPT due to security reasons. For instance, Samsung restricted the use of ChatGPT for its employees after the misuse of this chatbot. The company reported that some employees uploaded sensitive codes to ChatGPT that lead to concern in security risk considering the leaks of crucial information [53, 54]. For similar reason, US investment bank JP Morgan restricted the use of ChatGPT among its staff earlier in 2023 [54], while Amazon warned its employees not to upload confidential information to ChatGPT. However,

Samsung is also looking for ways in which generative AI could be used safely to enhance employee productivity and efficiency. Despite these restrictions, ChatGPT can help engineers and software developers in companies to generate computer codes to speed up their tasks, as this is the case in Goldman Sachs.

6 The Ability of Chatgpt-4 to Address the Use Cases in the Selected Service Sectors

This section explores the ability of ChatGPT-4, the latest version of the regenerative AI tool, to address some use cases in the selected service sectors. We asked ChatGPT-4 to provide solid, detailed, and deterministic answers for the use cases. The responses are then evaluated by taking the opinions of industry experts from considering the type and applicability of the output. Table 3 presents the outcomes of inquiries related to the use cases in each sector. The results include a classification of the content types of the responses and an overview of the types of outputs generated by ChatGPT-4. In the categorization of the output type, “suggestion” refers to the provision of recommendations that guide the user to solution, but not providing a direct solution; “ready solution” represents direct use of the outputs for the use case; “potentially applicable” means the output can be adapted to real world cases, if certain authorizations or data-system integration is provided such as access bank user account details in finance sector.

In this study, we provided only a sample of the questions and answers directed to and generated by ChatGPT-4 for the selected sectors due to large size of the responses and answers. The remaining questions and their answers can be provided by the authors upon requests.

The findings of the exploratory study in Table 3 show that, in e-commerce and digital marketing, financial and healthcare sectors, ChatGPT-4 can provide directly or potentially applicable outputs beyond suggestions. In education and management consulting sectors, in the all use cases, ChatGPT-4 provided directly applicable, and satisfactory outputs. In the IT and cybersecurity sector, most of the outputs, and in the tourism, travel and hospitality sectors some outputs are suggestions, rather than direct solutions, guiding the users towards solutions.

7 Conclusion

ChatGPT has produced remarkable changes in the business environment and the interactions of people since its release in December 2022. It offers companies significant opportunities like enhancing customer satisfaction, saving time and money, and gaining a deeper understanding of customer behavior by a natural conversational platform. The machine learning capabilities of ChatGPT enable it to be updated by

Table 3 The types of the outputs ChatGPT-4 provided for the explored detailed use cases in different sectors

Sectors	Use case no	Use case detail	Type of the output		
			Suggestion	Ready solution	Potentially applicable
E-commerce and digital marketing	1	Build smart product recommendation engines to personalize user experiences in e-commerce sector			+
	2	Assist in monitoring brand mentions and sentiment across social media platforms		+	
	3	Help segmenting customers based on various metrics for targeted marketing			+
	4	Assist in implementing visual search features for products			+
	5	Use data to optimize pricing strategies for different products		+	
	6	Predict inventory demand			+
Finance	1	Generate reports and summarize market analysis and potential market movement		+	
	2	Assist customers in performing basic banking transactions using natural language commands			+
	3	Assess loan applications and help determine creditworthiness by analyzing financial and historical data			+
Healthcare	1	Provide initial guidance to individuals based on the symptoms , directing them to appropriate care		+	
	2	Periodically ask patients for updates on their condition and relay that information to provide healthcare			+

(continued)

Table 3 (continued)

Sectors	Use case no	Use case detail	Type of the output		
			Suggestion	Ready solution	Potentially applicable
	3	Analyze public data to identify potential outbreak of diseases			+
	4	Generate possible treatments based on guidelines to assist doctors, though which they make final decision		+	
Education	1	Generate lesson plans or offer suggestions for activities		+	
	2	Guide students on how to approach a research project and suggest sources to structure it		+	
	3	Offer pros and cons for educational decisions , such as implementing a new curriculum		+	
	4	Assist in learning new topics by giving examples		+	
IT and cybersecurity	1	Assist in generating or updating technical documentation , manuals, and best practices guideline	+		
	2	Offer insights into code quality, readability , and potential security flaws		+	
	3	Suggest optimization strategies for allocating hardware and software resources in IT scenarios	+		
	4	Generate incident response reports during a security event	+		

(continued)

Table 3 (continued)

Sectors	Use case no	Use case detail	Type of the output		
			Suggestion	Ready solution	Potentially applicable
	5	Prioritize vulnerabilities based on textual descriptions and available data		+	
	6	Create cyberattack detection algorithms		+	
Management consulting services	1	Provide insights into different types of business models and adaptations		+	
	2	Outline strategic objectives and action plans		+	
	3	Run SWOT analysis for a firm		+	
Tourism, travel and hospitality	1	Offer suggestions for sightseeing, dining, and other activities based on user preferences		+	
	2	Offer immediate scripted advice in emergency cases until professional help is available	+		
	3	Translate content in multiple languages		+	

new data generated from customer engagements, social media platforms and other sources to provide precise responses to the needs of customers.

This study examines how ChatGPT affects firms across the selected service sectors. At the strategic level, ChatGPT assists in data collection and analysis, offering valuable insights for managers to make better decisions by using educated reasoning. At this level, ChatGPT may influence knowledge management by facilitating the spread of information within a firm. This opportunity offers new ways for employees to generate innovative ideas. At the functional level, ChatGPT improves customer support service, and shape customers experiences and relationship with the firm, increasing operational efficiency. Finally, at the administrative level, ChatGPT may facilitate the organization of work time, the simplification of procedures, the automation and scheduling of tasks like document reviews, report generation.

On the sectorial basis, ChatGPT provide different advantages to firms. It has a positive effect on e-commerce and digital marketing operations. Firms can quickly process customer queries and provide customized responses to them, building strong relationships with customers, leading to increase in sales. In healthcare sector, ChatGPT enables companies to provide automated patient support services that can

reduce costs and improve outcomes for patients through better diagnosis and faster response to medical concerns. In education business, ChatGPT assists students with course material, writing assignments, answering their queries, allowing them to focus more on research projects. It also helps teachers and academicians in evaluation and grading, moving their emphasis from fixing mistakes to developing more creative writing and innovative abilities. Financial institutions may use ChatGPT to enable customers to interact with their accounts without having to go to a branch, among many other things. In travel, tourism and hospitality sectors, ChatGPT assist travellers by generating answers about destinations, and transportation and providing personalized recommendations for activities, hotels, restaurants, and other value-added travel services based on the preferences of travellers. Finally, ChatGPT makes the job of management consultants much interesting. It allows them to collaborate more efficiently, creating new opportunities in the consulting sector.

The findings indicate a diverse landscape for the applicability of ChatGPT-4 across service sectors. In e-commerce, digital marketing, financial services, and healthcare, ChatGPT-4 shows a strong propensity for delivering directly applicable and impactful outputs, suggesting a ripe opportunity for firms to integrate AI-driven solutions for getting significant operational benefits. In the education and management consulting sectors, the tool offers directly applicable and satisfactory solutions for the use cases, indicating a potential to augment human expertise. However, for the IT and cybersecurity sector, as well as tourism, travel, and hospitality sectors, ChatGPT-4 plays the role of a suggestive guide rather than a solution provider.

A. Implications of the study

ChatGPT offers multiple benefits, i.e., reduced costs, improved user experience, increased productivity, for companies in service sectors. Companies that leverage this technology are likely to gain significant competitive advantages and they could seize their market share by offering better customer services. ChatGPT also can facilitate better allocation of employees to tasks, increasing operational efficiency. Therefore, companies should invest in this technology to pinpoint the right models of using these solutions to enhance corporate performance. Moreover, given the varied level of applicability, firms should carefully consider how to strategically deploy ChatGPT-4, taking into account strengths and weaknesses of their industry requirements. This approach is crucial for maximizing the potential benefits of AI adoption.

However, companies should be aware of the fact that the performance of ChatGPT is limited to making predictions based on the data it is provided. It needs creativity, empathy, and other human-specific abilities. Users should verify the information from reliable sources before relying on the responses of ChatGPT. They should also adapt this technology by incorporating it into their corporate values. They should identify the parts of the business where ChatGPT could have the most immediate impact and implement a mechanism to monitor it, given the fact that AI-powered chatbots evolve quickly. Finally, companies should exercise caution to ensure that private, sensitive, and secret business information remains where it belongs. Therefore, policymakers

should assess the possible consequences of ChatGPT and work out to introduce new regulations and standards to ensure the privacy and secrecy in the corporate world.

B. Limitations of the study and future research

We acknowledge that the analyses in this study are limited to the available knowledge on this technology. Further research is necessary to ensure the reliability of the solutions offered by ChatGPT. The ethical implications of incorporating ChatGPT into large endeavors should also be investigated to reveal its potential effects. Future studies may also explore whether ChatGPT leads to better employee performance. Finally, although ChatGPT improves operational efficiency and optimizes workflows in the service sectors, the close task collaboration between humans and machines should be explored to manage any anxiety that may arise within firms.

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