The impact of using ChatGPT on employees of Croatian IT Companies

Donata Szombathelyi, Tomislav Jakopec, Josipa Selthofer

Josip Juraj Strossmayer University of Osijek

Faculty of Humanities and Social Sciences in Osijek

Lorenza Jagera 9, 31000 Osijek, Hrvatska
{dszombathelyi, tjakopec, jselthofer}@ffos.hr

Abstract. *More efficient technologies and adaptations in work mainly create challenges for employees in the IT sector, who, in addition to search engines to solve problems, have recently turned more and more to chatbots. Chatbots are software systems whose goal is to automate and simplify certain tasks, and considering their widespread use today, a study was conducted that tries to answer the question of what impact ChatGPT creates on the work of employees in Croatian IT companies; in which IT area is its use the most dominant, what are its advantages and disadvantages, do search engines or ChatGPT dominate when it comes to solving problems, and what is the level of security and trust, and thus the perception of ChatGPT's development in the future. Using a survey questionnaire, it was confirmed that the full-stack development has used ChatGPT the most so far, its wide application was singled out as an advantage, while limited knowledge was also confirmed as a disadvantage. Conventional search engines still dominate in solving business challenges, and in a comprehensive review, the existing results, (and the IT population so far in the world), are very cautious about their use and have good attitudes about security and trust. The latest research show that the constant progress and improvement of ChatGPT is expected because they have encouraged their growing integration in different IT sectors, which will result in even more significant improvements in terms of access to problem solving for employees.*

Keywords. GPT, ChatGPT, IT, business

1 Introduction

We live in very interesting times from the point of view of the use of technology. Company's websites, expert sources, and articles in the media point to the battle in which companies are fighting for supremacy in the Large language model market as the next step to artificial intelligence. In 2022, Meta, the umbrella company of Facebook, announced a device and platform for using virtual realities known as Metaverse. Like any business venture, they presented it as the next big thing in our lives. However, the effect of everyday business and personal use of GUI (windows 95, 1995) or smartphones (iPhone, 2007), which have become integral parts of people's lives, did not occur. Not long after that, the Large language models developed by the company OpenAI, called GPT-3, became available to end users via the OpenAI Chat-GPT interface. Soon the topic of virtual reality fell into the background and the world of technology began to talk about the possibilities of the Generative Pre-trained Transformers (GPT). Compared to Meta's efforts to introduce virtual reality, besides rumours of Apple tackling that field, none of the big players (Google, Microsoft, Oracle and others) presented their competitors. In the case of Large language models, shortly after the presentation of ChatGPT, Google Bard was also presented as an immediate response in the usage of this technology in the search results. In contrast, there are reports that others will get into that race as well. It is pretentious to say after such a short time that the next big thing has just occurred, but there is a high probability that we are currently living at the next big thing point in time that will change our lives. Therefore, this paper aims to examine the employees of Croatian IT companies regarding the use of OpenAI ChatGPT technology as the first representative of Large language models technology widely available. Accordingly, the paper first looks at existing research on the use of ChatGPT in the world, followed by the described research (conducted in Croatian IT companies), goals, overall methodology, results, discussion and finally the conclusion, together with references.

2 Previous research

Previous research in the field of Large language models, GPT and artificial intelligence chatbot, particularly ChatGPT is rare and new since an OpenAI was released first in November 2022. Since that time, it became a global issue. It has been argued whether chatbots can write student essays, be an author of

scientific articles etc. (Lee, 2023). Looking at the state of the Art in artificial intelligence chatbot literature, it is obvious the lack of an interdisciplinary approach. In a bibliometric analysis from 2018 based on the information contained in the Scopus database, 314 documents were analysed. The first publication appeared in 2002, and in 2016 there was a significant increase in the number of publications. Probably due to fact of progress in performance, hardware, market visibility and potential investments in the artificial intelligence area (Bernardini at all, 2018).

Artificial intelligence is aimed to skip human interaction into problem solutions or task execution. According to the author Jatin Borana, artificial intelligence can by analyzing data be useful in the gaming industry (chess), heavy industries (in jobs dangerous for humans), weather forecasting (by analysing patterns they predict the weather), expert systems (statistical analysis), data mining or knowledge extraction and knowledge representation (based on data mining they establish patterns, associations and classification; all needed in the process of data visualisation) (Borana 2016).

In the business world, there are some concerns regarding the wide popularity of ChatGPT. For example, if a user request is replaced by a chat engine, certain websites could lose their purpose (De Vynck, 2023). There are reports of companies banning the use of ChatGPT for business purposes (Vincent, 2023; Tilley and Kruppa, 2023).

In a paper published in 2018, authors Anghelescu and Nicolaescu (2018), focused on the implementation and design of the Chatbot system using search engines and teaching techniques.

Further, authors in 2023 researched how ChatGPT may serve in management theories and concepts. Their findings are that some management theories and concepts could be used in artificial intelligence and implemented at strategic, functional, or administrative levels of business (Korzynski, Mazurek, Altmann et all, 2023).

Arguing on ChatGPT's legibility, there is also a question of its maliciousness. As an open tool, it is vulnerable to attacks from various actors (Murphy, Du & Suarez, 2023).

In the world of business, artificial intelligence platforms could be a new opportunity, for employers, as well as employees. As ChatGPT is evolving question is how it will affect people's businesses. It is a common belief that only human is capable to create an idea and possess creativity. Group collaboration and the exchange of knowledge, emotional intelligence and joy that brings working in a human environment can't be replaced. So, embracing new technology could be an opportunity for improving jobs and thinking in different ways. For sure, some of the jobs will be replaced by artificial intelligence, but also other job opportunities will appear (Garg and Khan, 2023).

Easy and free to use, ChatGPT is becoming frequently used by small and medium-sized companies, as well as start-ups. It can be used to identify product features, develop marketing strategies, or create pricing models. Although of the potential, many companies are cautious, mainly in terms of legal issues. EU plans to regulate artificial intelligence (European Commission, 2023). The plan is to divide applications into different categories so that they could be marked as risks or as potential for the society and economy (Büchel & Mertens, 2023).

3 Research

3.1 Aim and research questions

This research aimed to examine the employees of Croatian IT companies about the use of ChatGPT and to provide answers to the following research questions:
1. In which areas of business have Croatian IT companies used ChatGPT the most so far?
2. What are the advantages and disadvantages of ChatGPT for employees?
3. When solving business challenges, which dominates more, conventional search engines or ChatGPT?
4. Do employees have sufficient security and trust in ChatGPT?
5. What attitudes do employees have regarding the development of ChatGPT in the future?

3.2 Methodology

This research was conducted from March 31st to April 14th, 2023, and it included all employees of IT companies in the Republic of Croatia (including students and interns in IT companies). For this research, an online questionnaire was created in Lime Survey[1] and sent to employees, students, and interns via the official website of the Faculty of Humanities and Social Sciences Osijek (FFOS), via Gmail, LinkedIn, and WhatsApp. The questionnaire was composed of 18 questions[2], of which were single and multiple-answer types. In the first group of questions, the respondents were asked to confirm their gender, age and to indicate the job position in which they are employed. Moreover, the second group of questions required respondents to state which search engines they use and how useful the results are. The third group of questions refers to the use, purpose and usefulness of the results obtained by ChatGPT. Furthermore, the fourth group refers to the ease of use of ChatGPT and its advantages and limitations. Also, the fifth group of questions refers to trust, security, and negative experience in using ChatGPT. Lastly, the sixth group of questions asked respondents to state which they use more - ChatGPT or search engines, to indicate their

---

[1] https://puh.srce.hr/s/ofeiQPEbcpombgA

[2] https://puh.srce.hr/s/NqxGtCPtiKzb2ey

perception regarding the development of ChatGPT in the future, and to give their opinion on ChatGPT as a replacement for conventional search engines. It should be noted that respondents who have never used ChatGPT and those who intend to use it could only answer up to the third group of questions and 2 questions in the sixth group (perception of the development of ChatGPT and ChatGPT as a substitute for search engines).

3.3 Results

Out of a total of 166 solved questionnaires, 140 were complete answers [3], while the remaining 26 were incomplete. Regarding gender, a total of 62% (87) of respondents were male and 37% (51) were female while 1% (2) did not reveal their gender as shown in Fig 1.
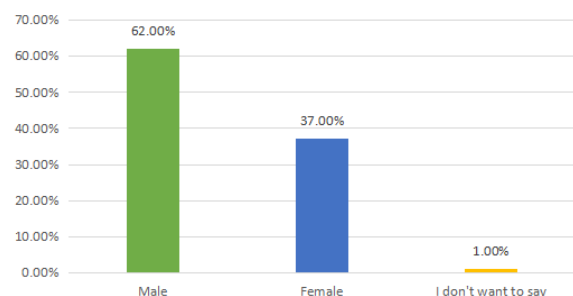
Figure 1. Gender of respondents

Fig. 2. shows the grouping age of the very diverse respondents. In the first group aged 18-20, there were a total of 4% (6 respondents), while in the second group, there were a total of 47% (66) aged 20-30. Furthermore, the third group included respondents aged 30 to 40 and there was a total of 35% (49 of them). Also, there were 10% (14 respondents) between the ages of 40 and 50 and a total of 4% (5 respondents) between the ages of 50 and 60. There were no respondents older than 60 years.
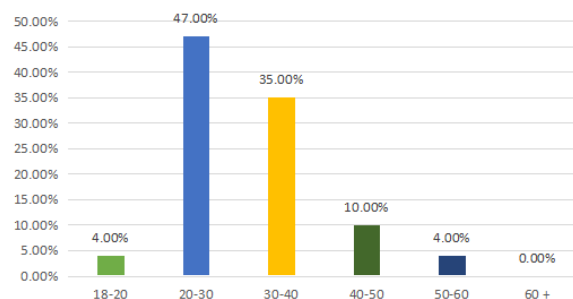

Figure 2. Age of respondents

Also, Fig. 3. shows which business areas the respondents belong to and gives the answer that full

___
[3] https://puh.srce.hr/s/sX6PEFXqX5kAkDK

stack development is the area that uses ChatGPT the most. The total number of positions is 140: CTO 2% (3), CEO 5% (7), Project Manager 8% (11), Back-End Developer 8% (11), Front-End Developer 9.3% (13), Full Stack Developer 15% (21), iOS Developer 5% (7), DevOps Engineer 3% (4), UX/UI designer 4.3% (6), Product Owner 2% (3), Scrum Master 0,7% (1), Social Media Manager 3% (4), Content Writer 1.4% (2), Marketing Manager 5% (7), Quality Assurance 6.5% (9), Cloud System Administrator (0%), Cloud Security Specialist (0%), Database Administrator 1.4% (2), Office Manager 3% (4), Human Resources 1.4% (4)), Business Analyst 2.14% (3), Data Analyst 3.6% (5), Data Scientist 2.14% (3) and Other 7% (10).
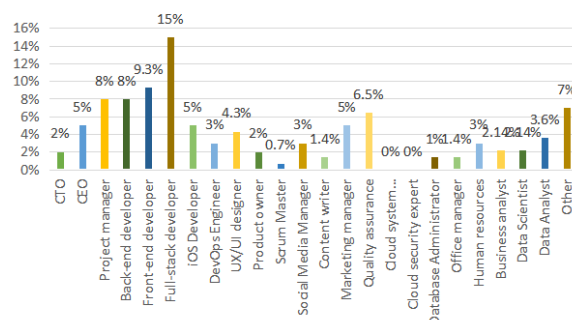

Figure 3. Business areas that use ChatGPT

Furthermore, in Fig. 4. is visible that respondents use various conventional search engines such as Google Search 87.14% (122), Yahoo 2.14% (3), Bing 1.42% (2), DuckDuckGo 7.14% (10), Ask 1.42 % (2) and Baidu 0.70% (1).
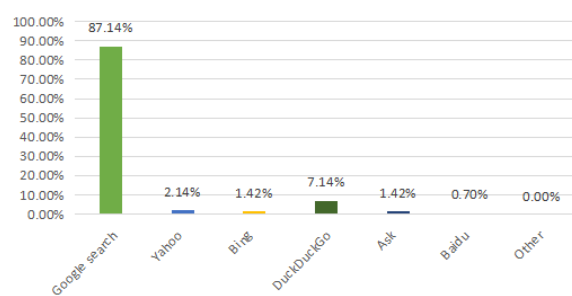

Figure 4. Use of search engines in work - Google Search, Yahoo, Bing, DuckDuckGo, Ask, Baidu and other

Fig. 5. points that a total of 46% (64 respondents) stated that the results were very useful, 30% (42 respondents) said that they were moderately useful and 24% (33 respondents) that they were completely useful. Only 1 respondent (0.70%) confirmed that the results were hardly useful.
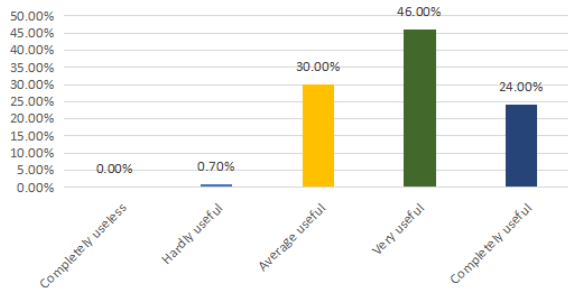
Figure 5. The usefulness of obtained data essential for work

Also, Fig. 6 indicates that a total of 4.30% (6 respondents) stated that they did not use a chatbot at all and did not plan to use one. 17.10% (24) confirmed that they did not use it, but plan to use it, while a total of 14.30% (20 users) probably used the chatbot but did not use it after that. Also, 48 respondents (34.30%) use a chatbot only, when necessary, i.e. when a certain problem needs to be solved, and a total of 30% (42 respondents) use it often because they like to experiment with artificial intelligence.
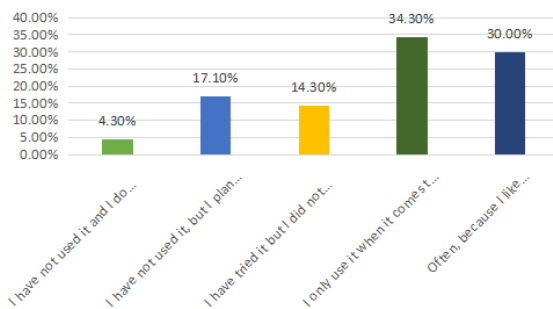

Figure 6. Using ChatGPT in work so far

Fig. 7. shows that a total of 38.70% (53 respondents) have used ChatGPT for debugging purposes, while 33.70% (46 respondents) have used it for code interpretation. For writing an essay, a total of 19.30% (27 respondents) are using it, and for writing an e-mail 24.30% (34 respondents). Also, 12.10% (17 respondents) used ChatGPT for text translation, and 41.40% (58 respondents) for a kind of testing. "Other" purposes were marked by 12.10% of respondents. This question allowed multiple answers.
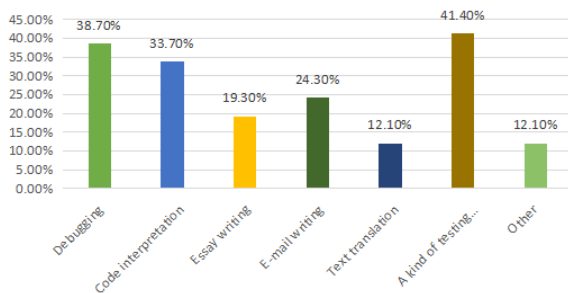

Figure 7. Purposes of using ChatGPT in work

Moreover, Fig. 8. is showing how a total of 3% (3 respondents) believe that the results are completely useless, 3% (3 of them) stated that they are barely useful, while a total of 22% (25 respondents) confirmed that they are moderately useful. As many as 32% (35 respondents) think they are very useful and 40% (44 respondents think they are completely useful.
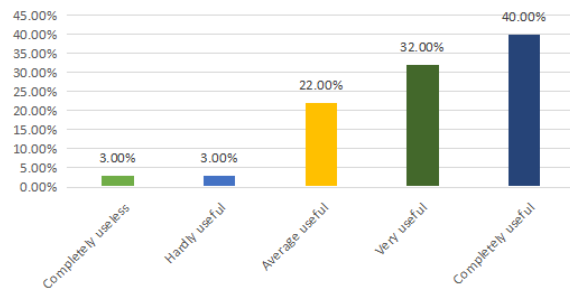

Figure 8. The usefulness of obtained data generated by the ChatGPT

Fig. 9. represents how 1% (1 respondent) thinks that ChatGPT is complicated to use, while a total of 12% (13 respondents) stated that it is moderate. 33% (33 respondents) think that it is easy to use, and a total of 54% (59) that it is very easy.
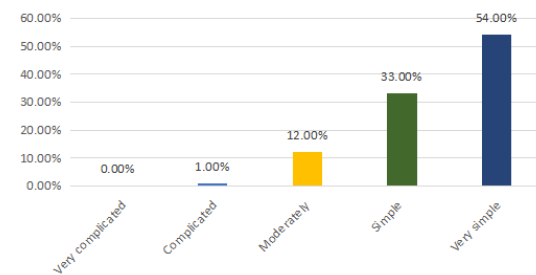

Figure 9. The ease of use of ChatGPT in work

Fig. 10. shows how wide application is the biggest advantage of 42% (46 respondents). 17% (19 respondents) think that it is the possibility of subsequent corrections, and 14% (16 of them) that it is previous interactions with the user. Also, a total of 13% (14 respondents) stated that for them the biggest advantage is the imitation of human conversation, while for the remaining 12% (13 respondents), it is the possibility to expand the features. Option "Other" have marked 2% of respondents (2).
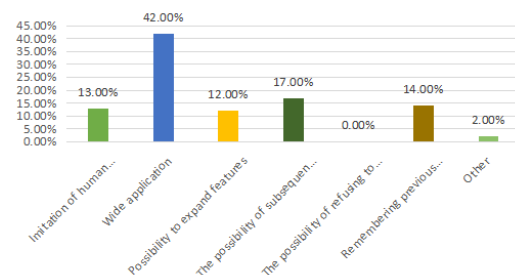

Figure 10. The biggest advantage of using ChatGPT

On the other hand, Fig. 11. represents that limited knowledge is considered the biggest disadvantage by 41% (45 respondents). Also, a total of 32% (35 respondents) believe that inaccuracy and ambiguity in giving answers are the biggest drawbacks, while for 11% (12 respondents), ethics is problematic. Legal issues are main disadvantage for 14% (15 respondents) and 2% (3 respondents) have marked "Other" disadvantages.
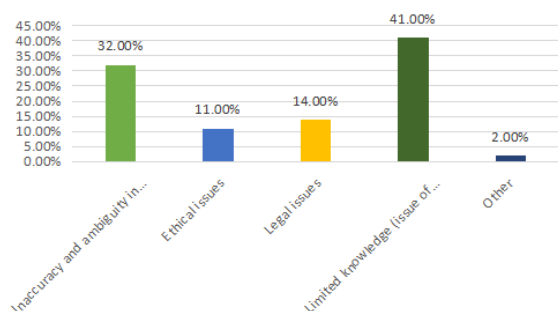

Figure 11. The biggest disadvantage of using ChatGPT

Furthermore, Fig. 12. point that 37.20% (41 respondents) think that ChatGPT is very safe and 31% (34 of them) think that it is only safe. Also, 24.50% (27 respondents) said that it is relatively safe, 6.40% (7 of them) said that it is not safe, and only 0.90% (1 respondent) thinks that it is very unsafe.
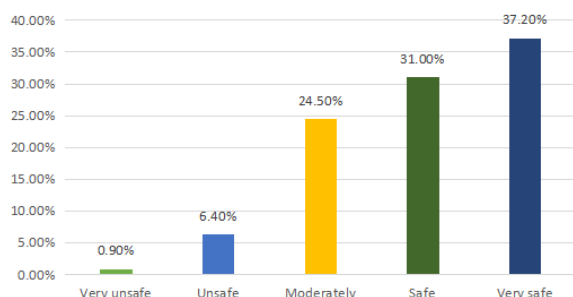

Figure 12. Safety of using ChatGPT

Also, Fig. 13. impersonates that a total of 92 respondents (84%) think they have enough trust, while 16% respondents (18) think they have no trust.
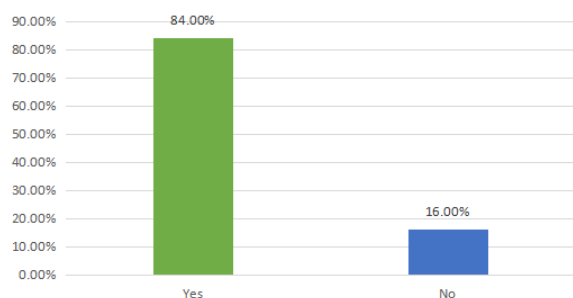

Figure 13. Trust in using ChatGPT

Likewise, Fig. 14. indicate that 73 (66.40%) respondents have never had a negative experience, 29 respondents (26.40%) had it only once, and 8 respondents (7.20%) had it more than once. No one has had a negative experience every time so far.
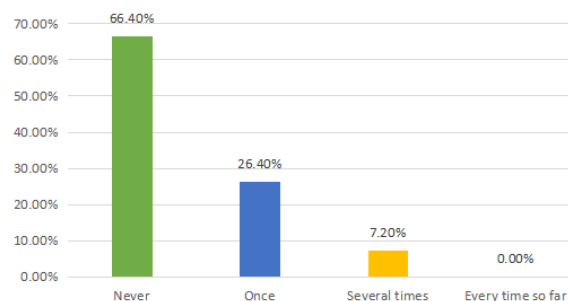

Figure 14. A negative experience by using ChatGPT

Also, Fig. 15. represents that 74 respondents (67%) use their search engine first when solving problems and 36 of them (33%) said the opposite.
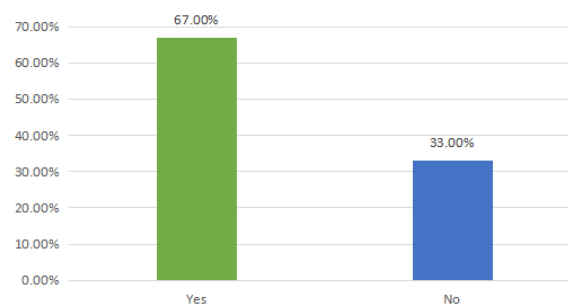
Figure 15. The first tool as a problem solver at work

When asked what they use more, ChatGPT or search engines, points to Fig. 16. 19% (26 respondents) answered that they use ChatGPT more, while 45% (63 of them) confirmed the opposite. As many as 15% (21 respondents) stated that they use both tools equally.

Figure 16. Domination of using - ChatGPT vs. search engines in work

The Fig. 17. shows that a total of 69% (96 respondents) have a positive perception regarding the development of ChatGPT in the future, and 2% (4

respondents) have a negative perception. 29% (40 respondents) have a neutral perception.
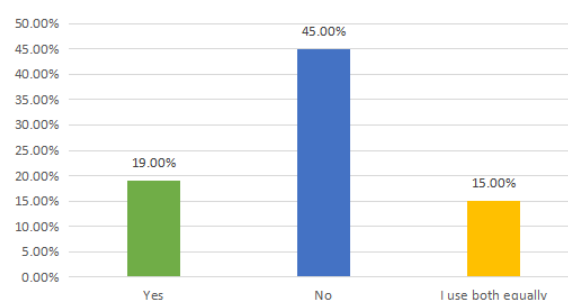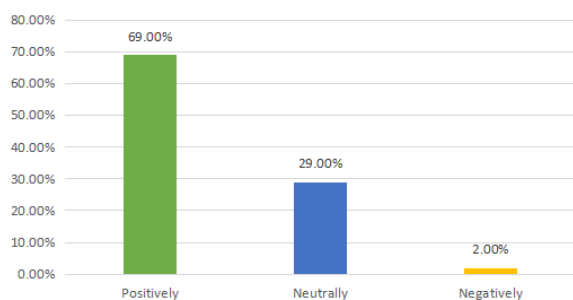

Figure 17. Perception of ChatGPT in future

In the last question, which is open-ended type, the survey confirmed that respondents believe that ChatGPT, despite its popularity, will not replace existing search engines (*"He won't, because he doesn't know how to think critically."*). Also, some stated that their relationship will be united and that they will function together ("*They will improve, and I think they will work together.").

3.4 Discussion

Compared to the existing literature, the results give a good insight into the use of ChatGPT by employees of the IT sector in the Republic of Croatia. Considering that only a few months have passed since the start of using this chatbot, the results about the effects of its use are really good. A high-quality answer to each research question was obtained.

Based on the findings of the study, it was determined that full stack development with 15% is imposed as an answer to the first research question which is the predominant business area of using chatbots so far. The second research question aimed to explore the advantages and disadvantages of using ChatGPT, revealing that its key advantage is its wide application, which was acknowledged by 42% of respondents. On the other hand, limited knowledge of ChatGPT was identified as a disadvantage, as indicated by 41% of respondents. Regarding usage as part of the third research question, the respondent confirms that search engines still dominate as the preferred tool for finding information over ChatGPT, according to 67% of respondents. In particular, several respondents emphasized that ChatGPT is not expected to replace existing search engines, but rather is seen as a positive trend in technological progress. An analysis of the sense of security and confidence in using ChatGPT, as addressed in the fourth research question, highlights that 31% of respondents stated that they feel safe when using the system. Finally, the attitude of the employees on the future development of ChatGPT was investigated. A total of 69% of respondents had a positive perception, while 29% of respondents

maintained a neutral attitude, and only 2% of respondents expressed a negative perception.

Regarding the limitations of this research, it should be pointed out that the survey questionnaire as a research instrument can be organized differently. Observing the results, moreover, it may contain some more questions. e.g. *"Do you use ChatGPT premium version", "Do you intend to pay for free ChatGPT services in the future?", "Do you use any other artificial intelligence tools in your work?"* etc. Moreover, the research instrument (if the sample is smaller) can be also an interview in order to find out more precisely the satisfaction of the users. Conducting interviews with a diverse group of IT employees would provide more detailed impressions of ChatGPT's performance and limitations. Also, the research limited the time. For detailed research, time for conducting should be longer. Likewise, sample should also be minimized. This sample is very large, namely IT employees throughout the Republic of Croatia. In this way, all areas are included at once, and not just one (e.g. not only Data Science).

As for the implications of this research, on the one hand, the theoretical contribution stands out, in the context of understanding the connection between man and machine and the increasing reliance on technology of this kind. In addition, by researching the impact of this chatbot, the so-called framework (model) for predicting trends, this is also confirmed by the fact that 30% of IT employees in the Republic of Croatia have used it because they like to experiment. Also, the progress of such a tool, in general, is an important item. By studying the requirements of employees in the Republic of Croatia and the purposes of their use of ChatGPT, employees will soon be able to get better results, thanks to the improved performance of the chatbot. But on the other hand, research implies numerous ethical and social issues. In other words, many are becoming concerned about their privacy, especially when it comes to key personal information. Also, it is implied that it is important to establish a proper implementation of the policy of using and implementing chatbots in Croatian IT companies. For example, Italy banned the use of this tool in business activities, where in fact the holistic approach to the integration of artificial intelligence in the workplace was lost, and thus the well-being and development of the skills of their employees. In addition, this coincides with De Vynck's fact that certain websites have lost their purpose due to the excessive integration of artificial intelligence tools. The goal is to create a positive and empowering environment where artificial intelligence tools complement employee capabilities, not replace or diminish them in any way.

Therefore, this research provides a general picture of the impact of chatbots on the work of employees in Croatian IT companies. For future research in Croatian IT companies, if a deeper approach and analysis of chatbot impact is required, it is necessary to specify the sample to only one area in the work (for example,

Quality Assurance or UX/UI design). In this way, all the nuances will be revealed because it is easier to focus on only one area and monitor the impact of the chatbot. In addition, it is easier to discover possible challenges that are specific to a certain position at work, and thus the necessary level of support for the employee can be better provided. Ultimately, classification into one area will enrich the understanding of the functioning of today's work not only for experts, but also for employees, and other research will probably build on the general findings of broader studies.

4 Conclusion

Artificial intelligence can be useful in the gaming industry, heavy industries, weather forecasting, expert systems, data mining or knowledge extraction and knowledge representation. In the business world, there are some concerns regarding the wide popularity of ChatGPT.

Considering the existing literature and already conducted similar research in the field, this research explored the field of use, attitudes, and perception of ChatGPT from an employee's perspective. Full stack development together with frontend and backend development is the most common area of business that uses ChatGPT. This fact was expected because developers are the ones who are supposed to come up with a solution to problems as quickly as possible. From the point of advantages and disadvantages, people are still exploring technology. It is reasonable that the biggest advantage of ChatGPT is its wide application.

ChatGPT can indeed incorporate into every segment of today's business. In addition, the problem of limited knowledge of this chatbot is a big minus for respondents, which would mean that many respondents probably turn to using their usual search engines. Security and trust in ChatGPT are quite high, and people are putting their trust in technology. The question is how quickly ChatGPT can complete tasks with the data provided in a limited time. At this moment, It is yet to see if ChatGPT will remain extremely positive and replace existing search engines. GPT technology is new, compelling, and doing things differently, and people like new and different.

As results show, developers are the dominant users so far. That is understandable because they are the most competent to understand and take the most from this new technology. The lack of an interdisciplinary approach is obvious when talking about the entire population and as seen in the previous research in the field regarding the use of chatbots and artificial intelligence in general. The easily accessible and widely accepted ChatGPT doesn't mean that humans are prepared in any way for such a transition to humanoid artificial intelligence interaction in such a short time. Many technologies over the centuries have changed the way people think, work, and interact with each other. So, understanding new ways in which humans can use new technology is crucial for knowing their best purpose. To achieve that, many new challenges are placed in front of employers, as well as employees.

References

Anghelescu, P., Nicolaescu, S. V. (2018). Chatbot Application using Search Engines and Teaching Methods. *Electronics, Computers and Artificial Intelligence, ECAI 2018 - International Conference – 10th Edition*, Iasi, ROMÂNIA, 28 June -30 June.

Borana, J. (2016). Applications of Artificial Intelligence & Associated Technologies. In (Eds.) *Proceeding of International Conference on Emerging Technologies in Engineering*, Biomedical, Management and Science [ETEBMS-2016], 5-6 March.

Bernardini, A.A., Sônego, A.A. & Pozzebon, E. (2018). Chatbots: An Analysis of the State of Art of Literature. In (Eds.) *Proceedings of the 1st Workshop on Advanced Virtual Environments and Education (WAVE2 2018)*, Florianópolis, Brazil, 4–5 October.

Büchel, J. & Mertens, A. (2023). *How companies use Chat GPT*. IW-Kurzbericht 32/2023.

European Commission. (2023). *Regulatory framework proposal on artificial intelligence*. Retrieved from https://digital-strat-egy.ec.europa.eu/en/policies/regulatory-framework-ai (2023-06-05)

Garg, A., Khan, S. (2023). ChatGPT and the future of work. (2023). *The Eightfold Talent Intelligence Platform*. Retrieved from https://eightfold.ai/blog/chat-gpt-future-work/ (2023-06-05)

Korzynski, P., Mazurek G., Altmann, A. et all. (2023). Generative artificial intelligence as a new context for management theories: analysis of ChatGPT. *Central European Management Journal*, Emerald Publishing Limited. DOI 10.1108/CEMJ-02-2023-0091. Retrieved from https://www.emerald.com/insight/2658-0845.htm

Lee, J. Y. (2023). Can an artificial intelligence chatbot be the author of a scholarly article? *Journal of Educational Evaluation for Health Professions*, 20 (6). Retrieved from https://doi.org/10.3352/jeehp.2023.20.6

Tilley, A, Kruppa, M. (2023). Apple Restricts Employee Use of ChatGPT, Joining Other Companies Wary of Leaks. The wall street journal. Retrieved from

https://www.wsj.com/articles/apple-restricts-use-of-chatgpt-joining-other-companies-wary-of-leaks-d44d7d34 (2023-06-05)

Murphy, A., Du, K. & Suarez, C. (2023). ChatGPT and Privacy Risks: Generative artificial intelligence technology chatbots rely heavily on the accuracy of vast quantities of online data, Chicago Medicine. Retrieved from www.cmsdocs.org.

Vincent, J. (2023). Apple restricts employees from using ChatGPT over the fear of data leaks. The Verge. Retrieved from https://www.theverge.com/2023/5/19/23729619/apple-bans-chatgpt-openai-fears-data-leak (2023-06-05)

Vynck, De G. (2023). Google is changing the way we search with AI. It could upend the web. *The Washington Post*, May 10. Retrieved from https://www.washingtonpost.com/technology/2023/05/10/google-io-ai-search-keynote/ (2023-06-05)