The Impact of Generative AI on IT Professionals' Work Routines: A Systematic Literature Review

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Keywords: Generative AI, Software Developer, Work Routine, AI Tool.

Abstract: The rapid evolution of Generative Artificial Intelligence (Generative AI) has had a profound impact on several industries, including Information Technology (IT). Generative AI is widely recognized for its ability to automate objective and routine tasks, such as code generation. AI tools, previously restricted to specialists, are increasingly accessible, expanding their use to a wide range of sectors, including the field of Information Technology (IT). Considering these impacts is crucial to prepare these professionals for maximize the potential of new tools in companies and face the challenges that arise with the automation of activities and processes, as well as with the changes in the skills required. Understanding this context, the present study's main motivation is to understand how generative AI is reshaping the IT profession, highlighting the opportunities and challenges that arise with the adoption of these technologies. This research used the Systematic Literature Review (SLR) in three stages. The analysis of 34 studies made it possible to find some interesting results. The main activities are code generation, code or script debugging and code documentation. The main tools are ChatGPT, GitHub Copilot and Tabnine. The main skills developed are prompt formulation, understanding AI, critical thinking and problem solving.

1 INTRODUCTION

The rapid evolution of Generative Artificial Intelligence (Generative AI) has had a profound impact on several industries, including Information Technology (IT). This research arises from the need to understand how these technologies are transforming the work routines of IT professionals, a group essential for the implementation and maintenance of innovative technological solutions (Webb, 2020).

Generative AI is widely recognized for its ability to automate objective and routine tasks, such as code generation, the studies reviewed indicate that its impact goes beyond these basic activities.

The growing production of articles and studies on generative AI and its impact on society follows the rapid popularization of these tools among the public. AI tools, previously restricted to specialists, are increasingly accessible, expanding their use to a wide range of sectors, including the field of Information Technology (IT). This movement drives debates not only about the possibilities and opportunities that generative AI offers, but also about the ethical limits and implications of its use in the work routines of various professionals (Fui-noon-Hah, et al., 2023).

These studies reveal that the possibilities for using AI are expanding rapidly. The tools are becoming increasingly sophisticated, capable of performing complex and non-trivial tasks.

This scenario of technological disruption motivates us to investigate what has already been impacted and transformed by these innovations, seeking to understand the changes that are shaping the present and future of professional routines (IOE, 2024).

Understanding these impacts is crucial to prepare these professionals for the future of work, maximize the potential of new tools in companies, and face the challenges that arise with the automation of activities and processes, as well as with the changes in the skills required.

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For example, the article It's like a rubber duck that talks back: Understanding Generative AI-Assisted Data Analysis Workflows through a Participatory Prompting Study [PS9] explores the use of these tools in more subjective tasks, such as suggesting evaluation criteria and formulating data analysis strategies. This demonstrates that generative AI can act as a partner not only in technical activities, but also in complex decision-making and less structured problem-solving.

Understanding this context, the present study's main motivation is to understand how generative AI is reshaping the IT profession, highlighting the opportunities and challenges that arise with the adoption of these technologies. From this objective, the following central research question was defined: "*How is Generative Artificial Intelligence transforming the work routines and skills of IT professionals?*". To answer the central question, the following secondary questions were defined: Q1) What are the main types of tasks/activities of IT professionals that are being automated by Generative AI? Q2) What are the main tools identified in the studies? Q3) What changes/skills have been generated for IT professionals? Q4) What are the benefits perceived by IT professionals with the adoption of Generative AI in their activities? Q5) What are the challenges and barriers faced by IT professionals when using Generative AI?

This research used the Systematic Literature Review (SLR) method proposed by (Kitchenham and Charters, 2007) in three stages: 1) planning the review; 2) conducting the review and 3) discussion of the studies. Thus, this paper follows these stages to present its results.

This paper is organized into six sections. After this introduction, Sections II describe a brief conceptual reference in Generative AI. Section III presents the research methodology. Section IV presents the results. Section V, presents the discussions, and Finally, Section VI presents the conclusions and future perspectives of this research

2 CONTEXT

Generative Artificial Intelligence (Generative AI) is a sub-area of Artificial Intelligence that uses models capable of generating data and information from data previously presented to them. Such content can be in a variety of formats such as text, images, code, videos and presentations (Brown et al., 2020).

One of the main techniques within the field of generative AI is the Generative Adversarial Networks (GAN), made up of two models: a generator and a discriminator. The generator model can generate data based on examples, and the discriminator model is able to evaluate or distinguish whether the data generated is real or synthetic. In general, training is based on data. The generator model receives a larger sample of random data and depends on feedback from the discriminator. The discriminator model receives the largest sample of real data (Goodfellow et al., 2014).

A more recent technique is the GPT-3 (Generative Pretrained Transformer 3), which is a model capable of generating mainly textual data in natural language. GPT uses a neural network based on transformers that partitions the text into smaller chunks to generate a larger number of parameters and more fluid feedback. Although it mainly generates text, there are tools such as DALL-E (Ramesh et al., 2021) which can generate images from descriptions. Despite its benefits and features, the GPT architecture also has limitations, such as reproducing prejudices, generating incorrect data and making it difficult to understand the context (Vaswani et al., 2017).

3 RESEARCH METHOD

To conduct the research, we used the Systematic Literature Review methodology and took as a guide the guidelines proposed by (Kitchenham and Charters, 2007). This method allowed to identify and classify relevant studies related to Central Research Question, as well as to collect and synthesize the evidence presented in the literature. Figure 1 the steps followed during the research.

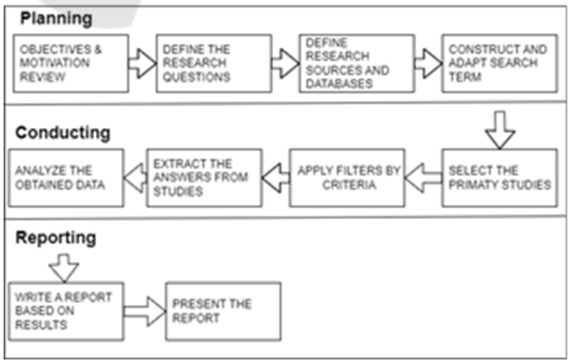

Figure 1: SLR Process.

3.1 Research Planning

In this study, we aim to answer the primary research question: *"How is Generative Artificial Intelligence*

transforming the work routines and skills of IT professionals?"

To ensure the answer for this question, we define a set of secondary questions, to guide the selection process:

- Q1) *What are the main types of tasks/activities of IT professionals that are being automated by Generative AI?*
- Q2) *What are the main tools identified in the studies?*
- Q3) *What changes/skills have been generated for IT professionals?*
- Q4) *What are the benefits perceived by IT professionals with the adoption of Generative AI in their activities?*
- Q5) *What are the challenges and barriers faced by IT professionals when using Generative AI?*

After defining the research questions and the method, we choose the keywords and databases for primary studies. Four databases were selected: ACM, IEEE, Scopus, ScienceDirect and Emerald.

From protocol definition we defined keywords to search string which were used in automatic search, as shown in Table 1. The keywords are related to "Generative AI", "work" and "Software Development".

Table 1: Search String.

Search String
(("Generative AI" OR "LLM") AND ("Software Engineer" OR "Software Developer" OR "programmer") AND ("work routine" OR "work" OR "task") AND ("AI tool" OR "AI mechanism"))

3.2 Research Conducting

From search string, automatic searches are conducted in the selected databases. After automatic search step, filters are applied to select the relevant and appropriate studies to research. The first filter applied on exclusion criteria take account the title, abstract and keywords of the works. The exclusion criteria applied in the selected studies, such as:

- E0001 - Articles that are not written in Portuguese or English
- E0002 - Publications not freely available
- E0003 - Other secondary or tertiary studies
- E0004 - Articles published before 2013
- E0005 - Articles with more than 50 pages

In the filtering, inclusion criteria are used:

- I0001 - Articles related to the research topic and questions
- I0002 - Full articles
- I0003 - Book chapters, conference papers

The criteria were used in two distinct stages. The first step used the exclusion criteria. In case of doubt in the selection, the inclusion criteria are applied reading the introduction and conclusion of the study.

3.3 Research Reporting

To extract the data, a shared spreadsheet was created, containing data such as title, year of publication, source, authors, and important fragments of the articles' text were extracted and classified. The columns of fragments from the studies were created based on the secondary research questions. The answers are classified according to relevance information to each question. The quality of answers was evaluated based on criteria presented in Table 2. These criteria were scored in a three-point scale: 0 - Does not meet; 0.5 - Partially meets; 1 - Fully meets.

Table 2: Quality Criteria

ID	Description
1	Defined methodology
2	Practical application
3	Defined Model
4	Relevant Discussions
5	Challenges, limitations or threats

Due to the small number of articles available for analysis, we needed to expand our database. To address this, we used the Snowballing technique, which consists of identifying relevant references from the initially selected articles. As an additional criterion, we performed this search only in articles that scored the maximum score in the classification (score 5).

After applying this methodology, we were able to expand our list of articles and selected 10 new articles. These additional articles were also scored using the same qualitative criteria at the end of the process to ensure consistency and reliability in our analysis.

We utilized an AI tool called NotebookML, an experimental research tool developed by Google, to assist in answering the secondary questions of our study. While the tool allows for querying across all selected articles simultaneously, we encountered limitations in its performance. Specifically, the tool occasionally provided answers referencing articles that were not relevant to the specific question being asked. To address this issue and improve accuracy, we

opted to input and analyze each article individually, ensuring that the answers directly corresponded to the content of the chosen article.

3.4 Limitations and Threats

Given the specificity of the topic addressed in this study, the initial number of articles selected was relatively low. This limitation can be attributed to the restricted nature of the subject, which, although relevant, has a limited number of publications available within the criteria. Therefore, this research area (Generative AI), gain focus as in the industry as in research and academia, with the popularization of Generative AI tools in society over the last five years.

4 RESULTS

A breadth-first search was conducted using the Search String in each of the databases, resulting in a total of 214 articles. After this task, we applied the exclusion criteria to the titles and abstracts of each study, resulting in a total of 191 excluded studies and 23 studies accepted.

A second filtering process was conducted, with an in-depth analysis of the introduction and conclusion sections of the studies. This step was important to decide on the inclusion of articles based on the initial filtering. After this step a total of 24 studies were accepted.

As mentioned in subsection 3.3, the Snowballing technique was conducted, resulting in 10 new articles.

Finally, the articles were classified according to the quality criteria presented in the previous section. At the end of the process 34 studies were collected. Figure 2 summarizes the article selection process according to the PRISMA model.

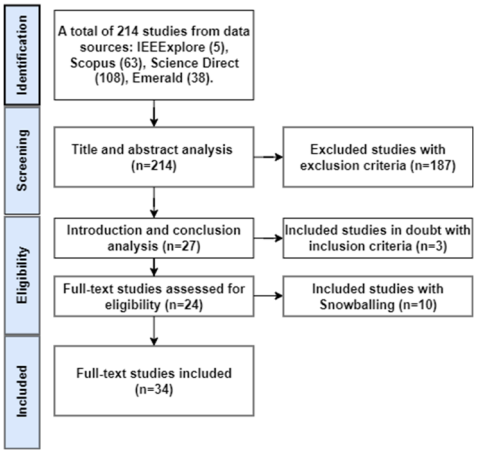

Figure 2: PRISMA flow chart of Selection Process.

Figure 3 present the studies from different databases. Scopus source stands the highest number of relevant works (14/24), followed by Science Direct (6/24), IEEE (3/24) and Emerald (1/24).

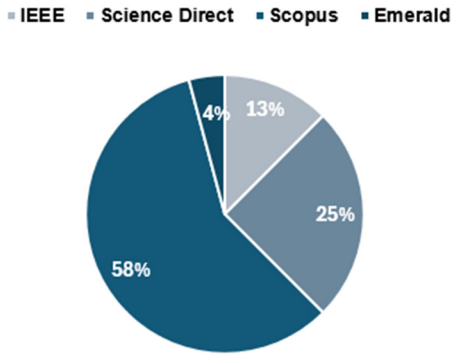

Figure 3: Source of Studies.

Figure 4 presents studies by publication year, where it is possible to assert that publications starts in 2022 and reaches its highest point in 2024.

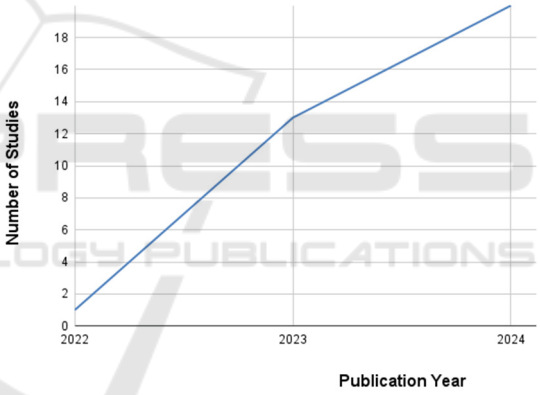

Figure 4: Studies in timeline.

During the collection of evidence to answer the questions defined in the planning, we observed the following points:

Identification of relevant studies: During the searches in the databases, we found a significant number of studies that address the impacts of generative AI on the work of different professionals. We selected the articles that: (a) focused on IT professionals and (b) explicitly mentioned these professionals.

Specific analyses by area: Some studies collected carried out analyses focused on specific areas of technology, such as game development [PS1] and data analysis [PS9].

Consideration of students: Studies that address the reality of students who already use generative AI tools in academic projects were also included [PS2, PS6, PS7, PS8, SB2]. This allowed us to identify the

tools most used by these future professionals and the changes perceived in the skills they are developing.

4.1 What Are the Main Types of Tasks/Activities of IT Professionals that Are Being Automated by Generative AI?

By analysing the 34 articles selected for the study, 17 types of activities that are being automated in the work routines of different IT professionals, including software engineers, programmers (with varying levels of experience), data analysts and game developers. Figure 5 presents the activities and the number of studies which appears.

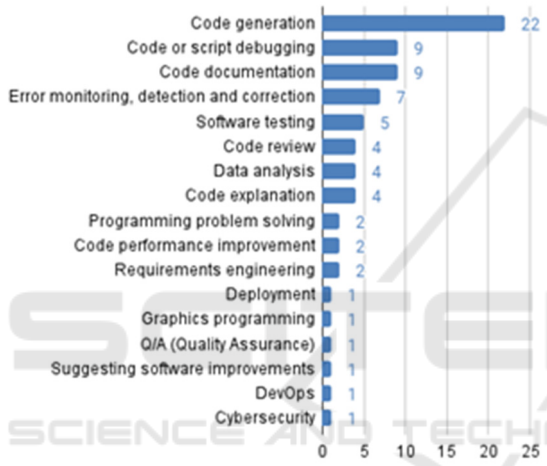

Figure 5: Automated Activities by Generative AI.

Among the studies reviewed, articles PS9, PS11, PS12, PS15, SB4 and SB10 stand out for offering a comprehensive overview of the types of activities impacted by automation.

The most mentioned task was code generation, cited in 22 of the 34 articles analysed, representing approximately 65% of the total, a broad category that encompasses several specific activities, as evidenced by the studies. These activities include generation of boilerplate code [PS11], generate SQL queries [PS23], auto-complete lines of code and comments [SB2, SB4], generate code adapted to different writing styles [SB8], generation of methods and classes [SB8] and creating code from natural language comments or prompts [PS10, PS11, PS23, SB10].

In addition to code generation, data analysis also encompasses several other activities highlighted in the studies. These include searching for relevant data sources, proposing analysis strategies, writing code for analysis, and suggesting subjective criteria for evaluating different scenarios. These activities are well exemplified in the article It's like a rubber duck that talks back: Understanding Generative AI-Assisted Data Analysis Workflows through a Participatory Prompting Study [PS9].

Based on the evidence presented in article PS9, it was possible to identify that the use of generative AI goes beyond basic and objective activities, also extending to more complex and subjective tasks. This type of action allows AI to function not only as a technical tool, but also as support in decision-making and in solving less structured problems.

The Table 3 presents a summary of the types of activities identified in the studies analysed, along with their respective references. These types of activities not only reflect the tasks directly mentioned in the articles but also serve as broad representations of other activities that are part of the daily lives of IT professionals. Thus, each category listed can encompass a broader set of actions performed in the routines of software engineers, programmers, data analysts and game developers, as evidenced in the reviewed articles.

Table 3: Types of activities by Study.

Types of tasks/activities	Study
Code generation	PS1, PS4, PS6, PS7, PS9, PS10, PS11, PS12, PS15, PS17, PS18, PS20, PS23, SB1, SB2, SB4, SB5, SB6, SB7, SB8, SB9, SB10
Code or script debugging	PS2, PS7, PS9, PS11, PS12, PS15, SB4, SB5, SB10
Code documentation	PS11, PS12, PS15, PS16, SB2, SB4, SB8, SB9, SB10
Error monitoring, detection and correction	PS4, PS11, PS12, PS15, SB5, SB6, SB9
Software testing	PS4, PS11, PS15, SB4, SB8
Code review	PS6, SB5, SB8, SB9
Data analysis	PS9, PS15, PS23, SB10
Code explanation	PS11, PS20, SB9, SB10
Programming problem solving	PS2, PS18
Code performance improvement	PS11, PS12
Requirements engineering	PS14, PS15
Deployment	PS15
Graphics programming	PS1
Q/A (Quality Assurance)	SB4
Suggesting software improvements	PS15
DevOps	PS14
Cybersecurity	PS23

4.2 What Are the Main Tools Identified in the Studies?

A small variety of tools were mentioned in the articles. Most of them were only mentioned once among the 34 articles analyzed. However, two tools stood out and were used more frequently in the works: ChatGPT, a generative artificial intelligence chatbot developed by OpenAI, and Github Copilot, an artificial intelligence tool developed by GitHub in conjunction with OpenAI, to assist users of integrated development environments. ChatGPT was used in 11 of the 34 articles, while Copilot was present in 10 of them. The Figure 6 presents the Generative AI tools used in works.

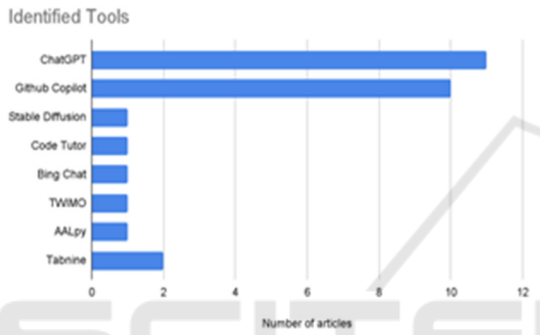

Figure 6: Generative AI tools.

Other tools found include Tabnine, an AI coding assistant designed to be under the control of an engineering team, Stable Diffusion, which is a deep learning model for text-to-image transformation, CodeTutor, which is an LLM-powered assistant developed by the research team of one of the articles, which was used by 50 students in order to conclude the study of that article, Bing Chat, as ChatGPT, is a chatbot assistant, Twimo, a conceptual framework to define domain-specific notations, used for the definition of human driver behaviour and ML-based services, and Allpy, which provides a library implementing different active automata learning algorithms that support the learning of finite state models of black-box systems.

4.3 What Changes/Skills Have Been Generated for IT Professionals?

The growing adoption of generative AI is transforming the profile of skills required of IT professionals. Traditional skills are expanding to include a new set of competencies that are essential for navigating an increasingly AI-driven environment. To qualitatively analyse the studies, the macro competencies identified were separated and grouped according to their occurrence between the studies as shown in Figure 7.

Figure 7: Generative AI competencies.

Formulating and analyzing prompts have become essential skills for IT professionals working with generative AI. This competence involves developing the skills to create clear and effective instructions that guide the AI in generating the desired results. Professionals need to not only understand how to structure these prompts, but also learn how to evaluate the AI's responses, adjusting and refining the requests to improve the accuracy and relevance of the outputs. This process not only increases efficiency when interacting with tools such as ChatGPT and Gemini but also transforms the way professionals approach complex problems [PS1, SB5, SB7, PS5, SB3, SB1, PS18].

The ability to think critically and solve complex problems is amplified by the use of generative AI. Professionals are being challenged to critically analyse AI outputs, validating their logic and safety. This critical approach is crucial to avoiding errors and biases, promoting more effective use of the technology [PS2, PS5, SB7, PS16, PS20].

IT professionals need to understand the capabilities and limitations of AI tools in order to effectively integrate them into their processes. In-depth knowledge of generative AI not only increases effectiveness in implementing technological solutions but also prepares professionals to innovate and improve existing systems [PS5, SB5, PS4, PS9, PS14, PS16, PS23].

The design of intuitive interfaces that communicate reliability is increasingly important. IT professionals must be able to create experiences that consider the needs of end users, ensuring that interaction with AI systems is transparent and

efficient. This competence is essential to ensure speed in the creation and validation of prototypes and also broadens the scope of templates and mock-ups [PS9, PS10, PS11].

Collaboration and communication skills are amplified in the context of generative AI. IT professionals must work together with AI systems and other teams. The ability to articulate complex ideas clearly and effectively is vital for the successful implementation of technological projects and can be best achieved with the intermediation of artificial intelligence models [PS4, SB1, PS17, PS15, PS16].

With the increased use of AI, awareness of cybersecurity and AI ethics is paramount. IT professionals must ensure that solutions respect security best practices and address ethical issues such as bias and data privacy. Regulations and laws such as the LGPD promote caution when adopting artificial intelligence. IT professionals must pay attention to security aspects when designing AI projects so that reliable and reputable systems can be built [PS5, PS17, SB5].

A continuous learning mindset is essential in a rapidly evolving field. IT professionals need to be willing to adapt to new tools and techniques, keeping up to date with the latest trends in AI. This willingness to learn and adapt is fundamental to their professional evolution [PS15, SB2, SB3, PS8, PS16].

Skills in systems development and management are enhanced by the integration of AI. Professionals must be able to create and manage complex systems using AI and machine learning, ensuring efficiency, effectiveness and innovation in development processes [PS8, SB4, PS14, PS23].

Finally, creativity is a skill that is stimulated using generative AI. IT professionals are encouraged to explore innovative solutions, using AI to generate ideas and solve complex problems effectively [PS20, PS18].

4.4 What Are the Perceived Benefits by IT Professionals with the Adoption of Generative AI in Their Activities?

24 of them provide answers or allow the inference of an answer to the question about the perceived benefits by IT professionals with the adoption of Generative AI in their activities. The identified benefits were grouped into nine main categories, covering aspects such as learning support, increased productivity, and improvements in communication and task automation.

The analysis of the 24 articles that address the perceived benefits by IT professionals with the adoption of Generative AI revealed a wide range of advantages in different areas. The most frequent benefit was "Support in Learning and Professional Development," found in 75% of the articles, as shown in figure 6, followed by "Increased Productivity and Efficiency" in 66.67%, demonstrating how Generative AI has the potential to enhance professionals' capabilities and optimize their time. Other highlighted benefits include "Improvement in Code Quality" (45.8%) and "Facilitation of Problem Solving" (37.5%), showing its value in technical tasks such as coding and debugging, as shown in Figure 8.

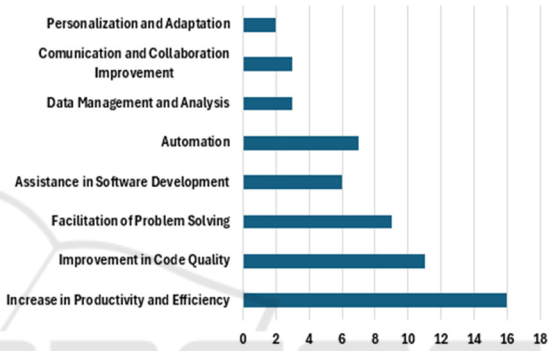

Figure 8: Perceived Benefits.

Among the most mentioned features in Kuhail et al. (2024) article, "Boilerplate Code Generation" was the most cited, appearing in 48.5% of the cases. This highlights how AI automates repetitive tasks, allowing developers to focus on more complex activities. Additionally, "Code Explanation" was noted in 38.4% of cases, with AI acting as a support for learning and understanding difficult code, helping professionals speed up their development process. "Solution Search" (36.4%) and "Error Identification" (33.3%) were also highlighted as important benefits, as they optimize information searching and speed up the debugging process, respectively.

Another important aspect relates to the impact on productivity. According to Kuhail et al. (2024), "Faster Coding Speed" was identified in 58.6% of the cases, with developers reporting that AI accelerates the process of writing code. Additionally, "More Effective Code" (27.3%) and "More Concise Code" (25.3%) were other points mentioned, showing how AI contributes to producing cleaner code with better performance. The automation of "Documentation Writing" (21.2%) and "Test Creation" (18.2%) were also cited as features that free up time for developers to focus on more complex tasks.

4.5 What Are the Challenges and Barriers Faced by IT Professionals when Using Generative AI?

Generative Artificial Intelligence (Generative AI) has emerged as a powerful tool that can bring numerous benefits to IT professionals. However, its implementation faces significant challenges. During the analysis of the 34 reviewed articles, 19 provided relevant findings for this question. The Figure 9 presents the main challenges and barriers identified.

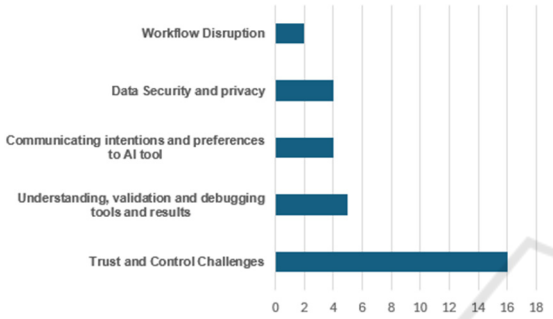

Figure 9: Main Challenges by mention.

Workflow disruption (SB1, PS9): Long suggestions can interrupt programmers' workflow. At best, these suggestions are immediately discarded, and at worst, they distract the programmer from their flow. For instance, upon receiving a 16-line suggestion and after only four seconds of analysis, one developer in [SB1] exclaimed: "Oh God, no. Absolutely not," "Stop it!" and continued programming as before. On the other hand, many programmers feel compelled to read the entire code returned by the AI and noted that reading these long suggestions often disrupted their flow. Some perceived interruptions included distraction by the suggested results and disorientation. One programmer expressed this frustration: "I was about to write the code, and I knew what I wanted to write. But now I'm sitting here, seeing if somehow Copilot came up with something better than the person who's been writing Haskell for five years. I don't know why I am giving it the time of day." [SB1] These distractions cause some programmers to abandon the tool altogether.

Difficulty in understanding, validating, and debugging (SB1, SB4, SB8, SB10, PS18): Some developers report difficulties in understanding, validating, and debugging the code generated by AI tools. The lack of immediate familiarity with the suggested code makes error identification more time-consuming and complex. As one developer commented: "I don't see the error immediately, and unfortunately, because this is generated, I don't understand it as well as I feel like I would've if I had written it. I find reading code that I didn't write to be a lot more difficult than reading code that I did write, so if there's any chance that Copilot is going to get it wrong, I'd rather just get it wrong myself because at least that way I understand what's going on much better." [SB1] Professionals claim that since they did not write the code, their understanding of errors is impaired, making debugging more challenging. They observe that reading and interpreting code generated by others is significantly more difficult than working with code they developed themselves. "Participants reported spending less time on Stack Overflow but now have less understanding of how or why the code works." [SB8] In academic contexts, this difficulty is even more evident. The superficial use of these tools, merely to get answers, can prevent students from developing a complete understanding of programming principles. Copying and pasting code without understanding the logic behind it can be detrimental in the long run. [SB10] In this sense, some developers prefer to make their own mistakes while writing code, as it provides a clearer and deeper understanding of what is happening in the system, facilitating correction and learning.

Lack of trust and control challenges (SB1, SB2, SB3, SB4, SB6, SB7, PS2, PS4, PS6, PS7, PS9, PS10, PS11, PS15, PS17, PS18): Many programmers report not fully trusting the code generated by AI tools. As one developer mentioned: "It's not official documentation, it's something that needs my examination...if it works, it works." [SB1]. In [SB2], it was identified that with Copilot, some of the suggestions are often wrong, include unnecessary elements, or are mainly variations on a theme. As observed by a participant: "Copilot most often does not understand our instructions to fix or improve the code it generated unless we formulate them in a very specific way." This problem was also identified with ChatGPT [SB3], which, although it can provide correct answers to many questions related to bug fixing, the overall accuracy rate is still relatively low. Developers also face challenges in controlling AI tools, as reported in [SB4]: "The most important reasons why developers do not use these tools are because these tools do not output code that addresses certain functional or non-functional requirements and because developers have trouble controlling the tool to generate the desired output."

Data security and privacy (SB3, SB8, PS6, PS15): IT professionals express concerns about the security and privacy of data used in training large language models (LLMs), which can be a barrier to adoption. When it comes to adopting ChatGPT for bug fixing, data security is a major concern for many developers. The study [SB3] highlights that many developers cited concerns about data confidentiality as the reason

they would not use ChatGPT for bug fixing. They were worried that the system might leak sensitive information, putting their companies and clients at risk. Moreover, they do not want their inputs and outputs to be stored by the system and potentially shared with other users later. Similarly, in the study [SB8], Copilot users identified some challenges, including the risk of revealing secrets like API keys and passwords, suggesting inappropriate text, and failing to write "defensive code," such as checking null pointers. The study [PS6] also presents that in terms of code quality, AI tools can generate code that is not robust and may have security vulnerabilities.

Difficulty in communicating intentions and preferences to the AI (PS1, PS9, PS10, PS17): Developers face difficulties in clearly communicating their intentions and preferences to code-generation tools, which can result in unsatisfactory outputs. In study [PS9], it was observed that "Part of the challenge was in fully articulating their need. Participants had trouble 'wording it in the right way that the AI understands [...] writing [what is in your head] down is the hard part.'" Developers found it difficult to express their intentions in a way that the AI could correctly understand what they wanted. This challenge was also noted in [PS17], which details how developers using Copilot struggle to generate the expected results. Often, they need to invest considerable effort in crafting strategies to design prompts and debug the model's inputs. This emphasizes the importance of proper prompt construction for the successful use of these tools.

5 DISCUSSIONS

The findings of systematic literature review reveal that generative AI is significantly transforming the work routines and required skill sets of IT professionals. The analysis of 34 studies shows that generative AI tools, such as GitHub Copilot and ChatGPT, are automating a variety of tasks, primarily in code generation and data analysis. These tools provide substantial advantages in terms of increased productivity, reduced time spent on repetitive tasks, and enhanced learning opportunities for both experienced professionals and students.

However, the adoption of these tools is not without challenges. One of the major issues reported by the studies is the disruption of workflow caused by overly complex or irrelevant suggestions from AI tools, which can sometimes distract or slow down developers. Additionally, there are concerns regarding the accuracy of AI-generated code, with professionals expressing difficulties in understanding, validating, and debugging the suggestions provided by these tools. These challenges highlight the need for further development of AI systems to improve the relevance and reliability of their outputs.

Another significant barrier identified in the literature is the trust and control challenge. Many developers remain sceptical of AI-generated outputs, particularly due to the lack of transparency in how the AI reaches its conclusions. Moreover, data privacy and security concerns present a substantial barrier, especially when using tools that rely on large datasets, some of which may contain sensitive information.

Despite these challenges, the introduction of generative AI tools has led to the emergence of new skill sets for IT professionals. Prompt formulation, critical thinking, and AI tool proficiency have become increasingly important. The ability to collaborate effectively with AI systems and continuously learn and adapt to evolving technologies has also been highlighted as critical to success in an AI-driven environment.

6 CONCLUSIONS

The adoption of generative AI within the IT sector offers both opportunities and challenges. On one hand, these tools enable the automation of routine tasks, such as code generation, freeing professionals to focus on more complex and creative aspects of their work. On the other hand, issues such as trust, workflow disruptions, and data security remain substantial barriers to widespread adoption.

The review demonstrates that while AI tools can enhance productivity and efficiency, their use must be carefully managed to avoid over-reliance, which can hinder deeper understanding and development of core programming skills, particularly in educational contexts.

Despite the benefits presented, the authors have encountered some challenges in the conduction process, related to the low number of studies and the recent nature of the topic. These challenges could be addressed with snowballing techniques, but in a general context, it is a call for more research in the field of Education and Generative AI.

To fully harness the potential of generative AI, future efforts should focus on addressing these challenges through the development of more transparent, accurate, and secure AI systems. Additionally, ongoing research is necessary to evaluate the long-term effects of AI adoption on professional development and to establish best practices for integrating these technologies into daily workflows.

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APPENDIX A

Selected Studies

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