The Impact of Generative Artificial Intelligence on Software Engineering Occupations

Executive Summary

The software development life cycle is undergoing a fundamental transformation due to the acceleration of artificial intelligence (AI) tools and use cases [S1]. Generative AI (GenAI) is augmenting and accelerating tasks across the enterprise, with 97% of developers using AI coding tools at work [S1]. The adoption of GenAI tools is widely prevalent in the IT sector, with 97% of IT workers using them, primarily ChatGPT [S2]. However, increased organizational adoption of AI strongly correlates with heightened employee job security concerns [S2]. The promise of GenAI in the software development life cycle is significant, and leaders should begin taking action to prepare employees to take advantage of this opportunity [S1]. Further research is needed to establish the circumstances in the sector and quantify connections between organizational GenAI implementation, productivity improvements, and job market impact [S2].

Transformative Effects On Software Development Roles

GenAI is being embedded throughout the entire software development life cycle, rather than focusing solely on coding, resulting in effects on roles such as product managers, software architects, developers, data engineers, DevSecOps engineers, and quality assurance teams [S1]. The evolution of AI tools and use cases continues to transform the software development life cycle, with GenAI models suitable for use in software development, capturing certain elements of software design, like coding and debugging [S2]. The shift is mainly driven by Generative AI's capability to scan large codes, recognize patterns, and then generate new code independently, making the software development cycle quicker [S2]. As the evolution of AI tools and use cases continues, tech industry leaders must prepare for this AI-driven future of work by engaging in scenario planning to consider uncertainties [S1].

The adoption of GenAI tools is expected to have a significant impact on software development and related IT activities [S2]. GenAI is augmenting and accelerating tasks across the enterprise, with significant personal productivity gains reported by participants [S2]. However,

the adoption of GenAI tools also raises concerns about the sustainability of GenAI model maturity, the GenAI ecosystem, AI regulatory environment evolution, and infrastructure development keeping up with demand [S1].

Adoption Challenges And Organizational Efficiency

Key adoption challenges include inaccurate outputs, regulatory compliance issues, and ethical concerns [S2]. Despite these challenges, participants report significant personal productivity gains and perceive organizational efficiency improvements that correlate positively with Generative AI adoption by their organizations [S2]. The study investigates relationships between GenAI adoption, organizational efficiency, personal productivity, and job insecurity, and aims to quantify connections between organizational GenAI implementation, productivity improvements, and job market impact [S2]. However, quantitative evidence on the long-term benefits of GenAI adoption is missing, and further research is needed to establish the circumstances in the sector [S2].

The adoption of GenAI tools is expected to improve organizational efficiency, with participants reporting significant personal productivity gains [S2]. However, the adoption of GenAI tools also raises concerns about the potential impact on job security [S2]. Increased organizational adoption of AI strongly correlates with heightened employee job security concerns [S2]. Further research is needed to establish the circumstances in the sector and quantify connections between organizational GenAI implementation, productivity improvements, and job market impact [S2].

Job Security Concerns And Productivity Gains

Increased organizational adoption of AI strongly correlates with heightened employee job security concerns [S2]. However, participants report significant personal productivity gains and perceive organizational efficiency improvements that correlate positively with Generative AI adoption by their organizations [S2]. The study investigates relationships between GenAI adoption, organizational efficiency, personal productivity, and job insecurity, and aims to quantify connections between organizational GenAI implementation, productivity improvements, and job market impact [S2]. Despite the potential job security concerns, the adoption of GenAI tools is expected to improve organizational efficiency and productivity [S2].

The adoption of GenAI tools is expected to have a significant impact on software development and related IT activities [S2]. GenAI is augmenting and accelerating tasks across the enterprise, with significant personal productivity gains reported by participants [S2]. However, the adoption of GenAI tools also raises concerns about the potential impact on job security [S2]. Further research is needed to establish the circumstances in the sector and quantify connections between organizational GenAI implementation, productivity improvements, and job market impact [S2].

Conclusion

The adoption of GenAI tools is expected to have a significant impact on software development and related IT activities [S2]. Despite the potential job security concerns, the adoption of GenAI tools is expected to improve organizational efficiency and productivity [S2]. However, further research is needed to establish the circumstances in the sector and quantify connections between organizational GenAI implementation, productivity improvements, and job market impact [S2]. The promise of GenAI in the software development life cycle is significant, and leaders should begin taking action to prepare employees to take advantage of this opportunity [S1]. The evolution of AI tools and use cases continues to transform the software development life cycle, with GenAI models suitable for use in software development, capturing certain elements of software design, like coding and debugging [S2]. As the evolution of AI tools and use cases continues, tech industry leaders must prepare for this AI-driven future of work by engaging in scenario planning to consider uncertainties [S1].

References

[S1] Laura Shact, Nate Drix, Ricky Franks, Dany Rifkin. deloitte.com. https://www.deloitte.com/us/en/Industries/tmt/articles/ai-software-development-engineering-roles-being-rewritten.html

[S2] Unknown Author. arxiv.org. https://www.arxiv.org/pdf/2508.16811