



СИНЕРГІЯ ІНТЕРНЕТ-ТЕХНОЛОГІЙ

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Видання вміщує тези доповідей учасників I Всеукраїнської науково-практичної конференції «Синергія інтернет-технологій», яка відбулася 26 березня 2026 року у закладі вищої освіти «Університет Короля Данила». Розраховане на наукових та науково-педагогічних працівників закладів вищої освіти і наукових установ, здобувачів вищої освіти, а також на широкий читацький загал.

Організаційний комітет не завжди поділяє думку учасників конференції. Відповідальність за достовірність фактів, статистичних даних, точність викладеного матеріалу покладається на авторів.

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INNOVATIVE AI-BASED TECHNOLOGIES FOR ENHANCING SKILLS AND ADAPTIVE CAPACITY OF PUBLIC SECTOR EMPLOYEES

The rapid diffusion of artificial intelligence (AI) technologies is fundamentally transforming how public sector organizations operate and manage human capital. Governments increasingly rely on data-driven decision-making, automated systems and digital platforms to improve efficiency, transparency and responsiveness. In this context, the skills and adaptive capacity of public sector employees become a critical determinant of successful digital transformation. AI adoption does not merely introduce new technological tools, but reshapes organizational processes, professional roles and institutional cultures, requiring new approaches to workforce development and governance [1].

Unlike the private sector, public organizations operate under additional constraints related to accountability, legal compliance, equity and public trust. These conditions amplify the importance of responsible AI implementation and inclusive skills development. Effective integration of AI in the public sector therefore depends not only on technological readiness but also on structured training, change management and even ethical oversight. This thesis examines how innovative AI-based technologies can enhance the com-

petencies of public sector employees, focusing on training mechanisms, ethical considerations and emerging educational applications. AI adoption significantly alters the nature of work by automating routine tasks, augmenting analytical capabilities and enabling new forms of human–machine collaboration.

Public employees are increasingly required to develop competencies such as data literacy, basic understanding of machine learning concepts and the ability to interact effectively with AI-based systems. Without targeted training initiatives, the potential benefits of AI investments risk being underutilized or resisted by the workforce. Resistance to AI adoption often stems from concerns about job displacement, uncertainty toward unfamiliar technologies and insufficient communication from leadership. These challenges highlight the importance of comprehensive change management strategies accompanying technological implementation. Training programs should extend beyond technical instruction and emphasize the complementary role of AI in supporting professional judgment rather than replacing it. Open communication, early involvement of employees and transparent articulation of expected benefits are essential for building trust and acceptance. For instance, in public service environments such as citizen support centers, the introduction of AI-powered chatbots may initially be perceived as a threat to frontline staff. However, empirical evidence suggests that when employees are trained to use chatbots as tools that handle repetitive inquiries, allowing human agents to focus on complex cases, resistance decreases and adoption improves [2]. This demonstrates that AI-related capacity building must integrate technical training with organizational learning and change management to ensure sustainable outcomes.

The use of AI in the public sector raises critical ethical concerns related to fairness, transparency and accountability. AI systems learn from historical data that may reflect existing social inequalities or institutional biases. If left unaddressed, such biases can be amplified through automated decision-making, leading to discriminatory outcomes in areas such as recruitment, service delivery or policy evaluation [3]. Responsible AI deployment requires proactive bias detection and mitigation throughout the AI lifecycle. This includes auditing training datasets, monitoring algorithmic outputs and establishing governance frameworks that clearly define acceptable use and accountability mechanisms. Transparency remains a particular challenge, as complex algorithms often operate as “black boxes,” making it difficult for public employees and citizens to understand how decisions are produced. Interdisciplinary collaboration among technical experts, policymakers and ethicists, as well as diversity within AI development teams, can help mitigate ethical risks. Clear ethical guidelines and continuous human oversight are especially important in public

administration, where AI-driven decisions may directly affect citizens' rights and access to public services [1].

Personalized learning is one of the most transformative applications of AI in workforce development. AI-driven systems can tailor educational content, pace and complexity to individual learners based on performance and learning patterns. Adaptive learning algorithms and intelligent tutoring systems adjust instructional pathways in real time, improving engagement and learning efficiency [4; 5]. Learning analytics complements personalized learning by using AI to collect and analyze data on learner behavior and outcomes. These insights allow organizations to evaluate training effectiveness, identify skill gaps and optimize instructional design. In the public sector, learning analytics supports evidence-based workforce development by enabling adaptive and responsive training strategies [5]. Virtual and augmented reality (VR/AR) technologies offer immersive learning environments that enhance experiential training. These tools are particularly valuable for scenarios that are complex, costly or risky to replicate in real life, such as emergency response or urban planning simulations. Although AI-driven VR and AR applications in public sector training are still emerging, their potential to improve comprehension and skill retention is substantial [6]. Advances in generative AI have redefined chatbots as sophisticated virtual assistants capable of providing continuous learning support. AI chatbots can answer questions, explain complex concepts and offer personalized guidance, making them valuable tools for self-directed learning among public employees [7]. Their accessibility and responsiveness reduce reliance on traditional training formats and support lifelong learning. As an example, ChatGPT exemplifies the potential of generative AI in education and professional development. As a virtual tutor, it can assist with skill acquisition by providing real-time explanations, feedback and learning resources. Research highlights its value in supporting diverse learners and enhancing online and blended learning environments [7; 8]. At the same time, limitations related to data reliability, overreliance on technology, limited customization and data privacy must be acknowledged. ChatGPT and similar tools should complement, rather than replace, human interaction and critical thinking in education. Responsible integration is therefore essential to maximize benefits while mitigating risks [1].

Innovative AI-based technologies offer significant potential to enhance the skills and adaptive capacity of public sector employees. Through personalized learning, learning analytics, immersive training environments and generative AI tools, AI can transform workforce development and organizational learning. However, successful implementation depends on comprehensive training, effective change management and robust ethical governance. AI should be

understood as a strategic enabler of institutional adaptation rather than a purely technical solution. Future research should focus on assessing the long-term impact of AI-driven training on public sector performance, developing measurable indicators of skill enhancement and identifying best practices for responsible AI integration. These efforts will contribute to more resilient, adaptive and capable public institutions.

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