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# EMPATHY IN TECHNOLOGY: AI AND SOCIAL ENTREPRENEURSHIP FOR POVERTY ERADICATION

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# ЕМПАТІЯ В ТЕХНОЛОГІЯХ: ШІ ТА СОЦІАЛЬНЕ ПІДПРИЄМНИЦТВО ДЛЯ ВИКОРІНЕННЯ БІДНОСТІ

*The intersection of social enterprise and artificial intelligence (AI) presents an unprecedented opportunity to address societal challenges effectively. This article explores the impact and potential of integrating AI technologies within the realm of social entrepreneurship. It examines how AI-powered solutions are reshaping social enterprises, enhancing their efficiency, scalability, and impact in tackling complex social issues. The discussion delves into the benefits of AI in optimizing resource allocation, improving decision-making, and fostering innovation in delivering social services. However, ethical considerations, such as algorithmic bias and privacy concerns, underscore the need for responsible AI deployment in social initiatives. The article emphasizes the importance of upskilling and collaboration while highlighting*

*prospects for AI-driven social entrepreneurship. Author at this article investigated the transformative potential of artificial intelligence (AI) within social enterprises aimed at supporting individuals vulnerable to poverty or social exclusion. It delves into the innovative ways in which AI applications are empowering marginalized communities by providing tailored solutions. Through a comprehensive exploration of AI-driven tools and strategies, this study outlines how social enterprises utilize technology to address the multifaceted challenges faced by individuals at risk of societal marginalization. The research assesses AI's role in skill development, job accessibility, financial inclusion, healthcare provisions, language accessibility, community support, and personalized assistance. By examining the intersection of AI and social entrepreneurship, this article highlights the instrumental role of technology in fostering inclusion, empowerment, and equity among vulnerable populations. The findings underscore the transformative impact of AI-enabled initiatives in facilitating access to opportunities, resources, and support systems for individuals facing poverty or social exclusion. It highlights the multifaceted challenges encountered by individuals facing poverty or social exclusion, emphasizing limited access to education, employment, healthcare, and financial resources.*

*Поєднання соціального підприємництва та штучного інтелекту (ШІ) дає безпрецедентну можливість ефективно вирішувати суспільні проблеми. У цій статті досліджується вплив і потенціал інтеграції технологій ШІ у сферу соціального підприємництва. Автором розглядається, як рішення на основі штучного інтелекту змінюють соціальні підприємства, підвищуючи їхню ефективність, масштабованість і вплив на вирішення складних соціальних проблем. Автор заглиблюється в переваги штучного інтелекту для оптимізації розподілу ресурсів, покращення процесу прийняття рішень і сприяння інноваціям у наданні соціальних послуг. Автор наголошує, що етичні міркування, такі як упередженість алгоритмів і конфіденційність, підкреслюють необхідність відповідального використання ШІ в соціальних ініціативах. У статті наголошується на важливості підвищення кваліфікації та співпраці, а також висвітлюються перспективи соціального*

*підприємництва, керованого ШІ. У статті досліджено трансформаційний потенціал штучного інтелекту у соціальних підприємствах, спрямованих на підтримку осіб, уразливих до бідності або соціальної ізоляції. Автор демонструє, що додатки штучного інтелекту розширюють можливості маргінальних спільнот, надаючи індивідуальні рішення. Завдяки всебічному дослідженню інструментів і стратегій на основі штучного інтелекту це дослідження описує, як соціальні підприємства використовують технології для вирішення багатогранних проблем, з якими стикаються люди, яким загрожує суспільна маргіналізація. Дослідження оцінює роль штучного інтелекту в розвитку навичок, доступності роботи, фінансовій доступності, забезпеченні охорони здоров'я, доступності мови, підтримці громади та індивідуальній допомозі. Досліджуючи взаємозв'язок ШІ та соціального підприємництва, автор підкреслює інструментальну роль технологій у сприянні інклюзії, розширенню можливостей і справедливості серед уразливих верств населення. Отримані результати підкреслюють трансформаційний вплив ініціатив на основі штучного інтелекту щодо полегшення доступу до можливостей, ресурсів і систем підтримки для людей, які перебувають у стані бідності або соціальної ізоляції. Автор висвітлює багатогранні проблеми, з якими стикаються люди, які перебувають у стані бідності чи соціальної ізоляції, наголошується на обмеженому доступі до освіти, роботи, охорони здоров'я та фінансових ресурсів.*

***Keywords:*** *Social Enterprise, Artificial Intelligence, AI Impact, Poverty, Social Exclusion.*

***Ключові слова:*** *соціальне підприємство, штучний інтелект, вплив ШІ, бідність, соціальна ексклюзія.*

**Statement of the problem in general view and its connection with important scientific and practical tasks.** One facet of the problem lies in comprehending how AI technologies can be effectively integrated into the operations, strategies, and mission-driven initiatives of social enterprises. This includes exploring the potential applications of AI in solving social issues, improving operational

efficiency, and fostering innovation. In our opinion, it is very important to study how the implementation of artificial intelligence in social enterprises affects various stakeholders, including employees, beneficiaries, partner organizations and communities. The implications of AI-driven solutions for work roles, social services and community engagement are worth analyzing. It is very important to study the impact of AI on social enterprises, which will help them to anticipate future changes and adapt effectively to them.

**Analysis of latest research and publications.** There are several authors who have contributed to the discussion about artificial intelligence and its impact on social enterprises. Jim Fruchterman at his work [1] in technology social entrepreneurship has written about the ethical use of AI and its potential for positive social impact. The article "Measuring Social Entrepreneurship: Identifying and Assessing the Performance of Social Entrepreneurial Ventures" by Jason Lortie, Kevin C. Cox, Stephanie Castro, and Gary J. Castrogiovanni explores the intricacies of measuring the performance of social entrepreneurial ventures [2]. Tomašev, N. in [3] highlight AI's capacity to address social challenges and create positive impacts across various domains. They emphasize the potential of AI technologies in healthcare, education, environmental conservation, poverty alleviation, and other areas to bring about tangible benefits for communities. The work by von Richthofen, G., Gümüsay, A. A., & Send, H. contributes to the discourse on the intersection of AI, work transformation, and CSR. It encourages a proactive approach to harnessing AI's potential for positive societal impact while mitigating potential risks and ethical challenges associated with its integration into the workforce [4]. Daniel Susskind exclusively focused on social enterprises, his work [5] delves into the broader implications of AI and its effect on various aspects of society, including its potential impact on the workforce and social structures. Lucy Bernholz writes extensively on the use of technology in the social sector. She explores how AI can be harnessed ethically for social good and its implications for nonprofits and social enterprises [6].

**Formulation of the goals of the article**. The main goal is to find out how AI technologies can be integrated into the core operations and activities of social

enterprises. Investigate the potential applications and benefits of AI in addressing societal challenges and furthering the mission of social entrepreneurship.

**Presentation of the main research material.** In recent years, Generative Artificial Intelligence (AI) has emerged as a transformative force, reshaping industries, and unlocking new avenues for innovation. This cutting-edge technology, capable of producing content that mimics human creativity, holds vast economic potential, and is poised to become the next frontier of productivity [7].

Generative AI has revolutionized creative sectors such as design, art, music, and content creation. AI-powered tools like deep learning algorithms and Generative Adversarial Networks (GANs) have enabled the generation of realistic art pieces, musical compositions, and even entire stories, reduced production time and stimulating creativity.

AI's generative capabilities have empowered businesses to offer personalized customer experiences at scale. From personalized product recommendations in e-commerce to creating tailored advertising content, AI algorithms leverage data to understand consumer behavior and preferences, leading to more engaging and targeted interactions.

Generative AI has become a catalyst for innovation in research and development across various industries. Pharmaceutical companies use AI to simulate and generate molecular structures, expediting drug discovery processes. In engineering and manufacturing, AI helps create and refine prototypes, accelerating product development cycles.

The potential for AI-generated insights has far-reaching implications for optimizing business operations. By analyzing vast datasets, generative AI provides actionable insights into market trends, forecasting demand, and optimizing supply chains, leading to more efficient and cost-effective operations.

AI-powered generative models are transforming the landscape of education and training. Customized learning materials, interactive simulations, and AI-generated tutors are reshaping the way students learn. Additionally, industries are utilizing AI to create immersive training environments that simulate real-world scenarios for skill development.

Beyond economic growth, generative AI holds promise in addressing societal challenges. From generating synthetic data for research in healthcare to creating models for climate change predictions, AI offers innovative solutions to complex issues, aiding policymakers, and researchers in making informed decisions.

While the economic potential of generative AI is immense, challenges persist. Concerns regarding ethical use, bias in AI-generated content, data privacy, and security remain crucial areas that demand attention. Striking a balance between innovation and ethical deployment is imperative for realizing the full potential of AI.

As per a McKinsey research "The economic potential of generative AI: Unlocking the next frontier of productivity," it's suggested that "the potential annual addition by generative AI could range from $2.6 trillion to $4.4 trillion across 63 examined use cases. To put this into perspective, the total GDP of the United Kingdom in 2021 was $3.1 trillion." [8].

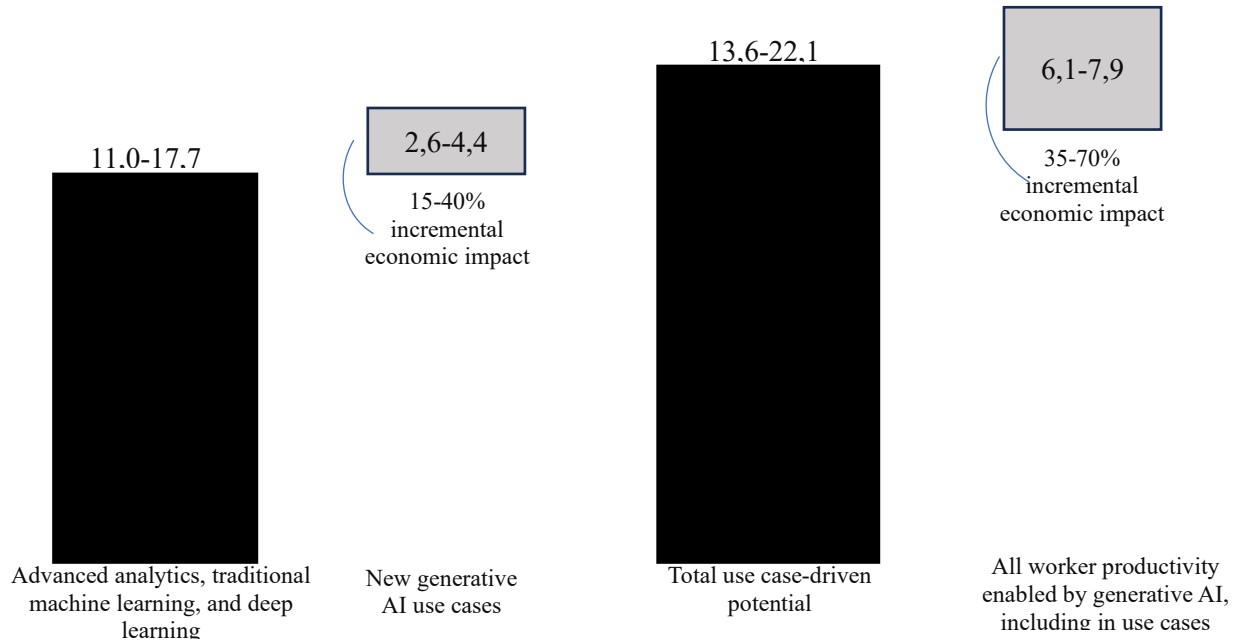


**Figure 1. AI's potential impact on the global economy, $ trillion [8]**

The steep rise in automation potential is significantly attributed to Generative AI's proficiency in comprehending and utilizing natural language across various tasks and endeavors. Approximately 40 percent of the tasks carried out by workers necessitate a moderately high level of human comprehension of natural language [9].

Consequently, numerous work-related tasks, including communication, oversight, record-keeping, and interpersonal interactions, hold the potential to be

automated through Generative AI. This acceleration of work transformation particularly affects occupations like education and technology, where automation potential was initially anticipated to emerge later, as indicated in Figure 2.

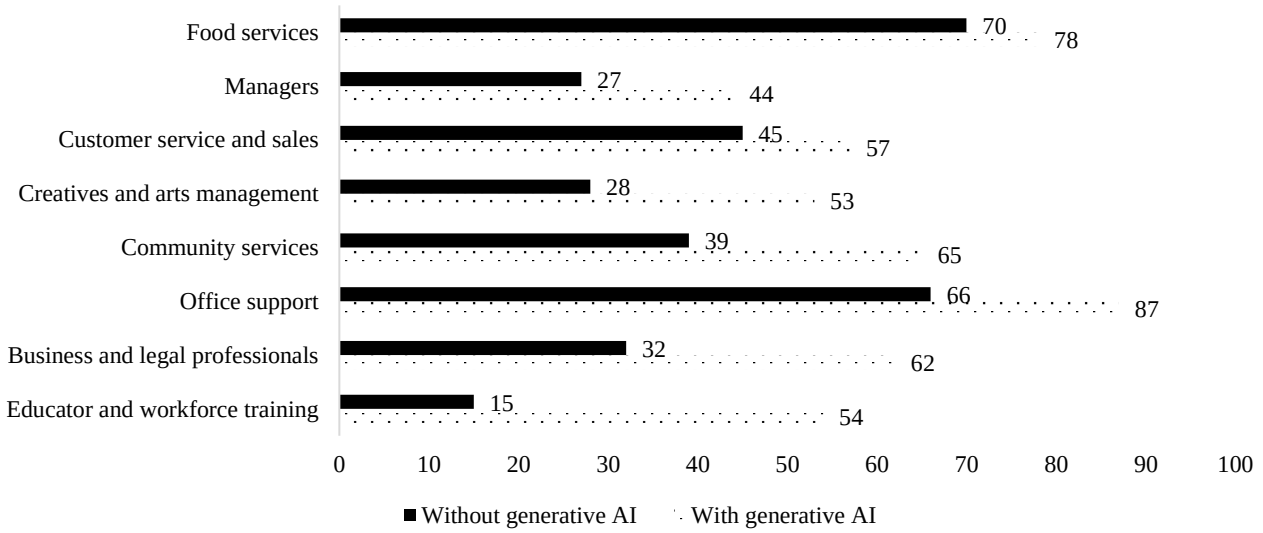


**Figure 2. Impact of generative AI on technical automation potential in midpoint scenario, 2023***

** Only those fields that can relate to social entrepreneurship are selected from the research [8].*

We agree with Dr. Barry J Barresi [9] that responsible AI involves the development and utilization of AI systems in a manner that upholds ethical principles, transparency, inclusivity, and impartiality. It encompasses ensuring that AI systems are created and employed in a manner that upholds human rights, fosters fairness, and contributes positively to society. Ethical AI prioritizes human rights, fairness, and regards aspects such as privacy, consent, and non-discrimination. Transparent AI involves making the functionality of AI systems and their data comprehensible and easily interpretable. Inclusive AI aims to ensure that AI systems are constructed and utilized in a manner that acknowledges diversity and supports equality. Unbiased AI does not reinforce or magnify pre-existing biases by utilizing biased training data or algorithms that unfairly disadvantage specific groups.

Mark Horoszowski [10] wrote that social enterprises are employing AI in four distinct methods to broaden their financial and impact capabilities. Here are further elaborations and illustrations for each approach:

– Utilizing AI to optimize operational efficiency and minimize expenses.

– Augmenting existing products/services with AI to enhance user experience and contentment.

– Integrating novel AI solutions to provide services/products in a manner that was previously not achievable at scale.

– Revamping their institutions by establishing fresh AI technology and platforms for innovative business models.

Of course, it is important to understand that there are threats to the use of AI in social entrepreneurship, this is detailed in the study [11]. This research findings indicate that founders face four primary challenges: (1) the danger of introducing inherent bias into AI systems; (2) the issue of non-human systems making decisions that are inscrutable and impact humans; (3) vying for limited technological expertise; and (4) delivering outcomes that are challenging to quantify, particularly concerning their emphasis on social good.

In the ever-evolving landscape of technological advancements, the integration of Artificial Intelligence (AI) has emerged not just as a tool for business optimization, but also as a catalyst for social impact (fig. 3).

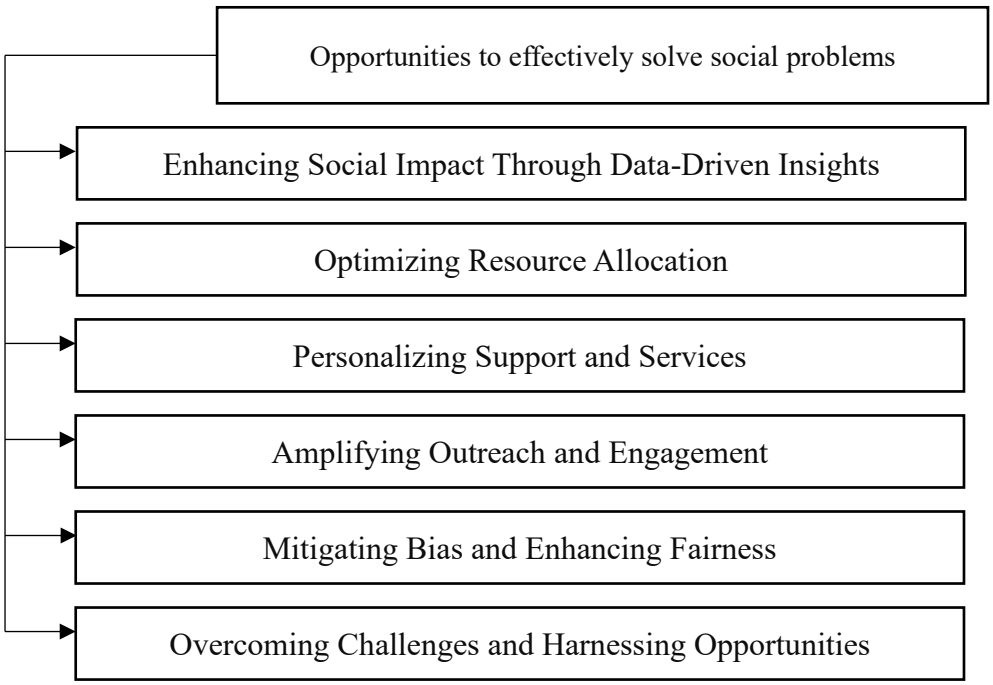


**Figure 3. The collaboration of AI and social entrepreneurship offers an unparalleled chance to effectively tackle societal issues.**

*Resources: developed by the author*

AI's capacity to process extensive datasets at lightning speed provides invaluable insights for social entrepreneurs. It enables the analysis of complex societal issues, such as poverty, healthcare accessibility, or education gaps, empowering organizations to make informed decisions and implement targeted interventions.

By leveraging predictive analytics, AI aids social entrepreneurs in optimizing resource allocation. It facilitates the identification of areas that require immediate attention, enabling more efficient deployment of limited resources for maximum impact. Whether it's identifying underserved communities or predicting high-risk scenarios, AI assists in strategic planning and decision-making.

Through machine learning algorithms, social entrepreneurs can tailor their services to individual needs. Whether it's personalized education plans, healthcare recommendations, or community services, AI-driven systems can adapt and evolve based on user interactions, ensuring more impactful and relevant assistance.

AI-powered tools, such as chatbots and social media analytics, streamline communication and engagement strategies. This enables social entrepreneurs to reach a wider audience, gather real-time feedback, and foster stronger community participation. It transforms the way organizations connect with beneficiaries and stakeholders, fostering a more inclusive and participative approach.

One of the most critical aspects is AI's potential to reduce biases and ensure fairness in decision-making. With ethical AI frameworks and robust algorithms, social entrepreneurs can minimize biases that might perpetuate inequality, ensuring that services and interventions are more equitable and just.

These social enterprises showcase the diverse applications of AI across sectors, from healthcare and pharmaceuticals to education and community development, emphasizing the potential for AI to drive positive social impact (Table 1).

**Table 1. Examples of the use of artificial intelligence by enterprises and social enterprises of various industries**

| № | Name | Sector | AI Application |
|---|---|---|---|
| 1 | Kiva.org | Microfinance, Crowdfunding | Kiva uses AI and machine learning algorithms to optimize its lending platform. It employs AI to analyze a variety of data points including borrower profiles, loan history, and repayment patterns to assess credit risk and predict the likelihood of repayment. |
| 2 | Pymetrics | Human Resources, Recruitment | Pymetrics employs AI-driven gamified assessments to match job seekers with suitable positions. The platform utilizes algorithms that analyze cognitive and emotional traits of individuals through games and assessments, subsequently connecting them to job opportunities that align with their skills and personalities. This approach helps in reducing bias in the hiring process and supports a more diverse and inclusive recruitment strategy. |
| 3 | AIndra Systems | Healthcare | AIndra Systems focuses on social impact by utilizing AI in healthcare, particularly in the field of cervical cancer screening. Their AI-based solution analyzes Pap smear tests to identify cancerous cells, providing accurate and timely diagnoses. This technology aids in detecting cancer at early stages, especially in regions with limited access to specialized healthcare services. |
| 4 | Bayes Impact | Public Services, Social Good | Bayes Impact employs AI to address various social issues. For instance, they have developed predictive analytics tools to assist government agencies in identifying vulnerable populations and allocating resources effectively. Their solutions help optimize public services by predicting trends and needs, enhancing decision-making for social welfare programs. |
| 5 | BenevolentAI | Healthcare, Drug Discovery | BenevolentAI uses AI to accelerate drug discovery and develop new treatments for diseases. Their platform employs machine learning algorithms to analyze vast amounts of biomedical data, scientific research papers, and clinical trial reports. This approach assists in identifying potential drug candidates, expediting the drug development process, and aiming to bring new therapies to market faster. |
| 6 | Mosaix | Education, Skill Matching | Mosaix uses AI to provide skill-matching services for job seekers. Their platform utilizes machine learning algorithms to analyze and match an individual's skills, experiences, and preferences with relevant job opportunities. By leveraging AI technology, Mosaix enhances career pathways for job seekers and supports more accurate job matching. |

*Continuation of table 1*

| | | | |
|---|---|---|---|
| 7 | African Robotics Network (AFRON) | Education, Robotics | AFRON is a social enterprise that utilizes AI and robotics education to foster innovation and skill development in African communities. They offer educational programs that use AI-powered robotics kits, teaching children and young adults coding, problem-solving, and robotics skills. AFRON aims to empower the next generation with technological knowledge and opportunities. |
| 8 | SIRUM | Healthcare, Pharmaceuticals | SIRUM employs AI-driven technology to redistribute surplus medication to individuals in need. Their platform uses algorithms to match excess medications from healthcare facilities with pharmacies or patients who lack access to affordable medication. By leveraging AI, SIRUM facilitates the efficient redistribution of surplus medicine, reducing waste and addressing medication access disparities. |

*Resources: created by the author based on data from enterprise websites*

The world is now divided over the use of artificial intelligence. Scientists are raising questions that the number of unemployed will increase and the number of the poor population will increase.

To address potential unemployment challenges posed by AI:

– Governments, educational institutions, and industries should focus on retraining and upskilling programs to prepare the workforce for the AI-driven economy.

– Promoting entrepreneurship and innovation can lead to the creation of new businesses and job opportunities.

– Policies that support a smooth transition for displaced workers, such as social safety nets, income support, and job placement programs, are essential.

– Encouraging research and dialogue on the ethical implications of AI to ensure that its implementation is responsible and equitable.

We want to provide data on at risk of poverty or social exclusion in the EU (Figure 4).

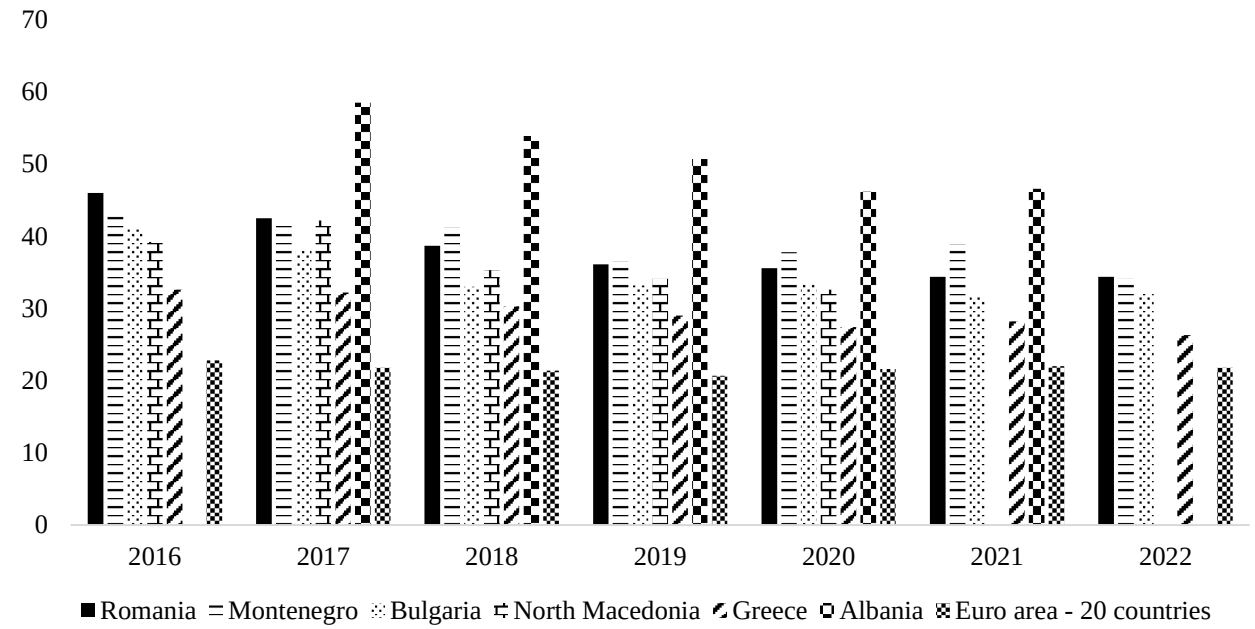


**Figure 4. Persons at risk of poverty or social exclusion in EU, 2016-2022, % [13]***

**the author selected countries with the greatest risk of poverty or social exclusion and general data for EU countries*

Ultimately, AI's impact on unemployment is complex and multifaceted, requiring a comprehensive approach that considers the potential benefits and challenges while mitigating the negative consequences for the workforce.

Persons at risk of poverty or social exclusion face challenges in accessing opportunities due to various socioeconomic factors. Social enterprises can utilize AI to create innovative solutions that address these challenges and uplift the affected individuals. Here's how AI can assist:

– Skill Enhancement: AI-powered platforms can provide personalized skill development and training programs. These tools analyze user behavior and learning patterns to offer tailored courses, empowering individuals with relevant skills for employment or entrepreneurship.

– Employment Opportunities: AI-driven job matching platforms can connect individuals from marginalized communities with suitable job openings. These platforms use algorithms to match skills, experience, and preferences, increasing access to employment opportunities for those facing exclusion.

– Financial Inclusion: AI-based financial services, such as micro-lending or personalized financial planning apps, can cater to individuals with limited access to

traditional banking. These services enable better financial management and access to capital for starting small businesses.

– Healthcare Accessibility: AI-driven telemedicine and health monitoring tools can provide affordable and accessible healthcare solutions. These technologies enable remote consultations, health tracking, and early diagnosis, especially beneficial for those in remote or underserved areas.

– Language Accessibility: AI-powered translation tools can bridge language barriers, enabling access to information and services for individuals with limited language proficiency. This helps in improving communication and understanding across diverse communities.

– Community Support: AI can enhance community support initiatives by analyzing social data to identify areas needing intervention. Chatbots or AI-powered community platforms can offer support, guidance, and resources to those facing isolation or mental health challenges.

– Personalized Assistance: AI-driven personal assistants or chatbots can provide information on social services, legal rights, or educational resources. These tools offer guidance, support, and information tailored to an individual's specific needs.

Social enterprises leveraging AI can create impactful solutions that directly address the needs of individuals at risk of poverty or social exclusion. By harnessing the power of technology in a socially responsible manner, these initiatives contribute significantly to creating a more inclusive and equitable society.

**Conclusion.** The integration of artificial intelligence in social enterprises has the potential to significantly enhance efficiency and effectiveness in addressing social challenges. AI-driven solutions enable better data analysis, decision-making, and resource allocation, thereby improving outcomes and impact. AI offers innovative solutions that can be scaled more efficiently, allowing social enterprises to reach a broader audience and have a larger impact on societal issues. It allows for the development of novel approaches that might not have been feasible without AI capabilities. Leveraging AI technologies enables social enterprises to optimize resource allocation and streamline operations. This can lead to better utilization of limited resources, ensuring that aid, support, or services reach the right people at the

right time. While AI offers numerous benefits, it also poses challenges and ethical considerations. Issues related to data privacy, algorithmic bias, and the potential for exclusion of certain groups need to be addressed to ensure responsible and ethical AI deployment in social enterprises. Successful integration of AI into social enterprises requires upskilling the workforce and adapting organizational structures to embrace technological advancements. Investing in the education and training of personnel is essential to maximize the benefits of AI. Collaborative efforts facilitate the development and implementation of AI-driven solutions that effectively address social issues. AI is continually evolving, and its potential for social impact is likely to expand further. Highlighting future possibilities and the need for continued research and innovation is crucial for the sustained advancement of AI in social enterprises.

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