Review of Artificial Intelligence: A Driver of Unemployment or Navigation towards a Prospective Future?

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ABSTRACT: Artificial intelligence has swiftly penetrated our lives that eased our way of life. With its massive utility in healthcare, education and other commercial sectors, AI has evolved as a boon to the world. Nevertheless, atomisation has resulted in large-scale job loss, retrenchment and unemployment, substituting human labour, resulting in controversies about the significance of advanced technological progressions. This study argues about the extent to which AI has led to unemployment changing the macroeconomics versus the new job opportunities opened by AI and other technological developments, augmenting productivity level and improving quality of service delivered.

KEYWORDS: Artificial intelligence, Automating, Job loss, Unemployment.

1. INTRODUCTION

The technological world is witnessing a long-standing debate over the pros and cons, whether the changes are more significant than the sacrifices made in the field of unemployment. Technology is making rapid developments in all disciplines, which is easing the way of life in every respect. Starting from commercial mundane to diagnostic techniques, the advanced form of technology has changed the entire paradigm of the human lifestyle. Among all, artificial intelligence has gained much prominence in recent times. Artificial intelligence denotes the amalgamation of human intelligence with technology to perform a wide range of tasks and operations [1]. AI has been found to be successfully integrated and offering valuable services in the hospital industry, hospitality segment, banking sector, educational domain and many more.

Korinek and Stiglitz [2] and Mutascu [3] reflected that artificial intelligence demonstrates the constant developments and progressions made in the technological domain to automate the services. It has been strongly established by several scholars that the application and use of artificial intelligence have changed the lives, simplified the work processes and increased the accuracy of various techniques; nevertheless, Li et al. [1] contradicted the opinion and asserted the negative implication of AI over the employment scenario. The aim of the research is to review the constructs of AI and establish the role of AI in increasing the unemployment rate. The outcome of the study will help in understanding whether AI is adversely impacting the employment status veiled by the benefits withdrawn from it.

2. OVERVIEW OF ARTIFICIAL INTELLIGENCE

The evolution of artificial intelligence and familiarisation with the new concept began in the early 20th century when fiction visualised robots and automated devices that mimicked human intelligence. Gradually, as information technology developed and various other aspects of technology advanced, exploring and developing innovative practices and software, AI began to evolve in reality. With more advancing computers coming into play, AI started flourishing, augmenting the ability to store huge information, and making different functions and operations of daily life more easy, flexible and fast [4]-[5]. In this regard, Walsh [6] acknowledged that artificial intelligence reflects the Darwin theory of evolution. The author further asserted that the novel paradigm of AI is still in the evolutionary phase and developing to establish "survival of the fittest" that emphasises constructing better software and programs, with each generation, without any assistance or modification from the human end. The role of AI became prominent with the machines being trained and fed with a large volume of programmes that assisted in addressing particular questions— for instance, retrieving and presenting weather reports to the client when asked. This paved the way for machine learning, which is designed and programmed in an approach that assesses a large volume of data fed, deducing patterns from them and providing a conclusive answer. This further resulted in the development of Big Data [7]. Artificial intelligence was originally

coined by John McCarthy in 1956 that inferred AI as the amalgamated aspect of scientific constructs with the engineering domain to produce "intelligent machines" [8].

Reviewing the applications and usability of AI, Abduljabbar et al. [9] asserted its gigantic role in the transport system. The authors added that intelligence close to the human brain being inserted in the machines mitigates the constraints of the earlier developed computational machines and computers. With unpredictable nature and behavioural patterns demonstrated by the travellers, the constructs of artificial intelligence seem to be a good fit to align to the traffic issues, carbon dioxide emission, dynamic travel demands, ecological impact and safety concerns [10] [11]. The role and functions of AI are not limited to any one segment of life and has been well-documented to be employed in different dimensions such as healthcare, education, retail chains and so on [5]. Nevertheless, Marchant et al. [8] argued that a growing number of scholars have indicated towards the rising unemployment and further generating "technological unemployment" epidemic by the advanced computational intelligence that will have serious repercussions on the societal conditions in the prospective times. This lays the foundation to understand and assess the benefits as well as the role played by AI in the employment-unemployment scenario in the contemporary world [12].

3. BENEFITS OF ARTIFICIAL INTELLIGENCE

The article of Anyoha [13] explores to establish if the machines can think, perceive and rationalise decisions like human beings. The author narrated the turbulent ride of AI from 1957 to 1974, revealing that the period boosted the developmental activities to evolve AI, with the advancements made in the computational field, information technology that allowed to store vast volume of data and retrieve and use information faster and making it available to millions of people. With the developments and progressions made in machine learning, individuals started resolving issues various challenges employing AI.
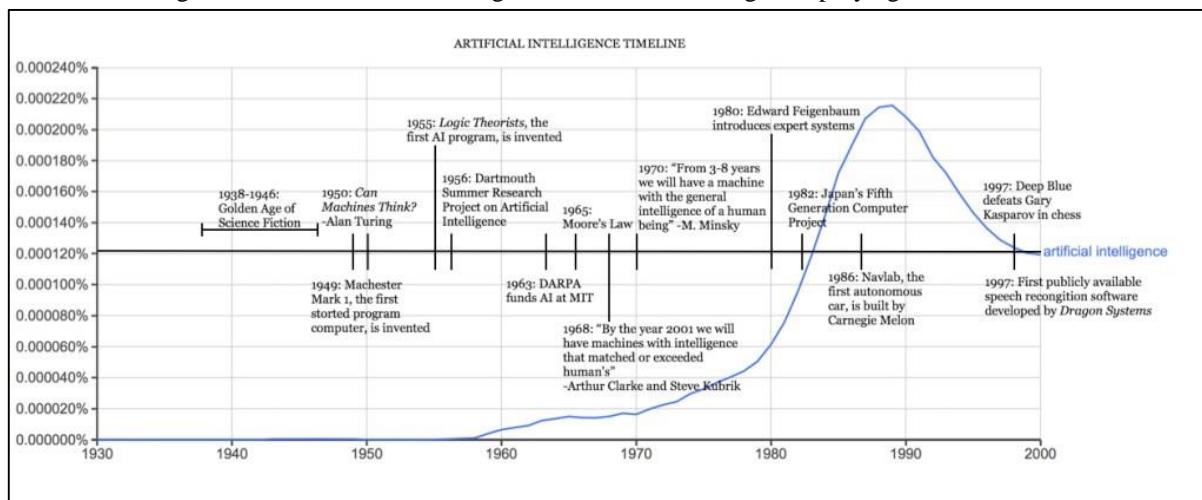

Figure 1: Timeline depicting the rise of AI
Source: [13]

The illustration above reveals the rise of AI in mankind, which asserted that as automatic machines, and technological developments penetrated in different domains of life, AI made its landing and strengthened the position. Remarking on the role of AI in the medical discipline, Amisha et al. [14] pointed out that AI has depicted positive changes in medicinal practice. AI is widely used to schedule appointments, maintaining digital medical records, online check-ins at the hospitals and medical centres, reminding the pregnant population and children about immunisation dosage, inferring of drug algorithms and even highlighted the adverse impact of the combination of multiple drugs. Additionally, AI plays a crucial role in the development of drugs and boosts prognosis techniques using radiology. AI has smoothened both the administrative functions of hospitals and the technical operation of the medical field [10].

AI is currently used to recognise speech with the aid of the technique "automatic speech recognition" that translates human language and voice into the written record. This technology is not integrated into many smartphone devices to convert human voice into written format [15]. In the earlier days, the commercial entities and service centres used to employ individuals as customer care

executives who attended and addressed the issues of the clients. However, AI has introduced online chatbots that replaced human needs as customer care executives. These automated chatbots ask questions revolving against common issues such as shipping issues, cross-selling goods that increase client engagement. The applications of Slacks and Facebook messenger employs virtual and voice assistance to chat and interact with the customers [7].

The use of AI is not restricted to commercial fields only. It has shown a plethora of functions in strengthening the educational service. Roll and Wylie [16] remarked that AI-assisted in offering greater customised educational service to the students. The pupils are able to tailor the learning program as per their preferences and needs. Furthermore, AI is offering additional help in subjects and teachings to the students, who require assistance beyond the class hours, but the teachers are unable to offer help. AI tools are honing the skills of the students without the restriction of any hour of the day [17] [18]. In fact, the applications of AI reply to repetitive questions made by the students quickly, reducing the waiting time and enhancing the learning opportunities. The most notorious feature of AI that made the educational system comprehensive is the accessibility of information across the world, making the classrooms global. It eliminated the constraints of communication barriers and even addressed the issues of visual or hearing disabilities through the use of presentation translators [19]. Consequently, it can be safely deduced that AI has facilitated various services in multiple domains; however, further fortifying the potent of creating technological unemployment.

4. A HISTORY OF TECHNOLOGICAL REVOLUTIONS

Though much has been debated over the growing role of advanced artificial intelligence in creating and augmenting unemployment; however, it is not a new phenomenon that unemployment since ages has been a by-product of creative destruction. As the world progressed and the human race became more civilised, investing time and resources to develop and enhance the ways of life paved the way for a more simplified and facilitated approach that encouraged the use of modern machines, which in turn cemented the route of creative destruction of manual labour [12]. With the successive industrial revolutions in many nations and the evolution of manufacturing sectors, there was a gradual shift towards technology. In the latter 19th century, the invention of computers, followed by the internet, completely transformed the automation scene. Batch production, Just-in-time approach, Kanban, agile technology, scrum techniques gradually surfaced in the manufacturing picture, which was supporting the iterative model to deliver quality and contemporary products based on the ideology of software life cycle development.

In the 21st century, though computers started giving better results and error-free outcomes, yet the capability of the computers depended on the efficiency of the programmers. Consequentially, computers becoming relatively productive to human labour. With ground-breaking technologies, AI closely resembled human emotions and started deciphering more complicated tasks and navigating beyond the capabilities of human beings, subsequently propelling the rise of AI in human lives and the commercial world [20]. Further ability to retrieve a huge volume of information through the use of Big data, deducing patterns and trends in the behaviour of the individual boosted the economy of the commercial and productive entities, reinforcing the role of artificial intelligence in the changing employment scenario [21].

5. AI AND TECHNOLOGICAL UNEMPLOYMENT

Though the functions of AI are dynamic and portrays successful delivery of the services; however, artificial intelligence holds something disquieting about its role in substituting human labour. In a long-standing debate over utility and progression of artificial intelligence, professor Hubert Dreyfus argued that machines and automated systems could never beat the need and brain of human beings over a game of chess, stressing the fact that how-so-ever, machines are advanced, it will not replace manual brain and labour. Nonetheless, a few years later, an automated machine defeated the professor in the game of chess [22]. According to Frey and Osborne [20], more than 47 per cent of the present employment role will be substituted by advanced technology. Furthermore, the economy is going to witness seismic changes with every one in 10 jobs being completely or highly automatised, thus rendering a huge population unemployed [23].

The studies of Taherian [4] and Walsh [6] further corroborated that automation has been constantly and increasingly substituting manual labour, which is further escalated by redundancy. The commercial entities depending extensively on manual labour and denying flexibility towards adopting newer technological practices are finding themselves unable to handle advanced competition from the technologically progressed entities. With the astonishing developments made in different automated services such as in artificial intelligence, robotics and three-dimensional technology, the entire paradigm has vastly encroached on the human

employment domains. For instance, technological progressions are increasingly used in diagnostic centres for better clarity and prognosis of ailments [19]. Further, it has entered and served multiple dimensions of society, such as architects, music composers, and even painters and photographers.

With the latest changes observed in the world population and growing unemployment, the apprehensions over artificial intelligence creating technological unemployment have unsettled the human community. It has been anticipated that by the end of 2050, the world population will surge to 9.8 billion individuals, out of which 6 billion individuals will attain employment age and disgracefully, in the present situation with 71 million individuals apply for the job are struggling to get employed appropriately [22]. However, on the contrary to the opinions presented above, Technology Org [24] contradicted that the advancements in technology are not resulting in unemployment; it is simply shifting the manual form of labour towards a novel form of employment. The author even asserted that the technological progressions are creating more job opportunities; nevertheless, reducing repetitive manual tasks and allowing the companies to explore creative and innovative domains. In meanwhile, United Nations [22] supported and inferred from historical experiences that the world is yet to become an automated world. It is averred that though various advanced technologies such as three-dimensional printing, artificial intelligence has evolved as useful tools for numerous industries; however, it has a very specific set of abilities, thereby negating the substitution of human labour from the industries completely [25].

Besides, United Nations [22] substantiated those newer technologies cannot be tagged as job destroyers; rather, it generates a new form of employment opportunities, honing the productivity of the employees, resulting in novel economic scopes. In addition, the regulatory bodies of the country will not support the complete washout of manual labour with technology. For instance, out of 270 jobs that have been identified in the 1950 census of the USA, only one job has been completely outdone by technology, which is recognised as the job of elevator operator [24]. On the contrary, though the job has been wiped off by manual labour in the US, it still employs human labour in developing countries like India.

Probing the implication of advanced artificial intelligence on the macroeconomic landscape, Kim et al. [26] argued that big data, artificial intelligence and machine learning and robotics have commenced exhibiting adverse impact on the present employment scopes, which in turn is negatively affecting economic conditions of the households. Authenticating the opinions, Young Joon Kim et al. [27] revealed that 47 per cent of 702 classified jobs possess the risk of reduced need for manual labour in the USA in the coming 25 years. On a different note, exploring the issues created by artificial intelligence over the job market and employment scenario, United Nations [22] pointed out that novel technological advancements are creating a greater rift between the labourers and company owners; blue-collared and white collared employees. The people with the means and resources to educate and update themselves to the modern and contemporary trends are more flexible and adaptable, making themselves more suitable to work with the advanced technologies. Nevertheless, the workers and labourers who are not in a position to afford to learn modern technologies are left behind, increasing the unemployment ratio. Further, it is noted that though companies are adopting novel technologies are not generating job loss, but the tendency to shift to new techniques, mandating acquiring of new skills and arrangements, led to greater rifts between the labour and executive class. Therefore, advanced forms of technology such as artificial intelligence, robotics and 3D printing techniques are attributed as creators of disparity within the workforce and the low to middle-wage income holders losing the earning grounds.

Another dimension that is investigated by Korinek and Stiglitz [2], artificial intelligence and novel technological progress, has generated greater gaps in developed nations and developing countries. The people of developing states are struggling to access education and daily necessities of life; in such a scenario affording training to update oneself is out of the question. The developing nations lack not only financial resources to bolster knowledge in technical fields; but also the inadequate supply of electricity, slow speed on the internet or no access to the internet and smart gadgets tend to pull down the individuals from the third world nations. As a matter of fact, inclining towards artificial intelligence dominated commercial world will lessen the dependence and further eliminate the need for low-skill labour dependent employment and repetitive tasks. Artificial intelligence will result in upskilling of the workforce and restructuring of the organisation. The dimensions encased by AI is so large and dynamic that it has given rise to a new challenge for the industry experts. With the level of changes and volatility involved, envisioning and predicting the future of the commercial job market is totally erratic. In all this, the role of AI in searching for new job opportunities cannot be ignored. The earlier process of searching for jobs, preparing resumes and applying to different jobs was cumbersome, and, in many cases, information was not timely dissipated to the job seekers. Along with that, applying to the employment opportunities beyond the geographic terrain was challenging, which all is eased and facilitated by AI [2].

6. THREATS RELATED TO AI OTHER THAN UNEMPLOYMENT

The contributions of artificial intelligence in different disciplines of life are incomparable. Further, in the sections above, its role and relation with unemployment are inevitable. In addition, AI can be associated with other threats as well. Like put forth by Tegmark [28], autonomous weapons exemplify the integration of artificial intelligence, which are programmed to create devastation by killing, causing mass causalities. Instead of offering defence to mankind, if the automated weapons fall into the wrong hands or are being developed by the wrong person can cause catastrophic impact.

7. CURRENT NAVIGATION TOWARDS A BETTER FUTURE?

The studies of Bruun and Duka [29] charted a chessboard analogy that recognised three probable implications of AI over employment options:
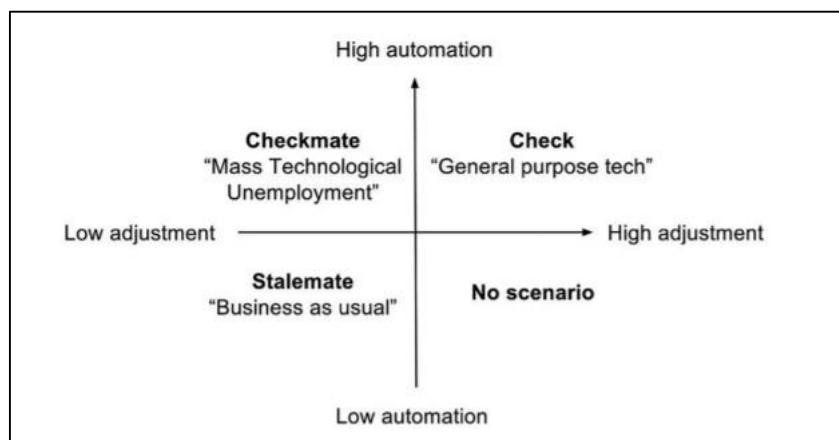

Figure 2: Analogy: impact of AI on jobs
Source: [29]

As per the illustrations, scholars narrated three incidents: check, checkmate and stalemate. Check is the condition wherein AI is accountable for creating more innovative employments, thus maintaining a balance between job loss and employment creation. Stalemate is the event whereby employment structure needs no change neither economy will be altered as AI revolution will not have a substantial impact. However, checkmate is the situation where the artificial intelligence revolution will drastically change the employment scene, creating a huge volume of unemployment status [29].

8. CONCLUSION

While concluding, it is noteworthy to identify the limitation of the study. Primarily, the study is descriptive in approach owing to the current pandemic situation; it was not feasible to carry out primary research. Further, the study should have been analytical for a more substantial outlook. Nevertheless, secondary reviews and peer articles and news sources have been used for providing comprehensive insight into the study topic. The study aimed at developing a theoretical foundation for collecting primary data and analytical study in the future.

Artificial intelligence has created a huge deal of controversy surrounding the increased efficiency of the labour force and unemployment generated. Artificial intelligence demonstrated the set of developments that aim to automate the services, offering a greater quality of work delivered precisely, increasing the satisfaction of the clients. AI has heavily contributed to the medical industry, aiding in the prognosis of ailments, radiology and treatment. It further assists in the research and development of newer drugs. Furthermore, the role of AI in the educational field is unparalleled, with the customised ability to reach students at the global level. However, substituting manual labour in various industries have raised a large number of questions.

From automating elevator jobs to accurate diagnosis of diseases, AI has resulted in increasing human redundancy. However, more volume of manual redundancy is observed in repetitive jobs, and a vast number of scholars have successfully argued that AI does play a role in unemployment, but it also generates jobs. In a nutshell, it is evident that AI resulted in the shifting of the job paradigm, which created a rift between developing and developed nations. Lastly, it was noted that AI has another deleterious impact on the

human race if automated weapons reach the wrong hands. To conclude, it is established that AI is the future, and one cannot evade that; but to mitigate the issues of unemployment, it is highly recommended to prepare an exhaustive plan that focuses on the roots of the problem and training all classes of individuals to make them tech-savvy and AI friendly.

REFERENCES

1. Li, F., Sun, H., Biswal, B.B., Sweeney, J.A., Gong, Q.: Artificial intelligence applications in psychoradiology. Psychoradiology. 1, 94–107 (2021). https://doi.org/10.1093/psyrad/kkab009
2. Korinek, A., Stiglitz, J.E.: Artificial Intelligence and Its Implications for Income Distribution and Unemployment. In: The Economics of Artificial Intelligence: An Agenda. pp. 349–390. University of Chicago Press (2018)
3. Mutascu, M.: Artificial intelligence and unemployment: New insights. Econ. Anal. Policy. 69, 653–667 (2021). https://doi.org/10.1016/j.eap.2021.01.012
4. Taherian, S.: 36 Million Unemployed: How AI Can Create Jobs, https://www.forbes.com/sites/suzytaherian/2020/05/26/36-million-unemployed-how-ai-can-create-jobs/
5. Zawacki-Richter, O., Marín, V.I., Bond, M., Gouverneur, F.: Systematic review of research on artificial intelligence applications in higher education – where are the educators? Int. J. Educ. Technol. High. Educ. 16, 39 (2019). https://doi.org/10.1186/s41239-019-0171-0
6. Walsh, T.: Expert and Non-expert Opinion About Technological Unemployment. Int. J. Autom. Comput. 15, 637–642 (2018). https://doi.org/10.1007/s11633-018-1127-x
7. D'Silva, G., Jani, M., Jadhav, V., Bhoir, A., Amin, P.: Career Counselling Chatbot Using Cognitive Science and Artificial Intelligence. In: Vasudevan, H., Michalas, A., Shekokar, N., and Narvekar, M. (eds.) Advanced Computing Technologies and Applications. pp. 1–9. Springer, Singapore (2020)
8. Marchant, G.E., Stevens, Y.A., Hennessy, J.M.: Technology, Unemployment & Policy Options: Navigating the Transition to a Better World. J. Ethics Emerg. Technol. 24, 26–44 (2014)
9. Abduljabbar, R., Dia, H., Liyanage, S., Bagloee, S.A.: Applications of Artificial Intelligence in Transport: An Overview. Sustainability. 11, 189 (2019). https://doi.org/10.3390/su11010189
10. Bullock, J., Luccioni, A., Pham, K.H., Lam, C.S.N., Luengo-Oroz, M.: Mapping the landscape of Artificial Intelligence applications against COVID-19. J. Artif. Intell. Res. 69, 807–845 (2020). https://doi.org/10.1613/jair.1.12162
11. Ford, M.: Could artificial intelligence create an unemployment crisis? Commun. ACM. 56, 37–39 (2013). https://doi.org/10.1145/2483852.2483865
12. Healy, A., Riain, S.: How to escape the low learning trap in a runaway labour market. Presented at the June 16 (2018)
13. Anyoha, R.: Can Machines Think?, https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/, (2017)
14. Amisha, Malik, P., Pathania, M., Rathaur, V.K.: Overview of artificial intelligence in medicine. J. Fam. Med. Prim. Care. 8, 2328–2331 (2019). https://doi.org/10.4103/jfmpc.jfmpc_440_19
15. Padmanabhan, J., Johnson Premkumar, M.J.: Machine Learning in Automatic Speech Recognition: A Survey. IETE Tech. Rev. 32, 240–251 (2015). https://doi.org/10.1080/02564602.2015.1010611
16. Roll, I., Wylie, R.: Evolution and Revolution in Artificial Intelligence in Education. Int. J. Artif. Intell. Educ. 26, 582–599 (2016). https://doi.org/10.1007/s40593-016-0110-3
17. Holmes, W., Bialik, M., Fadel, C., Center for Curriculum Redesign: Artificial intelligence in education: promises and implications for teaching and learning. Center for Curriculum Redesign, Boston, MA (2019)
18. Marr, B.: How Is AI Used In Education - Real World Examples Of Today And A Peek Into The Future, https://bernardmarr.com/how-is-ai-used-in-education-real-world-examples-of-today-and-a-peek-into-the-future/, (2021)
19. Yu, K.-H., Beam, A.L., Kohane, I.S.: Artificial intelligence in healthcare. Nat. Biomed. Eng. 2, 719–731 (2018). https://doi.org/10.1038/s41551-018-0305-z
20. Frey, C.B., Osborne, M.A.: The future of employment: How susceptible are jobs to computerisation? Technol. Forecast. Soc. Change. 114, 254–280 (2017). https://doi.org/10.1016/j.techfore.2016.08.019
21. STETTNER, A.: Mounting a Response to Technological Unemployment, https://tcf.org/content/report/mounting-response-technological-unemployment/?session=1&session=1&agreed=1

22. United Nations: Will robots and AI cause mass unemployment? Not necessarily, but they do bring other threats, https://www.un.org/en/desa/will-robots-and-ai-cause-mass-unemployment-not-necessarily-they-do-bring-other

23. Campa, R.: Technological growth and unemployment : a global scenario analysis. 24, 86–103 (2014)

24. Technology Org: The Impact of Artificial Intelligence on Unemployment - Technology OrgTechnology Org, https://www.technology.org/2019/12/17/the-impact-of-artificial-intelligence-on-unemployment/, (2019)

25. Su, G.: Unemployment in the AI age | AI Matters. 3, 35–43. https://doi.org/10.1145/3175502.3175511

26. Kim, S., Whitehead, E.J., Jr., Zhang, Y.: Classifying Software Changes: Clean or Buggy?

27. Young Joon Kim, Kim, K., Lee, S.: The rise of technological unemployment and its implications on the future macroeconomic landscape - ScienceDirect. 87, 1–9. https://doi.org/10.1016/j.futures.2017.01.003

28. Tegmark, M.: Benefits & Risks of Artificial Intelligence, https://futureoflife.org/background/benefits-risks-of-artificial-intelligence/

29. Bruun, E.P.G., Duka, A.: Artificial Intelligence, Jobs and the Future of Work: Racing with the Machines. Basic Income Stud. 13, (2018). https://doi.org/10.1515/bis-2018-0018