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Interventions of AI on Finance and Healthcare Sector, Labor Force and Economic Inequality

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ABSTRACT

This research publication will centralize upon the significant advancements that Artificial Intelligence has employed in regard to particular industries like the healthcare and workforce sector, economic policies, economic output and global development of nations, as well as the potential ethical limitations in diversifying such subset of results for all countries. This research publication has derived and obtained numerical data, and findings from longitudinal and empirical research to deduce how AI can play a prominent role in the advancements of various industries that are expected to unveil significant growth over the next few years. Intrinsically, this publication will shed light on the financial crisis, medical management of biotech and healthcare tools, as well as on global policies and frameworks that ensure that AI can boost the sustainability, development, and advancements of countries in the modern era. The particular influence of AI on the Latin-American nations will also be explored, in showcasing how particularly booming nations and industries have witnessed significant advancements in dabbling with novel artificial neural networks and AI interventions.

Introduction

One of the most significant evolutions in the world economy is the development of Artificial Intelligence (AI). Historically speaking, most technological innovation has always presented itself as a double-edged sword: it has created opportunities towards economic growth but has also created challenges with a view of job displacement and market dynamics. According to the World Economic Forum, AI is projected to have created an estimated 97 million jobs by 2025 (Jha, 2023). Meanwhile, AI is also expected to eliminate up to 85 million jobs in the same time period (Jha, 2023). Today, AI presents a truly unprecedented capacity for data analysis, decision-making, and automation that has the power to shape our understanding of economics as a whole, challenging traditional theory and norms.

Stemming from the late 20th century, the digital revolution has set the stage for the advent of AI, including primitive forms of machine-learning algorithms and digital commerce that today reshape activities in production, consumption, and labour markets. It not only marked a revolution in internet and computing technologies but also a profound change in the way business was conducted, the structuring of markets, and how governments regulate these new digital frontiers. Recently, the COVID-19 pandemic has only accelerated this trend, bringing into close focus how strong digital economies have grown and shining a light on how frail old-style models are in this modern era. This has been especially prominent in e-commerce, where the introduction of AI-driven analytics and machine learning has become a necessity that is revolutionizing the market; shaping the fundamental ideologies of consumerism and consumers' accessibility to markets. As a whole, AI is shaping how the economy functions, with governments across the world scrambling to find a harmonious balance between regulation and development.

Intersections of AI, the Economy and International Financial Crisis

Technology and artificial intelligence have become increasingly prevalent in the modern economy, amongst businesses. The shift to online shopping during the COVID-19 pandemic is due to the increased convenience of buying goods. Many direct-to-consumer brands utilize online platforms to sell their products, and online shopping is an emerging trend in the age group of 18-23 (Stimak, 2021). E-consumers tend to prioritize clear information about a product, as well as convenience and the presence of a wide variety. According to the study, e-loyalty to keep consumers buying products is categorized as e-satisfaction, online services, and the perceived value of the firm. Research was conducted on Mlinar, the largest bakery in Croatia with over 200 stores in 2019, during the beginning of the COVID-19 pandemic. It is the only web store which sells cakes nationwide in Croatia. Over 85% said that their reason for buying from the Mlinar web shop was that it was time-saving, and less than 5% attributed their purchase to previous experience. The three components of the e-loyalty model were: over 47% of customers were satisfied, over 50% were content with the online services provided, and over 57% of customers had a good perception of Mlinar. As a result, it could be concluded that the efficiency of a web shop, e-loyalty, and the relationship between the customer and company were the major components which enabled the success of the business e-commerce store. Research conducted in Iraq for the sales of technology from Samsung Electronics showed a shift from 2% online store sales in 2019 to a shocking 16% in 2020 during the COVID-19 pandemic, supporting the conclusion that the presence of e-commerce increased in multiple markets during the COVID-19 pandemic (Ali, 2020).

A shift to digital finance (DF), a type of financial service which utilizes technology and artificial intelligence to provide financial services for a reduced cost, has also affected consumer online shopping. With the introduction of Bitcoin and financial tools and assets that have complemented the growth of new emerging markets, coupled with the pandemic's impact, DF has helped increase consumption on digital markets due to its ease of use and reduced costs. The research conducted used the spatial econometric model to show that DF has also had a positive effect on consumer online shopping in local and neighbouring areas (Zhu, 2023). Furthermore, advancements in artificial intelligence and machine learning have had a profound impact on the economy worldwide. Implementations of ML and AI are foreseen to have a large impact on digital markets since they allow companies to properly analyze e-markets, online searches, and social media trends as shown by the survey conducted by Lancieri & Sakowski. Finally, with the growth of Artificial Intelligence and Machine Learning tools that enable tailored and personalized marketing and targeted advertisements on social media for customers, there has been significant growth in company sales as a result of utilizing customer data to draw attraction.

Financial Analytics and Management for Latin-American Nations

In Latin America, a booming economic industry, cryptocurrencies have greatly revolutionized the banking industry, where digital currencies have revamped the ways in which banking and credit, mortgage and industries are better regulated. Researchers have been investigating how cryptocurrencies have been adopted as a significant part of the global economy, especially in the digital financial sector. In Latin America, this is the case as cryptocurrencies are utilized as a new form of fiduciary money that can be traded at regular prices. Intrinsically in the finch sector, blockchains come of essential purpose in the financial technology industry, as the adoption of such cryptocurrencies has enabled Latin-America to make "implantation of taxes, emissions and circulation control" (Delva et al., 2018). However, it is essential to note that many Latin-American and Caribbean countries, such nations lack the necessary framework that can regulate cryptocurrencies and blockchain — despite the enormous tourism capacities of these nations, mobile telephony must be further strengthened to ensure that payment systems adopt blockchain-based technology to ensure that a wider network of ATMs can be witnessed,

just in the same way this has already been implemented in the largest and most prominent economies of the world. For instance, the adoption of ICOs which are regulated as “tokens” that can be exchanged for other fiat currencies in Latin-America has impacted the industry, especially in the business sector, where tourism can be further enhanced. Even in the sector of healthcare, through proper governmental and federal initiatives as well as legislation, private enterprises would be able to pave the way for more equitable access to health services through the platform of mobile technology (Barreto et al., 2019).

Integrating AI into Economic Policies for Sustainable Development in Low-Income Countries

The integration of Artificial Intelligence (AI) with economic policies, realises the potential from where the actualized sustainable development in low-income countries kicks off. This new paradigm of technology and economic strategy offers opportunities to an extent that had never existed for the catalysis of growth, improved well-being of society, and balance in environmental sustainability. In this age of technology, AI is not just an enabler or another technological tool but also rather should be utilized as a strategic asset to redefine the conventional methods of economic development and policymaking, particularly in low-income countries and resource-constrained settings. AI technologies—machine learning, natural language processing, and robotics—have the potential to revolutionize the very nature of how economic policies can derive improved effectiveness and efficiency through better analysis of data, prediction modelling, and automation.

AI can also assist policymakers in focusing more on poverty reduction strategies, financial inclusion, and job creation. For example, A study demonstrated how AI can offer alternative criteria for assessing creditworthiness and economic growth, particularly for small business owners in low-income communities who face challenges with traditional credit scoring systems (Candello et al., 2022). This paper introduces a voice-based conversational system that helps small business owners understand their business health through a Health Business Index (HBI), which can be used by financial institutions as an alternative measure of creditworthiness (Candello et al., 2022). This may improve inclusion and the ability to achieve quality in the credit risk of low-income community neighbourhood places (Candello et al., 2022). Other applications of AI in this sphere could also reform food security and income levels through the prediction of crop yield and optimization in the use of resources, coupled with the detection of pests and diseases, which support sustainable agricultural practices (Mhlanga, 2020).

Meanwhile, the wide use of predictive analytics to deliver personalized services with the assistance of AI to sectors such as education and healthcare may provide useful contributions to human capital development—one key constituent of sustainable economic growth. This means that even tailor-made education content and healthcare interventions for the specific needs of populations belonging to low-income countries can be supported by AI to help in meeting the success of learning outcomes and health indicators (Shree & Patidar, 2020; Ibrahim and Hall, 2022).

However, the integration of AI into economic policies is not without challenges. The national data protection framework must particularly focus on issues of digital infrastructure, data protection, ethics, and the digital divide in digital skills, among other issues that need due priority during the implementation for the purposes of an inclusive and fair deployment. Furthermore, regulatory frameworks are required to stimulate innovation with equal respect to the protection of citizens' rights and the need to ensure transparency and accountability in the application of AI (Damaševičius, 2023; Hunjra et al., 2022). The conclusion, therefore, that can be drawn from this is that it would strategically integrate AI into economic policies. Through this way, there would be an opportunity for accelerated and sustainable development of low-income countries. This can help countries master the capabilities of AI, increase the effectiveness of policies, make giant strides in social

and environmental outcomes, and enhance economic growth. This potential, implying the possibility of concerted efforts by governments, international organizations, and the private sector to leap above the barriers to AI adoption, must be tapped into for making technologies of artificial intelligence, in fact, catalysts for positive change and development (Candello et al., 2022; Mhlanga, 2020).

Medical AI: Healthcare Startups Enhancing Economic Viability

The application of artificial intelligence (AI) in the health sector is adopting revolutionary ways. The adoption of AI in healthcare startups brings about ways to impact significantly on patient care, accuracy in diagnosis, and operational efficiencies that lower costs while improving healthcare outcomes. High accuracy and speed in diagnosis, therefore, have been revolutionized by AI in the diagnostic process. It delivers an additional economic value that appears through early disease detection, as seen in a study that found that AI architectures, such as rule-based systems and machine learning, were indeed successful in differentiating between malignant and benign lesions, as well as detecting small-cell lung cancer (SCLC) and non-small-cell lung cancer (NSCLC) (Pacurari et al., 2023). Such applications are only expanding, and health startups must maximize and learn to adapt and use these technologies.

Moreover, health startups are in service to provide democratization in health services. These small businesses are working through the mode of telemedicine to bring quality healthcare to the reach of people who have been otherwise deprived, such as people living in geographically secluded areas. This would, in turn, not only assure a wider reach but also substantiate, in a big way, the reduction in health disparity, hence helping in the attainment of the delivery of equitable health across different demographics. This was particularly apparent during the COVID-19 pandemic, where Eighty-eight per cent of the analyzed papers in a 2023 study posited that telemedicine use to provide care increased during the pandemic (Freire et al., 2023).

The operational efficiencies introduced by AI in healthcare are equally noteworthy. AI is also being recruited in startups that streamline hospital and clinic operations to reduce wastage and optimise resource allocation. This goes on further to improve the experience of the patient by reducing waiting times, which was seen to be reduced by a whole 12 minutes at Hospital das Clínicas of the Faculdade de Medicina da Universidade de São Paulo during the COVID-19 pandemic when automated systems were implemented; which after 12 months was estimated to have saved 2508 hours n(KJ et. al, 2022).

The economic impact of these startups extends beyond the healthcare sector itself. In actuality, it serves as evidence that healthcare startups do add to widening economic growth, stimulating job creation, attracting investment, and fostering the competitive market. In this light, the relationship between healthcare innovation and economic development proves to be an important symbiotic one that keeps startups critical to an industry in flux. From the aforementioned discussion, it can be justified that the healthcare startups driven by AI are meant to enhance the economic viability within the healthcare sector. Their enormous contributions are to improve diagnostic accuracy, democratize healthcare access, optimize operational efficiency, and scale economic growth. These startups present one of the key factors in the future of a more sustainable, reachable, and economically viable healthcare system from this innovation and evolution.

Impact of AI on Economic Inequality

While the unequivocal rise of technology is certainly exciting, such technological advances have always been approached with caution before their worldwide implementation. Roman Emperor Vespasian once denied the use of construction technology, stating, "You must let me feed my poor commons" (Tranquillus, 1914). Similarly, the Luddites destroyed knitting machines to prevent redundancy (Perrigo, 2023). AI is no different, with plenty of concerns surrounding its socioeconomic implications, especially regarding economic inequality.

Since the development of the first artificial neural network (ANN) in 1951 (Karjian, 2023), the trend of rising inequality has been evident. The Lorenz curve in Figure 1 showcases the skewed income distribution in 1980 when AI was first commercialized (Karjian, 2023), while Figure 2 highlights the increasing Gini coefficient in the past half-century. Many attribute this to major technological advances such as AI, and it may be reasonable to assume so given AI's prominence across various industries. For instance, Nobel economist Joseph Stiglitz says that Generative AI has already begun to eliminate jobs altogether (Euronews, 2023), with the International Business Machines Corp. (IBM) pausing hiring due to considerations that these roles could potentially be replaced by AI (Ford, 2023). This shifts away from labor-intensive to capital-intensive production both displaces and reduces the demand for blue and, more recently, white-collar work, resulting in lower bargaining power for workers. Moreover, this may very well increase the skill requirement for certain jobs. Thus, the combined effects of rising worker displacement, reduced bargaining power, and increased skill requirements all lead to higher levels of economic inequality. Research by the Bank for International Settlements (BIS), covering 86 countries from 2010-2019, investigated how greater investment into AI affected income and income shares across various groups. The findings reveal a positive correlation between AI investments and higher income inequality (Cornelli et al., 2023), providing empirical support for Stiglitz's pessimistic view that AI will exacerbate existing economic disparities.

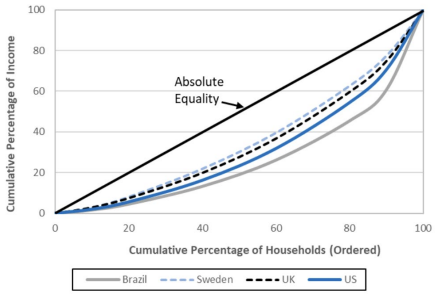

Figure 1. The global market income distribution, 1980. Source: World Bank, World Development Indicators database

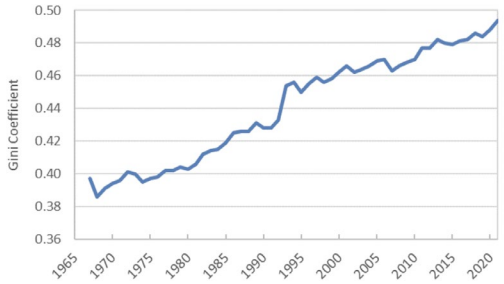

Figure 2. Gini Coefficient in the United States, 1967-2021. Source: U.S. Census Bureau, Historical Income Tables: Income Inequality, Table A-4b.

However, proponents of AI would argue that these economic inequalities far predate the rise of AI, attributing them to factors such as globalization, taxation, minimum wage, and wage stagnation (Harjes, 2007). Given this information, the impact of AI on economic disparity is not one-dimensional and must be addressed with a multi-faceted approach.

Impact of AI on the Composition of the Workforce

The current composition of the workforce has undergone significant changes in recent years, most of which fall into the category of skill requirements.

Table 1 highlights the decline in middle-skill jobs, indicating a 76% decrease. This trend is expected to continue following the disproportionate surge in the adoption of AI and technology by companies. Covid has evidently been a significant contributor to such major implementations of AI in companies, with 55% of companies reporting that they accelerated their AI strategy in 2020 (Poll, 2019). Therefore, the demand for much routine work that falls into middle-skilled jobs is expected to significantly diminish because of AI, creating a change in the labor market composition. It is interesting to note here that low-skill workers will tend to be more

resistant to automation due to a higher requirement for hand-eye coordination, making it harder to automate and eliminate.

Table 1. The change in the composition of the workforce by skill level, 1990-2010. Source: ILOSTAT, 2019

Direction change	*Share of jobs*			*Number of jobs*		
	Low-skill	*Middle-skill*	*High-skill*	*Low-skill*	*Middle-skill*	*High-skill*
Increase	44%	24%	81%	69%	76%	92%
Decrease	56%	76%	19%	31%	24%	8%

Nevertheless, new research suggests that in the coming years, unlike previous instances of increased job polarization due to technological advances, AI is most likely to impact all jobs regardless of skill level, leading to lower levels of polarization compared to the past (Petropoulos et al., 2020).

Furthermore, the composition of the workforce not only takes into account the level of skill of workers but also the types of skills that workers possess. Shifting away from repetitive and technical tasks, the need for soft skills and critical thinking has never been more important. LinkedIn's 2021 Workplace Learning Report found that 57% of talent developers ranked soft skills training as their top priority. This includes emotional intelligence, collaboration, communication, and critical thinking. While AI and machine learning are attempting to replicate these skills, it is clear that organizations recognize the importance of possessing these skills, shaping the overall composition of the workforce.

Impact of AI on the Economic Output as A Whole

According to some estimates, AI is predicted to drive a 14% increase in global GDP by 2023 (PwC, 2017). There are three key considerations when it comes to the impact of AI on a country's economic output:

1. Replacement of existing workforces
2. Increase in labor productivity
3. Creation of new opportunities

When it comes to potential AI applications, generative AI stands out as a prime example, owing its success to its readily available nature. Large language models such as GPT-4 and CoPilot have made implementing AI into the workforce much easier, with both startups and established companies alike leveraging generative AI to maximize their productivity. A study by the National Bureau of Economic Research found that across 5,179 customer support agents, their productivity, as measured by the number of issues resolved per hour, showed a 14% increase with generative AI assistance - with some lower-skilled workers seeing up to a 34% improvement (Brynjolfsson et al., 2023). Ultimately, what can be derived from this study is that AI will have the largest impact in lower-skill fields, which may lead to the complete replacement of some workforces as a whole. With the help of machine learning, tasks ranging from customer support to data analysis are being superseded by virtual workers who can both adapt and learn from experiences. In fact, the automation of labor is postulated to contribute around $9 trillion or 11% to global GDP by 2030 (PwC, 2017).

As AI takes over these activities, two outcomes are anticipated. First, workers are freed up to engage in much higher-value work, such as creative tasks, which drives efficiency and saves costs all around. Second, AI and automation will improve the productivity of existing tasks due to a lower margin of error and longer working hours, not to mention its ability to process large amounts of data at once. Additionally, although AI is certain to have caused job displacement issues globally, it is undoubtedly creating countless new opportunities in various fields such as data science and robotics. Overall, AI is increasing productivity while creating new opportunities for growth and innovation, thereby boosting economic output as a whole.

How Nations Can Prepare for The Micro and Macroeconomic Changes Brought About by AI

In order for countries to effectively prepare for these changes, it is imperative that nations are willing and able to embrace AI and implement comprehensive strategies to do so. Now, more than ever, nations must be alert, as research has shown that new technologies may widen the gap between developed and developing countries (Alonso et al., 2020), creating a vicious cycle.

One major hurdle that countries have to face is the negative externalities that are associated with AI. Perhaps most urgent, however, is the issue of job displacement due to AI integration in ways such as automation, which is particularly prominent in sectors such as manufacturing and customer service. Indeed, the McKinsey Global Institute estimates that up to 800 million individuals could be displaced by automation by 2030 (Manyika et al., 2017). One solution would be to introduce and enforce education policies that increase graduation rates, encouraging higher education. In tandem with these policies, countries should also aim to provide upskilling and reskilling programs to prevent redundancy and equip workers with the ability to thrive in the digital world. Through greater investment in these programs and policies, countries can increase their human capital, which is defined as "the stock of knowledge, skills, and other personal characteristics embodied in people that helps them to be productive" (Botev et al., 2019). The importance of this lies in the strong correlation between human capital and labor productivity, ultimately minimizing structural unemployment and promoting economic growth (Botev et al., 2019). This is visually displayed in Figure 3, where a clear positive correlation was observed between GDP per capita and school life expectancy (where school life expectancy translates into human capital).

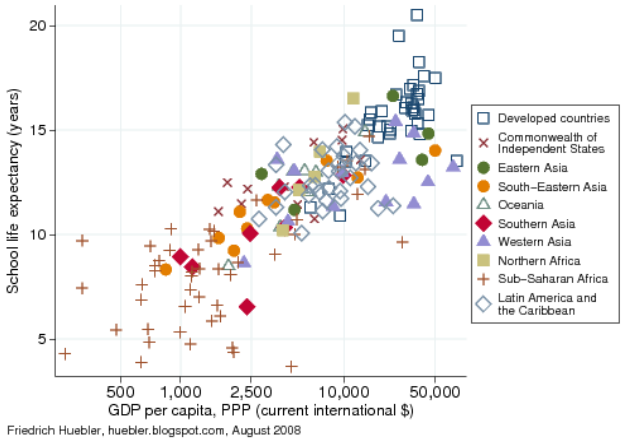

Figure 3. GDP per capita and school life expectancy, 2006. Source: UNESCO Institute for Statistics, World Bank, UN Population Division.

In the final analysis, nations that can internalize the negative externalities and have a meticulous national AI strategy will be those that come ahead of the pack. As mentioned above, embracing AI will also lead to a snowball effect of benefits, where countries can gain a comparative advantage from specialization through AI, indefinitely setting them apart from those driven by unskilled labor. Due to the higher levels of productivity and efficiency, countries, as a result, will reap the benefits of higher trade and globalization, while strengthening global relations. Ultimately, this advances economic growth, increasing the standards of living for the population.

Ethics, Discussion, Limitations

While these research findings are prominent for future researchers to pursue comprehensive research about the implications that AI has on industries, it is notable to consider that as for limitations, other industrial sectors outside of medicine, labor market and education have not been touched upon. For instance, while the advancements of AI on the medical industry, labor market and workforce, sustainability and education have been touched upon in this publication, the particular impact AI has on the industries surrounding automobiles, energy and public services has not been explored. Additionally, when exploring globalization on a large scale, research findings discussed in this paper have focused specifically on low-income nations, such as Latin-America, where the industry is expected to witness a foreseeable growth. Thus, since research findings have only shed light on Latin-America, the impact AI has on other developing nations in Southeast Asia or on developed nations like the United States and Canada have not been properly employed. Another source of limitation is regarding the lack of longitudinal data that was derived from findings collected from this publication. While longitudinal data is considered to be an asset, as changes can be monitored and tracked over time to witness the positive advancements AI has made on industries, some empirical research collected, and discussed in this publication focus on a 2-year or 3-year development in particular industries and areas of growth. Additionally, another ethical limitation is surrounding the need to mitigate certain risks and societal concerns revolving around the usage of AI - as this particular industry has received significant attention over the past course of years, it is necessary to establish appropriate legal frameworks, informed consent and appropriate disclosure in scientific advancements to ensure that proper policies bolster the positive impact AI has on sustainable economic growth for all nations.

Conclusion

In conclusion, researchers have witnessed significant advancements that AI has made on major industries surrounding education, healthcare and medicine sector, sustainability as well as on the labor market. From significant advancements made by corporations and companies that have seen an emerging usage of AI to implement global sustainable development, alongside bridging economic disparities at large for both low-income and developed nations, researchers in the future would be able to deduce more tangible metrics for meeting the requirement that is enacted by policies and global international frameworks. At the same time, there are significant limitations that coincide with this research finding surrounding AI and various industries – such as the limited diversification of results, limitations with the methods employed, as well as the lack of results taken from nations outside of Latin-America.

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