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THE ARTIFICIAL INTELLIGENCE AND ITS GLOBAL ECONOMIC GROWTH IMPACT

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Abstract:

Artificial intelligence (AI) is the skill of any mechanical gadget to mimic human intelligence. AIis created for generating technologies potentially increasing productivity and economic welfare. The main objective of the article is to show the key role that AIare playing in the national economies to global transformations. This paper basically spins around ideas, challenges, and uses of AIand economic growth. However, this paper providessignificant implications for policymakers, especially during an economic transformation. Theevidence showed AI largely influences economy. This study used international organizations' statistics related to the AI-economic growth to collect AI data. The latter has special data sources such as International Federation of Robotics(IFR),McKinsey Global Institute,World Bank, OECD, and PricewaterhouseCoopers (PwC) Global. The economic efficiency of AI for individual industries or enterprises is not questioned. This allows us to conclude that individual positive results did not become universal due to objective circumstances and require further research in this direction.

Keywords: Artificial intelligence; AI market; robotics; economic growth

1. INTRODUCTION

The growth of AI has its roots from three connected trends: numerous databases, computing power accuracy and venture capital rise to new financing, technological and scientific projects (Donepudi et al.,2020). AI was first utilized, as a term, in 1956 by McCarthy; yet, the likelihood that machines could think was described very earlier (Pticek& Dobrinic**,** 2019)**.** AI is a machine-based system, for a specific set of human-knownaims, make estimations, recommendations or decisionsinfluencing real or virtual contexts (OECD,2019).According to the growth principle in neo-classical theory, the technological transformation increasesthe capita per person and the savings and investments increasing the real GDP growth (Caliskan, 2015).Solow stated that the labor force and capital are exogenously the keyforce of economic growth, thus usingCobb-Douglas production function, focusing on the interrelations between innovation, output, and productivity (Solow, 1956).On the contrary, Romer's endogenous growth theory treats technological change as a contributor to the economic growth reliance on population growths operating in the knowledge sectors or R&D and capital accumulations (Romer, 1986).The fast diffusion of digital technologieshas undoubtedly contributed to the increase in productivity, in the United States in 2016 the digital economy value reached up $11000 billion representing 59.2% share in the GDP. In Japan, the 2016 digital economy numbered at$2300 billion and accounted for 45.9% of the country GDP while European economies since 2000 are experiencing a slow growth of digital economy due to a lower capacity to adopt and exploit the digital technologies(Tchamekwen&Xicang,2019).According to a McKinsey's report of 2017, AIincreases the Chinese economic productivity by 0.8 - 1.4 each year. AI and robotics may add up to $ 15 trillion to the global GDP**,** Tchamekwen & Xicang (2019),also found that activities related to robotics increased nearly 0.4% to the GDP of 17 countries. According to Chen, et al. (2016),AI will range from $296.5 billion to $657.7 billion in the GDP of high-income countries in the next ten years. In similar methodologies that focus on venture capital investment, it is estimated thatthe GDP of high-income countries of AI is from $63.1 billion to $115.5 billion in in the next ten years.According to IFR (2020), by 2025, the total global market for robots and AIcould be $248 billion and increase productivity by 30% in specific industrial sectors. Universally, from 2016 to 2019, 8 million robots were solid in the educational and scientific sectors only**.** In addition to PwC (2017),representatives suggest that "AI could contribute up to $15.7 trillion to the global economy in 2030, more than the current output of China and India combined"(Vyshnevskyl et al.,2019).This study outlines the relevant economic patterns in a world withAI with the assistance of an analytical perspective rooted in

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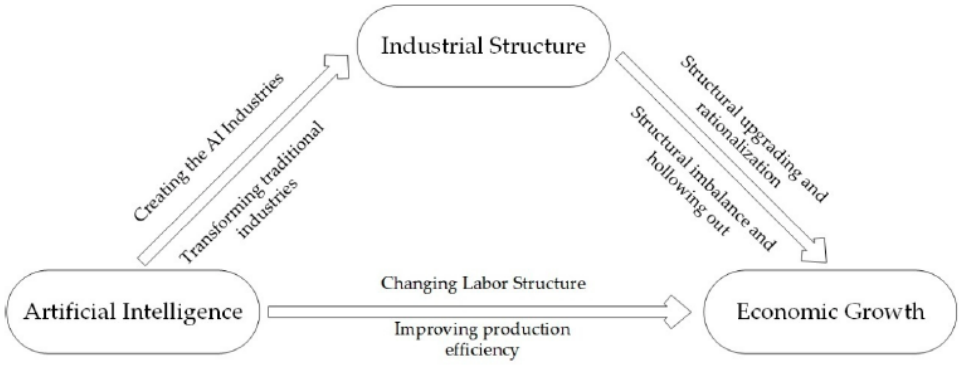
economics.It provides a comprehensive survey of the AIgrowing economic literature with economic influence on markets and society, that focuses on those issues in which AI is likely tobe the most imminent tasksto policymakers.The rest of this work is. Section 2 is the AI technology: A New Economy. Section 3 explain the data and methodology. Section 4 shows the results, and the last section is the conclusion.

2. AI TECHNOLOGY: A NEW ECONOMY

Automation and AI technology is role in the moderneconomicand social development. They are the labor-substituted technologicalprogresses withextra jobs substituted by AI.So, AI. improves the industrial structure rationalization through the improving of adding values of traditional industries, narrowing the technological gap between industries that enhance the resource factor flow (Fan& Liu, 2021).Then, these intelligent manufacturing strategies could decrease the tertiary industry resource inputs as not conducive to upgradethe industrial structure. According to the previous discussion, Figure 1is drawn.

Figure 1: sustainable economic growth through AI applications



Source : Fan& Liu, 2021

After the universal and unanimous recognition of the lack of alternatives to the introduction of Industry 4.0 and the wide possibilities of using AI, one could expect accelerated growth of the global economy. However, if you look at the dynamics of the global economy (Figure 2), then a noticeable steady decline of growth rates. Since the proclamation of the movement towards Industry 4.0 at the Hanover Fair in 2011 year (Vyshnevskyl et al.,2019), the average growth rate of the global economy in 2011-2018 has been 2.84% per year. Even if you look at the average growth rates of the global economy in 2015-2018 when conceptual and theoretical models began to translate into reality more and more, all the same, the average rates will not differ much2.9% per year. This is almost 2 times lower than the average rate of economic growth half a century ago (in 1961-1968 the average growth rate of the global economy was 5.47% (Vyshnevskyl et al.,2019).Thus, the introduction of digital technology has not yet had the same economic effect as the industrialization of the 60s of the last century.

Figure 2. The dynamics of global GDP (growth annual %)

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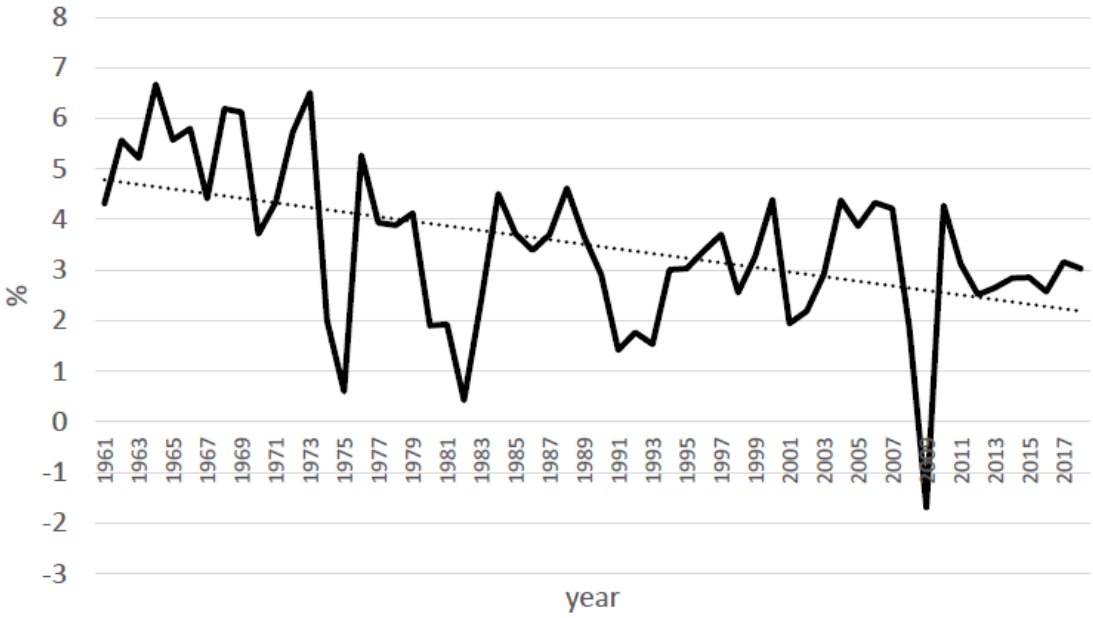

Source :World Bank & OECD ,2019

We can the total observation period (1961-2018) divide into two conditional sub-periods: (i) pre-digital period from 1961 to 1990 and (ii) digital (1991-2018). On 6 August 1991, the World Wide Web started its first, in the world, live (Vyshnevskyl et al.,2019). and this date we can use as delimiter between these two sub-periods.

Computerized approaches for automatic purposes, learning and perception become a popular phenomenon. For example, smartphoneshows how artificial intelligence is used.Also, AI plays aprogressivelycritical role in economy. Itis potential to be the engine of productivity and economic growth.Yet, throughout history, people are concerned that automation such as mechanization, computing, and AI and robotics could cause unemploymentwiththe generation of irreversible destruction to the labor markets(seeTable1). For instance, according to Keynes (1930), technological unemploymentis"unemployment due to our discovery of means of economising the use of labour outrunning the pace at which we can find new uses for labour"(Furman &Seamans, 2019).

Table1. The advantages and disadvantages of AI

Advantages AI	Disadvantages AI
Reduce human errors	High costs
Difficult exploration	No human involvement
Daily applications	Without improving the experience
Digital assistants	Without original creativity
Repetitive tasks	Unemployment
Medical applications	It does not interpret custom data
It works without breaks	It provides only for what is designed

Source :Babeanu et al,2021

Even though AI is appearing in more and more places and more and more people want to experience its benefits, it is gaining in popularity, yet there are still many challenges to be faced today (Seyidzade & Ildiko,2020).In addition to the benefits of AI implementation, Polachowska (2019) has also collected difficulties and problems from a business perspective, and her analysis includes the following (see Figure 3)

Figure 3: The main obstacles holding back further AI adoption

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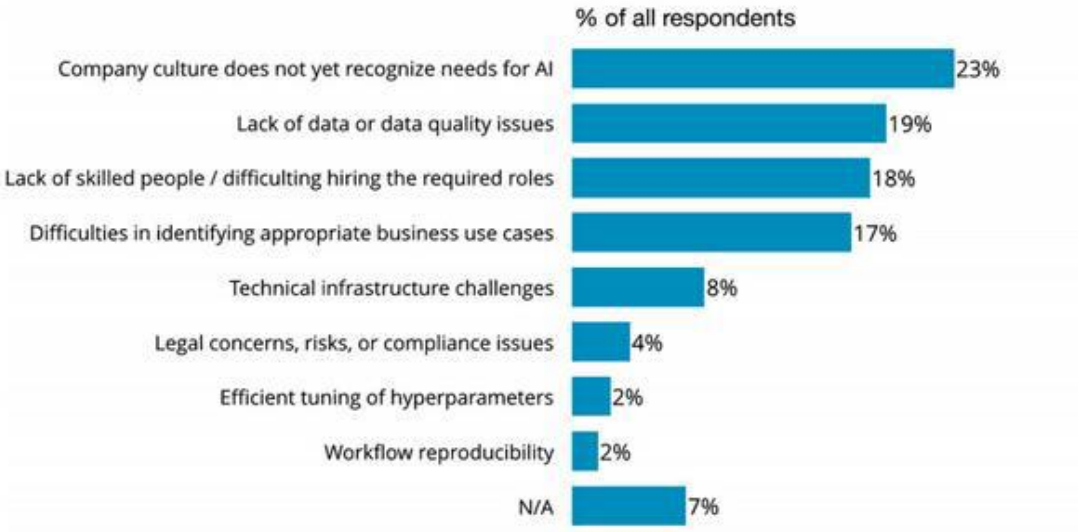

Source: Polachowska, 2019

The above discussion shows only recent development of AI with its subsets in the evolutionary forms. It is since 70 years ago (1950 – 2020) to the current AI status. A big number of scholarscontinuallystressed thesignificance of this technology in the daily lives. After all, there is amulti-faceted influence of the diffusion and adoption of robotics and AIon the economy that affect not only current sectors developing& producing or applying the focal technology (Vermeulen et al.,2017).

3. METHODOLOGY

There areTwo key methods within research: deductive and inductive. Meanwhile, they are contradictory. The latterdeals with moving from the specific to the general, and is usually utilized in interpretivism. It presents the inductive logic as a logic using known theories for finding new conclusions.Hence,this paper used a literary survey to collect data and information from different resources, with the consideration of the published resources, the impact factors of the reviewed articles and the governmental statistical. This workused the international organizations' statistics specific tothe AI-economic performance correlations to collect AI data. The latter data type containedWorld Bank, OECD, IFR and PwC Global.The collected information for answering the research questions help reach the conclusions.

4. RESULT AND DISCUSSION

Rising of robots in economy depends on two issues, the increase in quality and efficiency more than anything else because they are scalable through production lines.

Robots are widely used in big or small factories that are working in a large or small product in 2000 the rate of countries which installed robot's technology were divided in 6 main countries such as Korea, Taiwan, India, Brazil, and Poland (Alonezi & Al-Dhlan,2021).But who get the big share of the total stock from the shown statistical, is China indeed with more than fifth of the world's total stock of robots (see Figure4).

Figure 4. Robot installations by country

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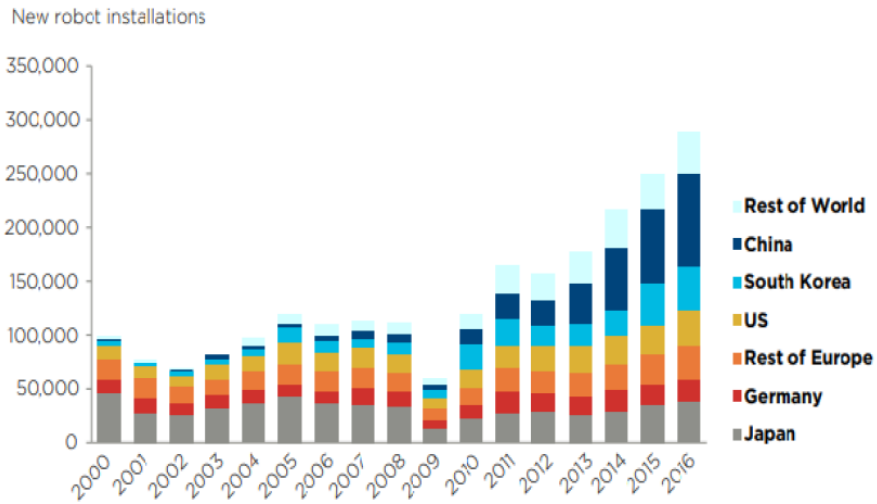
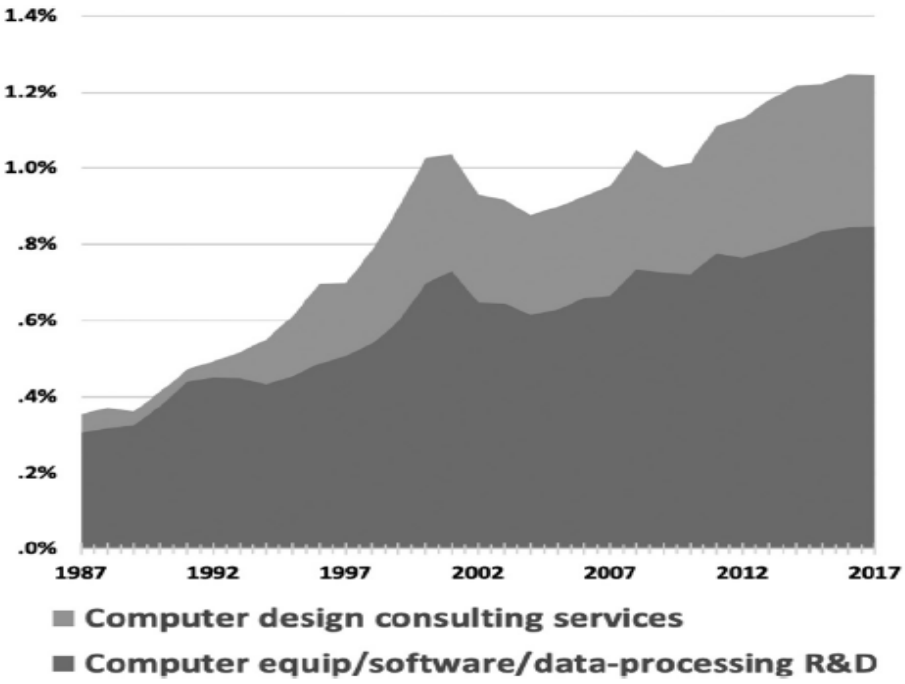


Source : IFR,2018

Figure 5reveals USA AI indicators,suchconsulting services ofcomputer design and computer equipment/software/data-processing R&D. These indicators grow very fast recently. There is no data on consulting services of computer design for Europe. Yet, the industry-level R&D data in Europe is steadyin relation to GDP. In consistence then with EU patterns,ICT investment ratesgrows bigger higher in the USA (Corrado et al.,2021).

Figure 5. Indicators of AI product development in the USA (%GDP)



Source :Corrado et al.,2021

Haseebet al. (2019) highlight the10-year projections of AI market revenues in Asia-Yet, may issues are still inconclusive such as these projections highlight no factors accounting for a stableeconomic growth. In addition, these projections provide noinformation into the challenges facing Asian countries' economies relative to the AI implementations. Finally, they falter because they have no determinant role in the perceived steady growth in Asia-

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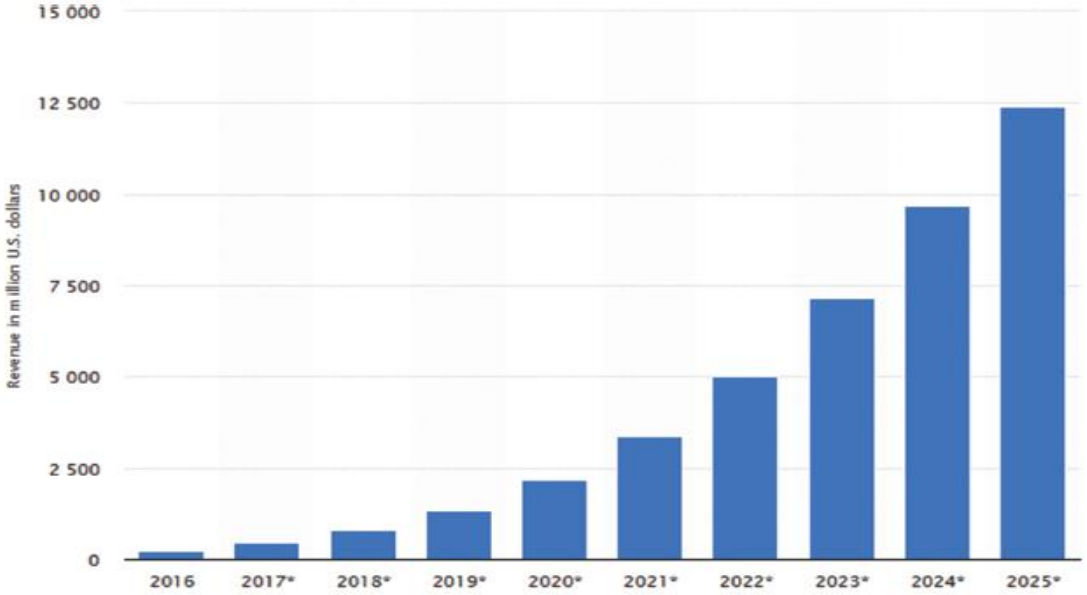
Pacific's AI marketrevenues (if it might hold) possibly exhibits direct or inverse correlations with the economic performance of the influenced countries (see Figure 6).

Figure 6. Indicators of AI market revenues in the Asia-Pacific



Source: Agrawal et al.,2018

PwC Global,(2017) emphasized that the worldwide GDP rises to 14% in 2030 due to the acceleration in the development and take-uping of AI – which is equal toextra $15.7 trillion. The Ai economic influence is determined by: (i) Productivity from the businesses automating process (such as using robots and autonomous vehicles).(ii) Productivity gains from industries enlarging their available labour force with AI technologies (helped and amplified intelligence). (iii) consumer demands from the availability of personalised and/or higher-quality AI-enhanced products and services increased.

In the near-term, the largest potential economic rise from AI possiblycomes from improved productivity (see Figure 7) such as automation of routine tasks, augmenting employees'abilities that free them up for additional focus on the stimulation and higher value-adding works. Capital-intensive sectorsincludingmanufacturing and transport possibly witness the largest productivity gains from AI, asseveral operational processes are very vulnerable to automation (PwC Global,2017).

Figure 7.The value gains from AI

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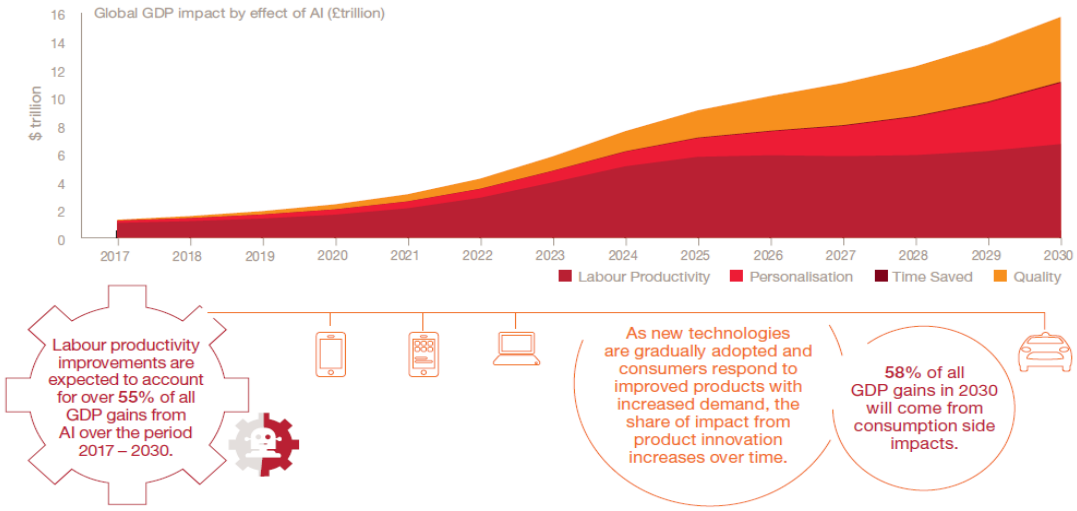

Source : PwC Global, 2017

The productivity influences are competitively transformative – businesses failing to adapt and adopt which may be rapidly finding themselves weaken on turnaround times and costs. So. they drop a big market share. Yet, the initial AI application stagepotential focus on the enhancement of what has already being conducted, thenmaking too much that's new.

According to the Government AIReadiness Index (Table 2), GDP in the countries included in the TOP 10 is growing on average more slowly than the global economy. This is true for 2017 and 2018. Moreover, while the growth of the global economy slowed down from 3.16% to 3.03% over the year, the GDP of the countries from the TOP 10 according to the World Government AIReadiness Index slowed down from 2.41% to 1.93%. And only one country out of 10 showed rates above average (Vyshnevskyl et al.,2019).

Table 2. Number of countries with GDP growth rate more than in the World Government AI Readiness Index

Rank	Country	The Government Artificial Intelligence Readiness Index (2018/2019)	GDP (2017), %	GDP (2018), %
1	Singapore	9,19	1,82	3,14
2	United Kingdom	9,07	2,10	1,40
3	Germany	8,81	2,26	1,43
4	United States of America	8,80	2,22	2,86
5	Finland	8,77	2,16	2,33
6	Sweden	8,67	3,70	2,36
7	Canada	8,67	2,99	1,88
8	France	8,61	2,65	1,72
9	Denmark	8,60	2,26	1,42
10	Japan	8,58	1,93	0,79
	world		3,16	3,03
	Number of countries with GDP growth rate more than		1	1

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	in the World			
	Number of countries with GDP growth rate less than in the World		9	9

Source :Vyshnevskyl et al.,2019

This indicates that the high position of the World Government AI Readiness Index does not provide accelerated growth rates for the national economy.If AI have a fundamental positive impact on the economy, then the countries that are in the TOP-10 ICT development index and Government AIReadiness Index should show higher economic growth rates than the world average. Government AIReadiness Index includes four components: (i) governance, (ii) infrastructure and data, (iii) skills and education, (iv) government and public services (Vyshnevskyl et al.,2019).

5. CONCLUDING REMARKS

This study has shown wider scope for the AI technologyin increasing in different fields. Since AI has moved upward paving the way for several new inventions in different areas. AI could cause a new revolution and competition on AI among the USA, China and Europe. USA leads for now. Yet, China catches up fast and attempts at leading by 2030. EU is not a case ofwinning or losing a race rather it is finding the way to hold the opportunities provided by AI in a way which is human-centred. The AI development made labor force classified into at least twocategories, high-skilled and low-skilled, eachfacingvarious working opportunities and incomes. So, this division possibly increases inequality and intensifies social contradictions. The government is able totax and transfer payment system to solve these issues. For instance, taxing AI equipment or robots for subsidizing the replaced workers or improve their working skills. In addition, the tax could be utilizedfor dealing with the old-age pension shortagesdue to aging.At the same time, the economic efficiency ofAI for individual industries or enterprises is not questioned. This allows us to conclude that individual positive results did not become universal due to objective circumstances and require further research in this direction.If the production technologies, too, are frictionless,when they are self-replicating AI, the most labor friendly sectorsoperateas a black hole, pulling workers into a small set of lower labor friendlysectors and finally absorbing all workers in an infinitely far future.The results show that AI may cause more poverty, rather than wealth to underdeveloped countries. It could also increase inequality among people and deskilling consequence. The findingscould havesignificant effects in terms of management, sociological factors, and economy by highlighting the aspectsdeserving most of the attention in relation to AI and socioeconomic structures**.**

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