International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

Transforming Data Capital into Economic Value: The Role of Artificial Intelligence in near Future

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Abstract: ***This research capitalizes on the impacts of Artificial Intelligence, as combination of machine learning, algorithms and data, starting from national economies to global. It is introduced the current situation and gaps based on recently done researches and studies. As pointed, the world economy is transforming where Artificial Intelligence is applicable across the economy. Artificial Intelligence is becoming one of the important factors of economic development. Soon the developed countries will be considered those who are the most dynamic data hubs in the world. In the modern era of globalization, the digital data is becoming the new commodity and on the other hand can be considered the important factor for economy development. So more data gives better products, better business services and indeed it gives more economic value. Therefore, the important role of data in economy led to data usefulness. Data is what makes Artificial Intelligence go. It is pointed out that Artificial Intelligence is strategic for future economic growth and welfare of society.***

Keywords: Data capital, high technology, quantum economics, Artificial Intelligence, innovation management

1. Introduction

Digital life has become an important part of people's everyday life. Data can be considered as a new economic resource for creating value. In virtual life collecting, storing, analyzing and transforming data add a value in Artificial Inteligence, blockchain, IoT, cloud computing and all other Internet-based services that are transforming data into an economic capital. As stated in the Digital Economy Report 2019, digital data is created from the digital footprints of personal, social and business activities from different digital platforms. The statistics show that Global Internet Protocol (IP) traffic, a proxy for data flows, grew from about 100 gigabytes (GB) per day in 1992 to more than 45,000 GB per second in 2017 and by 2022 global IP traffic is projected to reach 150,700 GB per second, fuelled by more and more people coming online for the first time [1].

In 2017, *The Economist* published an article which title was "The world's most valuable resource is no longer oil, but data" [2]. Since that the saying "Data is the new oil" has become topic of many researches. So if personal data is the oil of the 21st century and we are the source of data then why that profit should not belong to me or my country? In the past, economies were built on the raw materials but nowadays the most important is becoming creating value from the data. Therefore, Artificial intelligence (AI) is playing a significant role in evolution of the technology landscape.

2. Objective

The main objective of the article is to show the key role that digital data, Artificial Intelligence are playing in the national economies to global transformations.

3. Literature Survey

Data is a digital footprint that consists of lot of things like words, numbers, images, clicks and every online step done in platforms. Worth to mention that each platform collect as much data as possible about user. In case it can be digitally stored then later it can be fed into a machine-learning algorithm. In machine learning the computer get data and answers related to data and based to that it creates rules. Machine-learning algorithms are responsible for artificial intelligence developments. Artificial intelligence (AI) is playing a significant role in evolution of the technology landscape. The boundaries of AI are really confusing but the main idea is to develop something similar to human intelligence or even to duplicate intelligence. Some experts and scientists believe that having massive amounts of data and using machine learning, deep learning we will do it, nevertheless everyone agree that some pieces are missing. AI can be defined as machines that can learn, act and reason. They can make their own decisions about new situations, similar like humans and animals can [3]. A research from MIT Technology Review states there are 3 main trends: a shift toward machine learning during the late 1990s and early 2000s, a rise of neural networks beginning in the 2010s, and development of reinforcement learning in the past few years[4]. But where will be AI in next decades?

David Orell announced *that Economics is quantum* (published by Aeon, 2018) and he mentioned that money and brains are both quantum phenomena [5]. Money' quantum phenomenon is more obvious when we talk about virtual money and on the other hand in his work the author defined New Economics as "the study of transactions that involve money". So In this sense we should ask also what makes money valuable? Later in his works published in "Economic Thought" journal, D. Orell indicates the complexity approach of quantum economics where the prices are measuring from financial transactions and models, assumptions are fundamentally different from neoclassical economics [6]. As a result, David Orrell argues current economic models.

Therefore, the importance of data in economy led to data usefulness. According to Varian (2018) the data is nonrival and access of data is more important than ownership [7]. Nevertheless, markets for data are limited. But when

companies own data, they can overuse it. Agrawal, Gans and Goldfarb (2018) discuss the economics of machine learning and think that more data have increasing return for economic value [8]. So more data gives better products, better business services and indeed it gives more economic value. Here comes one of the most important questions - whether the quantity of data that a company or even country has owned can become an essential productivity advantage? Mainly till now the impact of AI on economy is researched by two factors: potential impact on jobs and effect on productivity.

4. Main Material

Technology plays a significant role in development of any countries' economy. The evolution of the technology landscape can be described as follows [9]:

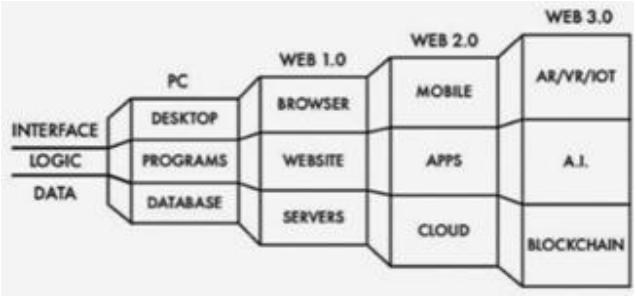

Diagram 1: The evaluation of WEB

Indeed quantum revolution in society and economics will foster a new wave of innovation. Quantum computers are coming with faster processing speeds, and solving complex problems that for traditional computers could take long time. Quantum computers manipulate qubits and simultaneously can be both: a one and a zero. Nevertheless, the quantum powered technology infrastructure can help mitigating many problems and the most important quantum computers can develop self-learning artificial intelligence (AI). But in this case with quantum computing arise the data protection problem. The security of the public-key encryption algorithms will be reduced to zero if attackers have the access to large quantum computers.

Nowdays the combination of Data + Platform is essential for a competitive scenario. From this perspective, the significance of data will keep on growing. There can be mentioned 8 types of online platforms:

- E-commerce Online Platform
- Online Resource Sharing Platform
- E-financial Service Online Platform
- Online Social Network Service Platform
- Online Auction or Matching Platform
- Online Competitive Crowdsourcing Platform
- Online Noncompetitive Crowdsourcing Platform
- Online Search Platform [10].

In each type of platforms companies monetize. According to Nick Srnicek, the platforms are intermediaries between different groups and infrastructures for interaction and development which are defined as natural monopolies, for example Google, Amazon and Facebook. In this viewpoint AI can change any business with defining losers and winners. Author adds that AI isn't limited to any particular sector of the economy, but it is applicable across the economy [11].

AI is considered a general purpose technology (GPT). AI which is the combination of machine learning, algorithms and data is developing very fast and changing our lives. Digital is becoming part of our everyday life. In the past economies were built on the raw materials but nowadays the most important is becoming creating value from the data. There are many countries that recognize the importance of AI as application of data economy which is strategic for future economic growth and welfare of society. For example the WHITE PAPER AI EUROPEAN COMMISSION indicates pilot scheme of 100 million euro in Q1 2020 to provide financing for innovative developments of AI. The InvestEU aims to give additional 650 billion Euros. It is mentioned that the Commission has proposed more than €4 billion to support quantum computing and edge computing [12]. AI is expensive but the development of economy is starting to build on creating value from data. EC is also developing programs to guide the development of artificial intelligence. It is worth noting that EC proposed a Digital Europe Programme with a budget of EUR 9.2 billon for the period of 2021-2027 focusing on supercomputing, artificial intelligence, cybersecurity, advanced digital skills and ensure use across economy and society [13]. Artificial Intelligence is becoming one of the important factors of economic development. Soon the developed countries will be considered those who are the most dynamic data hubs in the world. One of the most interesting cases is China. China is already a leader in digital economy. It has 42% of the global share of e-commerce and 11 times more mobile payments than the USA. China is going to become the world leader in AI by 2030. Nevertheless, there is a strong competition among on AI among the USA, China and Europe.

It is obvious that AI labor demand is growing. Interesting example is India related to AI skills. It is expected that India will add more than 10 million new professionals to the labor force every year over the next decade [14].

Nevertheless, the data has opened new door for big business such as opportunity to analyze behavior and probability of new insights related the new needs of product. In his article Kai Fu Lee (2018) mentions that "China has more data than the US — way more. Data is what makes AI go. A very good scientist with a ton of data will beat a super scientist with a modest amount of data"[15]. He summarizes that AI is an industry and it's the cycle in motion: where the more data you have, the better your product and the better your product then the more data you can collect and the more talent you can attract. In such case if you can attract more talent then the better is the product [16]. Does we can conclude that AI companies can control the commanding heights the global economy?

Data is crucial for AI. It can be transferred virtually zero cost all over the world [17]. The key economic characteristics of digital data include the scale, scope and non-rivalry points. Therefore, the information and data is concentrated and belongs to few actors and on the other hand there is a massive open source of data from which

many can benefit. Necessary to mention AI requires big data for training algorithms. As not every company has such kind of resources and appropriate expertise, it can be rented from big companies. In this field mandatory legal requirements are necessary on developers and users of AI for the next decade and valuation of data will play a central in this future landscape. Data policy and privacy concerns are receiving great attention and respecting consumer privacy is a key in this framework. Having open data we should develop policy on how to secure data and control over it as the digital transformation of society has already begun. As data is new oil then the pipelines of it is controlled by online platform companies. In the future, blockchain technology can allow each consumer to have an own pipeline for taking control of their ownership, and to decide whether and how to sell personal data to companies interested in data collection [10]. Understanding the value of their personal data in fact will help for securing data. On the other hand single data does not have a value, but indeed a collection of data has a network effect. Nevertheless, a person's location history, preferences, medical records, and driving data and any other information can be used by any number of firms simultaneously. According to "Facebook's global economic impact" report done by Deloitte it is indicated that Facebook connects more than 1.35bn people and creates significant economic impact by three effects: such as a tool for the marketers, such as a platform for app development and also as a channel for connectivity. The study shows that Facebook enabled $227bn of economic impact and 4.5m jobs in 2014 [18]. Need to mention also that according to Deloitte the largest share of impact and jobs occurred in the United States, where it shows $100 billion in economic impact and 1,076,000 jobs.

Recently Stanford Researchers Publish AI Index 2019 Report which clearly shows the impact of AI on everything: starting from national economies to global. The AI Index Report include nine chapters: R&D, Conferences, Technical Performance, Economy, Education, Autonomous Systems, Public Perception, Societal Consideration and National Strategies & Global AI Vibrancy [19]. The Economy chapter includes jobs, investment and business activity data. Overall important to mention few facts:

- The fastest growing countries in AI hiring are Singapore, Brazil, Australia, Canada and India from 2015 to 2019,
- US, Europe, and China take the lion's share of global AI private investment, while Israel, Singapore, and Iceland invest substantially in per capita terms.
- 2018-2019 Autonomous Vehicles (AVs) received the lion's share of global investment over the last year with $7.7B (9.9% of the total), followed by Drug, Cancer and Therapy ($4.7B, more than 6.1%), Facial Recognition ($4.7B, 6.0%), Video Content ($3.6B, 4.5%), and Fraud Detection and Finance ($3.1B, 3.9%).
- Globally, 4,403 AI-related companies were identified. From 36 different sectors, top areas are Data Tools (5.5% of all companies); Fashion and Retail Tech (4.7%); Industrial Automation, Oil & Gas (4.3%); Financial Tech (4.2%); and Text Analytics (4.2%) for period of July 2018-July 2019
- In 2019, global private AI investment was over $70 billion,
- AI is the most popular area for Ph.D. computer science candidates,
- China publishes as many AI journal and conference papers per year as Europe, but on the other hand United States produces the most-cited AI research. Worth to mention that China had the highest volume of AI papers, followed by the US, India, UK, and Germany
- Peer-reviewed AI research grew by 300% from 1998 to 2018,
- 60 % of global AI patent is from North America.

According to PwC's Global Artificial Intelligence Study, 45% of the total economic gains by 2030 will come from product enhancements, stimulating consumer demand. It shows that in 2030 the leader will be China - 26% boost in GDP and then comes North America - 14.5% boost and this will account for almost 70% of the global economic impact [20]. So AI development is largely a "fight" between the US and China. Nevertheless, AI development is emerging into many countries national strategies priorities list as it is considered key driving force for innovation across many sectors.

5. Conclusion

Nowadays economy is very sensitive to non – economic factors and we see how non-economic factors can collapse whole economy of country in a short period of time. The role of data and information is playing one of the key roles in this case. Future can not be written or predicted but digital data will have a great impact on future transformations of our economy and society. Artificial intelligence (AI), as combination of machine learning, algorithms and data, can transform productivity and GDP potential of the global economy. The role of bringing know-how and new technology will allow the country to enter global markets and increase their competitiveness potential.

Nowadays, it is very important also to solve the privacy problem in the context of finding the right balance between information sharing and information hiding. In this field mandatory legal requirements are necessary on developers and users of AI for the next decade and valuation of data will play a central in this future landscape. Data policy and privacy concerns are receiving great attention and respecting consumer privacy is a key in this framework. Having open data we should develop policy on how to secure data and control over it as the digital transformation of society has already begun. Now economy should be build on creating value from digital data. In near future AI will play key role in commanding heights the global economy.

6. Acknowledgments

I thank European University, Armenia (EUA) and special thanks to my supervisors Dr. Kirakosyan and Dr. Vahanyan for their valuable support.

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