The Role of Artificial Intelligence and Ict on Economic Growth of G7 Countries

Tekin Birinci

*Abstract***:** *One of the most concern in artificial intelligence is the fundamental meaning of intelligence. The issue is especially critical when we need to consider artificial systems, which are meaningfully different to humans. On one hand, one of the most arising question is that, in the long-term, what would be the economic significances and consequence of continuous development in developing artificial intelligence in the field of ICT. On the other hand,* **In G7 countries, ICT capital facilities has key contribution on economic growth.** *This chapter tried to make a link between artificial intelligence in ICT and economic growth stressing features of the production, innovation and human labor.*

*Index Terms***:** *Artificial intelligence, economic growth, G7 countries, ICT.*

I. INTRODUCTION

The concept of 'intelligence' that one might use it in daily lives give the impression to have an impartially tangible but possibly naive, however, intelligence comprises a puzzling assortment of concepts, many of which are equally hard to express [8]. Psychologically, one might first become fascinated dealing with these definitions, which is based on the nature of the mind, while when we considering artificial intelligence we need to consider artificial systems, which are expressively different to humans.

Artificial intelligence can be defined as the ability of a specific kind of machines to duplicate 'intelligent human behavior' or a representative's capability to achieve objectives in a wide range of environments, which instantaneously recall fundamental economic concerns [3]. As an instance of these economic concerns, we can point out to the transformation the process by which human can generate novel ideas and technologies, contributing to address complex phenomena and scaling creative endeavor. In order to tackle this complexity, we need to come up with the answer of these questions: To what extent, intensifications of automation in producing properties and services, would impact economic growth? Under what situation, artificial intelligence can contribute to the growth rates and capital share in 20 decade? Whether or not artificial intelligence can support in production of creative and novel idea? Under what complex configurations and at which firm-level artificial intelligence would modulated economic growth?

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II. ARTIFICIAL INTELLIGENCE AND ICT

The role on artificial intelligence would be more complex in 21th century when it comes to consider information communication technology (ICT) services and ever-increasing amount of tasks that use to be performed by human labor and now will be to be automated. There are numerous research in the literature that suggest article of growth with automation can produce a rich portrayal of the growth process, comprising significances and consequences for future growth and 'income distribution'.

After 'industrial revolution' transistors and semiconductors, artificial intelligence continued trend of automate many production processes. It would be an expected progression from computer-controlled automobile engine. Many practitioners have suggested that artificial intelligence opens the door to something more thrilling — a "technological singularity" in which growth rates will explodes [3].

III. SUBSTITUTION OF HUMAN AND MACHINE

One of the most arising question is that, in the long-term, what would be the economic significances and consequence of continuous development in developing artificial intelligence in the field of ICT. Today, artificial intelligence and automation are enduring interdisciplinary fields in which unequivocal goals are to advance principles of enterprise to ultimately empower machines to undertake all human intellectual and physical jobs [5].

Along with these concerns, recent investigations discovered high levels of anxiety about automation and other technological trends, underlining the widespread apprehensions about their effects on human [1]. There are few economists, [7], [9].who have forecast that artificial intelligence will eventually substitute for greatest number of human labor. General worries of automation do not seem like to have stopped, and many robotics and artificial intelligence researchers have made reliable forecasts that just as communicational technology and computers, are now complement human labor, will sooner or later be intelligent enough to be replaced with human.

These concerns and solicitude notwithstanding, outlying us from a satisfactory understanding of how automation in general and in particular in ICT, influence the 'labor market 'and 'productivity'. In the competitive near future, machines appears to have generally supplemented and complemented 'human labor'. Henceforth, new

machine technology, specifically in the field of communication technology has appeared to increase. In line with this fact, the demand for skilled labor expected to increase, which would be a sign for economy development and growth.

According to the sophisticated model of automation is presented by Zeira (1998), automation has been going on at least since the industrial revolution predictions that growth rates and capital shares should be increasing with the automation development [13]. In contrast, Kaldor (1961) formalized evidences that 'growth rates' and 'capital shares' are comparatively steady over time [6]. Precisely, this stability is an accountable classification of the G7 economies for the majority of the 21th century. In order to deal with this contradiction, research could take two different sides: first side, determining how to automate a current task; Second, determining new tasks, which could contribute in production [2].

In order to come up with good economic model we need to know the wage, population, and economic growth consequences of machine intelligences in the field of ICT. Hence, in order to address the complexity of artificial intelligence role on economic growth, we need to emphasis on the major inputs provided by machine intelligences and to what extent the quantities and amounts to 'modern economic production' change over time. Explicitly, it needs to reflect human labor, human capital, which could be range from education, training and improvements of factories [5].

To allow machines to both replace with human labor as well as complement them, it needs to contemplate a variety of jobs or roles in each economy, jobs that either humans or machines can accomplish. Each task powerfully complements all the others, in the aspect that having one task completed well increases the significance of having the other task accomplished. Accordingly, when machines (computers) take care of one task and humans take care of others, machines powerfully supplement and complement humans. In order to satisfying a particular role, still, a computer can straight replace with a human. In the situation that, the comparative advantage of humans over processers (computers) differs from task to task, and computer becomes cheaper quicker than similar human does in the same case, then computers as representative of artificial intelligence gradually take over more and more task and jobs.

Generally, this substitution and complementation would be more practical at ICT level, which the computers are able to do more total production from the similar inputs, as well as produced more cheaply from other inputs in comparison with human [5]. As a result, the development of artificial intelligence, specifically in information and communication has caused general concern. Relatively, the usage of computers become more widely as they gradually get improved and developed, so they can undertake the same tasks that human can do, but more cheaper.

Growth implications are much more demonstrative with 'endogenous growth'. For example, in a situation when computers are very expensive, the role of human labor would be significant then, as human labor wages increase as the economy grows. In previously mentioned situation, computers are generally unrelated to growth, which is mostly specified by developing ICT enlarged by growths in conventional forms of capital. In contrast, in the situation when computers take care of tasks, human labor is relatively become insignificant, it means that rise or fall in human wage would be determined by the value that proprietor of capital, place on facilities that only can be provide by human.

If human can do the role, the wages can increase with the economy over again, but if human cannot do it, and then human wages decrease faster than the price of computer and we could expect faster economic growth. Faster growth is due to the fact that artificial intelligence and the usage of computer are more significant in these days, and ICT technology advances more rapidly than the progress of general technology. The population of 'machine intelligences' rises so rapidly and this increase is more than decrease in computers' price and the rate of economic growth.

IV. G7 COUNTIES, ICT AND ARTIFICIAL INTELLIGENCE

Canada, France, Germany, Italy, Japan, United Kingdom, United States Also known as the 'Group of Seven', these countries are the seven largest economies in the world. Together, they represent more than 62 per cent of the global net wealth ($280trillion) [4]. ICT has predominant role in explanation of sustainable growth. Therefore, the term "new economy" refers to the affiliation of 'inflation-free growth' with globalization and computerization [10]. In G7 countries, ICT capital facilities has key contribution on economic growth, while there is not enough evidence that other capital facilities rather than ICT have different situation [12]. Over the past decades, technological development contributed to a rapid development in the price based efficiency of 'ICT capital goods'.

Accordingly, the user cost of 'ICT capital goods' decreased related to other sorts of resources. Consequently, there has been noteworthy replacement of 'ICT capital' for other kinds of capital and labor contributions. In the position of 'capital goods' and supplier of 'capital services', ICTs have progressively played significant role to production and therefore to labor productivity growth.

In consideration of developed counties (i.e., G7 countries) a first assumption is that, artificial intelligence technologies would help leading edge technologies to convert automated. Therefore, machines would discover in no time how to copy leading edge technologies. At that time, a key source of discrepancy might become credit restrictions, in which, developing countries or less developed economies might be prevented from machines while developed economies could manage to pay for such machines. Therefore, world might be experienced an increasing degree of divergence, to the extent that, advanced economies invest all their resesarch endeavor on producing new leading edge technologies whereas poorer economies would dedicate a constructive and growing portion of their research force on acquiring knowledge of new leading edge technologies as they cannot afford the cost of artificial intelligence equipment.

On the other hand, a second assumption is that, the effect of artificial intelligence on the possibility and quickness of imitation, potential

innovative human may get unwilling to patent their inventions, due the fact that they might be afraid of the discovery of novel knowledge would lead to direct imitation. Instead of patenting, trade confidences may then become the standard. Instead, innovations would become like what are today's financial innovations, like knowledge creation with enormous network effects and very little patenting scope. Eventually, with artificial ability 'super-machines' in developed economies would be the learners, and then research labor would put their almost efforts on product innovation to increase product diversification in terms of product line or new products.

Overall, assumption might end up being more tangible, if only because of the originality effect of artificial intelligence on recombinant assumption-based growth.

V. CONCLUSION

As a conclusion, this chapter tried to make a link between artificial intelligence in ICT and economic growth stressing features of the production, innovation and human labor. However, the development of artificial intelligence and its macroeconomic impact will rely on the potentially performance and behavior of firms.

Current literature on competition and 'innovation-led growth' reflects two neutralizing effects: from one perspective, more powerful innovation production market and imitating competition persuade organizations and firms at the 'leading edge technologies' defector competition by innovation; contrariwise, more strong competition tends to discourage producers against the current 'leading edge technologies' to revolutionize and thereby catch up with leading edge technology firms. Therefore, based on the degree of competition in the economy, and while firms escape the competition, it causes low preliminary levels of competition and in more advanced economies, the despondency effect may cause higher levels of competition or in less advanced economies [3].

As an another effect of artificial intelligence, the ICT revolution may affect innovation and economic growth by affecting the development of ideology or networks in the product market competition.

A main objective of innovators and producers is to optimize the efficiency of participants to the stand on both sides of the corresponding two-sided markets. As an instance, data access may have considered as an entry blockade for the firms producing new competing networks in communication industry, while it did not avoid 'Facebook' from developing a new network after 'Google'. "Outstandingly, networks can benefit from their domination positions to enforce large fees on market contributors, which may discourage innovation by these contributors, whether they are firms or self-employed people who plays a role in job market" [11]. By reviewing the literature, the sophistication between different job roles from the possibility of replacing machines for humans, specifically for in particular ICT tasks, we can take the positive side that human wages and machines rises which complement human labor with regular predictions of definitive machine replacement and resulting falling human wages.

In some developing economic situation, wages can increase a great deal for a long time before ultimately falling radically.

Accordingly, use of artificial intelligence could increase economic growth rates by an order of great value or more. However, we need to consider the economic effects of machines from different point of view. As an instance, we need to assume that rates of technological progress would change and not steady when the economy grows more rapidly, excluding for one present of bigger change from an 'endogenous growth model'. We also need to consider the probability of creating new kinds of tasks and jobs.

According to numerous research, computer and specifically ICT technology advances more rapid than general technology and the number of labor who work with machine intelligences grow as fast as anticipated to meet 'labor demand', we can expect increased in growth rates. The conclusion and findings in this review suggest that, if artificial intelligences and ICT are a real concern in the anticipatable future, their economic implications would deserve deeper scrutiny.

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AUTHORS PROFILE

I was studied Creative Industries which is like the business of media from Greenwich University between the years 2005-2009. After that he made my master as studied Tourism management until 2014. From that date, I am making PHD on the subject of Business Administration. My first publication is about the business mobility in New Era: New Generation 4G Technologies in organization. From 2009, I have been working as a committee member for Birinci Group of Companies as running different companies in the sector.