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THE CONCEPT OF THE EXPONENTIAL ECONOMY: THEORETICAL ISSUES AND EMPIRICAL FINDINGS³

Abstract: The availability and quality of new technologies is multiplying every year, which means that they are changing very quickly from the interesting ideas to practical products or services. Primarily, the technology-intensive sectors characterized by exponential technological growth are more responsible for an increasing share of productivity and overall economic growth. The aim of this paper is to clarify the theoretical approach of the Exponential Economy supporting the sustainable development of the global economy. Moreover, empirical findings confirm that this is principally the case for the digital economy, the industry 4.0 concept, as well as the increasingly important position of the space sector. These mentioned areas of the economy will definitely play a major role in the implementation of effective and inclusive digital transformation.

Keywords: Exponential Economy, Technological Progress, Sustainable Development

JEL: F63, O11, O33

Theoretical Definition of the Exponential Economy

The concept that innovation leads to Creative Destruction was for the first time developed by economist J. A. Schumpeter, in his work called *Capitalism, Socialism and Democracy* (1943). This process of Creative Destruction is the essential fact about capitalism, which is a

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form or method of economic change and never can be stationary. The forces of Creative Destruction described by Schumpeter play a critical role in any given industry by constantly replacing the established practices and technologies by a new generation of innovations[15]. This dynamic approach needs to be applied to the understanding exponential technological development.

Moore's Law is another important aspect of the Exponential Economy (see Figure 1). Moore's Law observes that the processing power of computers doubles approximately every two years, and has retained striking accuracy over the past five decades [8]. Since it was first observed by Intel Corporation co-founder Gordon Moore in 1965, Moore's Law has been something of an enigma to the semiconductor industry. This rapid scaling of information technology is the foundation of the digital economy, the Internet, and a revolution in distributed knowledge sweeping the globe.

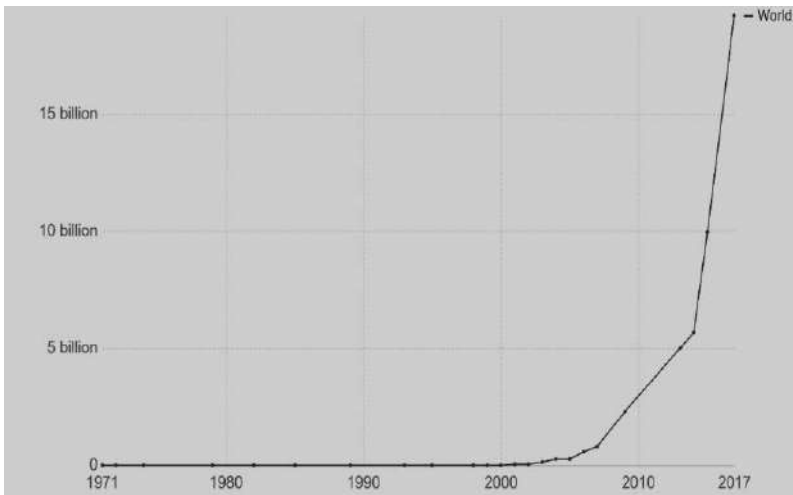


Figure 1. Moore's Law: The number of transistors on integrated circuit chips

Source: K. Rupp a S. Selberherr, 2010 [14].

The concept of Exponential Economy is in line with the theory of new economy and the theory of sustainable development. The new economy is based on labour productivity, the growth of which is achieved by using modern information technologies. Labour productivity growth and the growth of the competitiveness of the eco-

nomy and its production will be reflected in the growth of the whole economy. The main forms of capital are information and knowledge. On the other hand, the theory of sustainable development is characterized by an understanding of the global economy as a whole with generally accepted order. Sustainable development can be defined as development that meets the needs of the present without compromising the ability of future generations. The 2030 Agenda for Sustainable Development, the latest initiative of the international community, is a commitment to eradicate poverty and achieve sustainable development by 2030 world-wide, ensuring that no one is left behind.

Empirical Findings

There are both the theoretical and empirical supports for the view that the exponential economy plays a significant role in determining economic growth in the long-term analysis. As explained above, **the sustainable development of the country can be achieved through the existence of the exponential economy**, which is basically proved by empirical findings. Additionally, the technology-intensive sectors characterized by exponential technological growth are more responsible for an increasing share of productivity and overall economic growth. Our empirical findings confirm, that this is particularly the case for the digital economy, as well as an increase in total consumption as a result of global population growth. These areas of the economy play a key role in the implementation of effective and inclusive digital transformation.

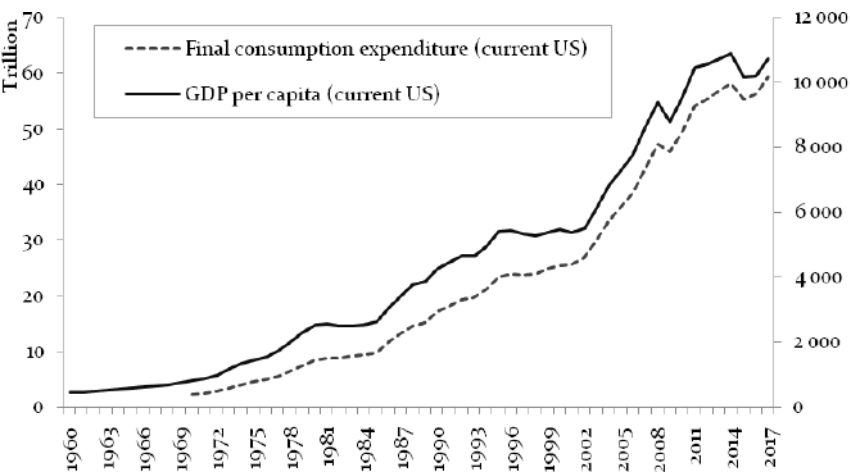


Figure 2. World GDP per capita and Final Consumption Expenditure, 1960–2017

Source: Own elaboration based on World Bank [18].

Figure 2 captures the relation between the world GDP per capita and the final consumption expenditure, from 1960 to 2017. In general, we can observe that the world GDP per capita has multiplied several times in the reporting period. **The global economic growth is increasing exponentially** due to the growth in total final consumption expenditure as a result of the world population growth. Moreover, according to the World Bank 's latest report, the world economy could more than double in size by 2050, far outstripping population growth, due to continued technology-driven productivity improvements [18].

Significant progress occurred in the period of the so-called new economy associated with the modern information and communication technologies, especially the invention of the Internet. It must be noticed that there has been a digital transformation. The term **digital transformation describes the gradual transition of existing economic and social systems into the digital age**. In addition, it is the process of using digital technologies to create new or modify existing business processes, culture, and customer experiences to meet changing business and market requirements [9]. Digital transformation can only be fully realised if high quality access to communication networks and services is made available at affordable prices for everybody.

The Internet is defined as the worldwide interconnection of individual networks operated by government, industry, academia, and private parties. Figure 3 shows the annual data on the internet users in the world, from 1993 to 2016. As it can be seen, **the number of people using the internet is growing exponentially**. According to the recent data, published in March 2019, the Internet is used by more than 4.38 billion users, representing 56.8 % of the world's population [6]. It should be stressed that the Internet is changing all the time. Two things have marked its evolution recently: the social web and mobile technology.

In conclusion, we have found some empirical evidence that the current digital transformation significantly modifies existing economic and social systems. Because of that, it is necessary to focus on technology-intensive sectors characterized by exponential technological growth, which are responsible for an increasing share of productivity and overall economic growth. This new development perspective is in accordance with the concept of the Exponential Economy.

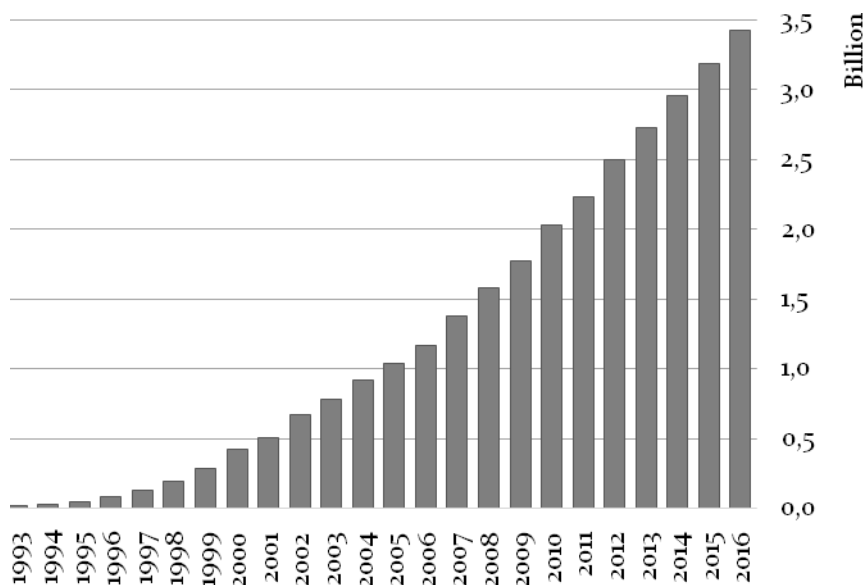


Figure 3. Internet Users in the World, 1993–2016

Source: <https://www.internetworldstats.com>[6].

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ЦИФРОВІЗАЦІЯ ДОГОВІРНОГО РЕГУЛЮВАННЯ СОЦІАЛЬНО-ТРУДОВИХ ВІДНОСИН

При постійному розвитку та просуванні цифрових технологій використання паперових документів поступово зменшується у всіх сферах життя. Ця тенденція неминуче позначилася на секторі зайнятості, цифрові технології вимагають нових підходів до організації та оформлення трудових договорів різних форм. Осо-