

How to Measure the Digital Economy in 5G Technologies and Digital Silk Road Era

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Abstract:- The current transformation of the society under the influence of digital technologies has no historical analogue in terms of its spread and the pace of development. The future will heavily depend on digital technologies. The role of the digital economy and 5G technologies is increasing day by day and for Georgia, - as a developing country, it is important not to fall behind the world trends. Measuring the digital economy and calculating its mathematical algorithm (gross virtual product) is important for the modern world, since, based on the world development trends, the digital economy plays an imperative role directly in the development of the economy. A non-existent, highly unusual and universal economic governance is being established - a corporate "digital dictatorship", with its benefits and risks, which will radically change human thinking, mentality, consumer behavior and economic activity. A new paradigm of employment is developing - Gigeconomy. A new model of economic relations is established - platform economy and many others.

Keywords:- 5G Technologies; Digital Silk Road; GVP Index, GVP, Index Divisor.

I. INTRODUCTION

Relevance and significance of the research. The existence of the single digital market of the Silk Road is the free movement of digital goods, services and capital, the growth of economic activities, which is the basis for the creation of new startups and laboratories. It will provide additional jobs and promote the introduction of innovative technologies. This road comes from Europe to Georgia, passes through Azerbaijan, continues under the Caspian Sea and joins the infrastructure in Kazakhstan, thus connecting Shanghai and Frankfurt, and Georgia itself is a part of this most important project. The amount of information in technologies is 140 zeta bytes. Information is the oil of the future. Data extraction is a project on the same level as oil pipelines were at one point.

The Digital Silk Road significantly reduces the chances of a new global economic crisis and at the same time, offers many young people stable jobs. The growth rate of small business is 3 times higher if the company is led by digital 5G technologies.

How and when will 5G affect the global economy? According to industry researchers, 5G will have its full economic impact worldwide by 2035. Among them, 13.2 trillion dollars will be directed to global economic products, 22.3 million dollars to the creation of new jobs and 2.1 trillion dollars to the growth of GDP.

In addition, in order for Georgia's involvement in the Digital Silk Road project to be effective, it is necessary to investigate:

- Unification of historical silk countries - cost of digital road (Internet traffic);
- Where will digital hubs be located on the Digital Silk Road?
- The purpose and the objectives of the research. It should be noted that one of the most popular topics in the modern world economy is the measurement of the digital economy. The purpose of the present work is to research the issue. Based on the purpose of the research, we set the research objectives:
- Economic and mathematical analysis of digital economy indices, on which ratings are constructed;
- Correlations between different indicators of digital inequality and the level of development of the digital economy;
- Determination and analysis of correlation-mathematical connections of GVP-GDP.

II. OVERVIEW OF THE LITERATURE

One of the most interesting monographs on digital economy assessment and measurement is "Virtual Economy, Design and Analysis", in which the authors describe and argue why the world needs to determine the true scale of the digital economy. The theoretical aspects of the connection between GDP and the virtual economy are remarkably discussed (Lehdonvirta and Castronova, 2014.).

The "Digital Silk Road" is one of the priorities, which aims to reduce production costs while improving the global competitiveness of Chinese products and increasing trade among countries participating in the initiative. According to China, these goals are achievable with the digital economy, cloud technology, artificial intelligence, big data and other communication innovations. (Geissbauer , Schrauf, Koch & Kuge, 2014.)

Another leading player of the "Digital Silk Road" is the Chinese B2B platform "DHgate", whose main goal is to simplify e-commerce and, at the same time, it aims to involve several developing countries in digital business. In addition, the company carries out foreign trade trainings in various universities of Turkey and Georgia, which are carried out within the framework of SREB (Southern Regional Education Board). (China Cross-Border E-Commerce (Export B2B) Report. 2017).

The development of the communication costs and the development of the communication systems should be one of the driving forces for the spread of the Internet, the introduction of communication and telecommunication systems should be a contributing factor for the simplification of the communication and the use of the Internet and communication systems should be significantly simplified. (Digital Transformation Initiative Telecommunications Industry. 2017.)

III. RESEARCH METHODOLOGY

Various sub-category digital indices are used to evaluate the digital economy, and the geometric mean obtained from them shows a single-level digital economy index, which itself has a correlation with GDP. these are:

- 5g tech index
- ICT Development Index
- Global Connectivity Index – GCI
- e-Government Development Index, EGDI
- ✓ Telecommunication Infrastructure Index
- ✓ Human Capital Index
- ✓ Online Service Index

- Digital Economy and Society Index, DESI
- World Digital Competiveness Index – WDCI
- Digital Evolution Index – DEI

The research was planned with a triangulation approach, which implies the use of several research methods. The procedural plan of the research was drawn up as follows: 1. Data collection and processing; 2. Mathematical modeling; 3. Analysis/conclusion.

- In order to obtain a single indicator (index) of the digital economy, each factor (index) affecting the digital economy is reduced to one indicator. The general indicator of the digital economy is obtained by the geometric mean of the indicators obtained from the factors, which can be represented by the following formula:

$$INDEX(GVP) = \sqrt[N]{Index1 * Index2 * Index3 * IndexN}$$

- After the calculated index, the regression (slope) correlation analysis of the above mentioned index with the overall economy model is carried out (GDP).

IV. RESULTS AND ANALYSIS

The product of the geometric mean of the digital indices of the subcategory of the digital economy on the index divisor presented in the methodology, allows us to obtain a mathematical model of the digital economy, which makes it possible to depict the absolute level of the digital economy.

$$INDEX(GVP) = \sqrt{(N \& (5g \text{ tech index}) * (ICT \text{ Development Index}) * (Global Connectivity Index) * (EGDI) * (DESI) * (WDCI) * (DEI))} \tag{1}$$

And, based on the digital index formula (1) presented above, the index divisor model is further used, from which, by multiplying the formulas (1) and (2) together, it is possible to move from the digital economy index to the absolute indicator of the digital economy.

$$D(t) = \frac{\sum_{i=1}^n (P_{i,t} * F_{i,t} * X_{i,t})}{100} \tag{2}$$

Where,

X(i,t) - the number of index shares of the index component i on the trading day;

P(i,t) - price of index component i on trading day;

F(i,t) - Exchange rate for converting index component price i on trading day t into index currency

In the end, we can get the absolute value of the digital economy by the following formula:

$$Gross \ Virtual \ Product \ (GVP) = INDEX \ (GVP) * D(t) = (1) * (2)$$

V. CONCLUSIONS AND RECOMMENDATIONS

The role of the digital economy and 5G technologies is increasing day by day, and for Georgia, as a developing country, it is important not to fall behind world trends. Based on the trends of the world development, the digital economy plays an important role directly in the development of the economy. The digital revolution has led to the existence of a large amount of various digital products in people's lives, therefore the study of these issues and the measurement of the digital economy are also important for the development of states. Many tech companies in the world play a major role in economic processes and their role is increasing day by day. All this affects the labor market and the specialization of people.

Measuring the digital economy and calculating its mathematical algorithm is important for the modern world because:

- In the nearest future, the digital economy will become the driver of the growth and development of the country's economic system, as it has a number of advantages

compared to the material (traditional) economy: the speed of delivery of goods and the immediacy of providing services, the low price of production and transaction performance, as well as the inexhaustibility of the production of digital goods;

- A new integrated science and practical activity is developing - digital economy, as a positive correlation with the traditional branches of the economy and a higher level of their technological development;
- The content and meaning of the fundamental concepts: "time, "space, "labour activity, "high qualification, "profession, "consumer, "information and "knowledge" changes qualitatively;
- A new style, methods, forms, models and technology of managing the economy/business are formed;
- The educational system created in the industrial age and not suitable for digital communication will be changed.

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