A New Quality of Economic Growth in "Smart" Economy: Advantages for Developing Countries

Elena G. Popkova, Nadezhda K. Saveleva and Anastasiya A. Sozinova[1]

Abstract *Purpose*: The purpose of this paper is to determine a new quality of economic growth in smart economy and to substantiate its advantages for developing countries. *Design/methodology/approach*: The authors use the methods of correlation and comparative analysis for determining the character of change of correlation of digitalization (digital competitiveness according to IMD) and the rate of economic growth (according to the IMF) with the indicators of quality of life (according to Numbeo) in 2020 as compared to 2017. The research objects are countries of BRICS and Newly industrialized countries (NIC). *Findings*: It is determines that as of 2020 digitalization defines quality of life in developing countries to the same extent as economic growth. Digitalization ensures fighting inflation (49.79%). However, economic growth still defines cost of living (-67.22%). *Originality/value*: Based on the analysis of dynamics of change of the statistics, it is substantiated that under the influence of smart economy in developing countries there formed a new quality of economic growth in 2020. The advantages of digitalization include growth of purchasing power of population, development of healthcare, reduction of inflation, and reduction of commute time due to development of online economic operations.

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Also, economic growth, which is also influenced by digitalization, leads to reduction of cost of living. However, the problem of cyber security is very urgent in smart economy; its solution will influence further quality of economic growth and perspectives of obtaining advantages by developing countries.

Keywords New quality • Economic growth • Smart economy • Advantages • Developing countries

JEL codes D91 • E01 • F42 • F43 • F64 • Q01 • Q15 • O31 • O32 • O33 • O38 • Q56 • Q57 • O13 • O41 • O43 • O44 • O47

1 Introduction

Transition to smart economy is a new stage of technological modernization of economic systems, the Fourth industrial revolution. Experience of the previous industrial revolutions shows their contradictory influence on the global economy. Developing countries, which are traditionally the first to start the processes of technological changes and which occupy the leading positions in new emerging markets, gain the main advantages from this. In particular, the rate of their economic growth grows, new jobs appear – most of which are highly-paid – and the population's living standards increase.

Developing countries conduct delayed modernization of economy, which does not allow them to fully receive the above advantages. Instead, they often face the negative manifestations of industrial revolutions, becoming production centers, suppliers of resources, and sales markets for developed countries' products. As a result, the power of sellers in the labor market decreases, which strengthens the outgoing migration flows. Depletion of natural resources and increase of hazardous waste increase the ecological costs of developing countries' economic growth.

The Fourth industrial revolution is unique due to a range of reasons: from previously inaccessible total authomatization to its implementation against the

background of sustainable development goals. This is a logical basis for suggesting the working hypothesis that a new quality of economic growth is achieved in smart economy, which creates advantages for developing countries and allows balancing the global economic system.

The purpose of this paper is to verify the offered hypothesis, determine a new quality of economic growth in smart economy, and substantiate its advantages for developing countries.

2 Materials and Method

The specific features and perspectives of formation of smart economy in developing countries are studied in the works I. V. Andronova, I. N. Belova and E. A. Yakimovich [2], E. B. Belik, E. S. Petrenko, G. A. Pisarev and A. A. Karpova [3], O. V. Fokina, L. A. Fufacheva, A. A. Sozinova, A. V. Sysolyatin and L. L. Bulychev [4], L. Haabazoka, E. G. Popkova and Y. V. Ragulina [5], O. Ivanov, E. Zavyalova and S. Ryazantsev [8], O. B. Pichkov [12], E. G. Popkova [13], E. G. Popkova and K. Gulzat [14-15], E. G. Popkova and B. S. Sergi [16-18], E. G. Popkova and K. V. Zmiyak [19], E. G. Popkova, A. A. Sozinova and V. I. Menshchikova [20], Y. V. Ragulina [21], Y. V. Ragulina, A. N. Alekseev, I. V. Strizhkina and A. I. Tumanov [22], N. K. Saveleva, A. V. Kuklin, I. P. Lapteva, and N. V. Malysheva [24], B. S. Sergi [25], B. S. Sergi, E. G. Popkova, A. V. Bogoviz, and T. N. Litvinova [26], A. A. Shulus, E. S. Akopova, N. V. Przhedetskaya, and K. V. Borzenko [27], A. A. Sozinova [28-30], A. A. Sozinova, A. A. Nabokikh, A. V. Ryattel, and M. A. Sanovich [31], I. A. Strelets [32], E. B. Zavyalova, N. V. Studenikin, and E. A. Starikova [33].

Economic growth – as a characteristic of economic systems' development – is studied in the works: K. Amusa and M. Oyinlola [1], X. Long [9], V. Mohamad Taghvaee, L. Agheli, A. Assari Arani, M. Nodehi, and J. Khodaparast Shirazi [10], S.

Saddiq and A. Abu Bakar [23]. Despite the large number of publication on adjacent topics, the issue of qualitative transformation of the essence of economic growth in the conditions of smart economy and perspectives of gaining advantages from this by developing countries has not been sufficiently studied and solved in the modern economic science.

Here we use the methods of correlation and comparative analysis for determining the character of change of correlation of digitalization (digital competitiveness according to IMD) and the rate of economic growth (according to the IMF) with the indicators of quality of life (according to Numbeo) in 2020 as compared to 2017. The research objects are countries of BRICS and Newly industrialized countries (NIC) (Table 1 and Table 2).

Table 1 Digitalization, economic growth, and quality of life of developing countries in 2017

Category	Country										
		Digital competitiveness	Gross domestic product, constant prices, percent change	Purchasing power index	Safety Index	Health care index	Cost of living index	Property price to income ratio	Traffic commute time index	Pollution index	Climate index
BRICS	Brazil	52.290	0.165	42.38	29.38	51.70	53.07	16.96	46.39	61.17	70.76
	China	71.452	6.582	67.84	66.10	62.25	44.76	23.29	43.87	88.96	38.70
	India	54.367	7.179	76.73	56.04	69.18	25.08	10.28	46.38	76.53	9.30

	Russia	62.854	1.400	48.27	53.95	56.40	42.01	13.55	48.57	63.04	10.69
	South Africa	55.709	0.817	98.96	24.28	61.72	43.12	3.58	42.98	63.56	88.74
NIC	Indonesia	44.225	5.100	27.61	50.32	64.80	41.11	21.03	49.44	76.41	9.62
	Malaysia	79.944	4.500	73.34	35.25	65.99	40.24	9.53	39.40	67.08	-79.43
	Thailand	63.771	3.002	34.28	50.22	80.66	43.71	24.43	43.56	73.23	-20.21
	Turkey	53.867	2.452	55.64	58.91	71.68	38.60	8.87	47.58	70.46	73.19
	Chile	65.383	1.672	61.28	52.50	60.97	50.09	10.67	35.70	67.67	89.39

Source Compiled by the authors based on International Monetary Fund [7], IMD [6], Numbeo [11]

Table 2 Digitalization, economic growth and quality of life of developing countries in 2020

Category	Country										
		Digital competitiveness	Gross domestic product, constant prices, Percent change	Purchasing Power Index	Safety Index	Health Care Index	Cost of Living Index	Property Price to Income Ratio	Traffic Commute Time Index	Pollution Index	Climate Index
BRICS	Brazil	57.346	2.000	32.81	31.12	56.29	40.22	16.41	41.70	54.98	97.16
	China	84.292	5.900	60.88	68.17	64.48	40.04	29.06	41.81	80.77	79.19
	India	64.952	7.921	54.30	56.68	67.13	24.58	11.38	46.99	78.87	64.87
	Russia	70.406	1.500	38.94	58.88	57.59	39.21	10.77	45.30	62.79	40.36
	South Africa	60.865	2.201	73.61	22.51	64.14	42.87	3.93	39.43	57.30	95.25

NIC	Indonesia	58.011	5.500	25.05	54.16	60.48	37.27	18.88	43.11	66.56	74.15
	Malaysia	82.390	4.880	64.49	41.16	68.10	39.12	9.94	37.03	63.18	57.92
	Thailand	68.434	3.110	35.45	59.52	77.95	49.77	22.26	38.23	75.07	69.45
	Turkey	59.793	3.794	40.85	60.51	69.80	34.69	7.81	44.65	67.35	93.26
	Chile	66.724	2.900	42.50	54.77	65.44	43.62	14.93	35.44	65.78	90.21

Source Compiled by the authors based on International Monetary Fund [7], IMD [6], Numbeo [11]

3 Results

Results of the correlation analysis for 2017 are shown in Fig. 1.

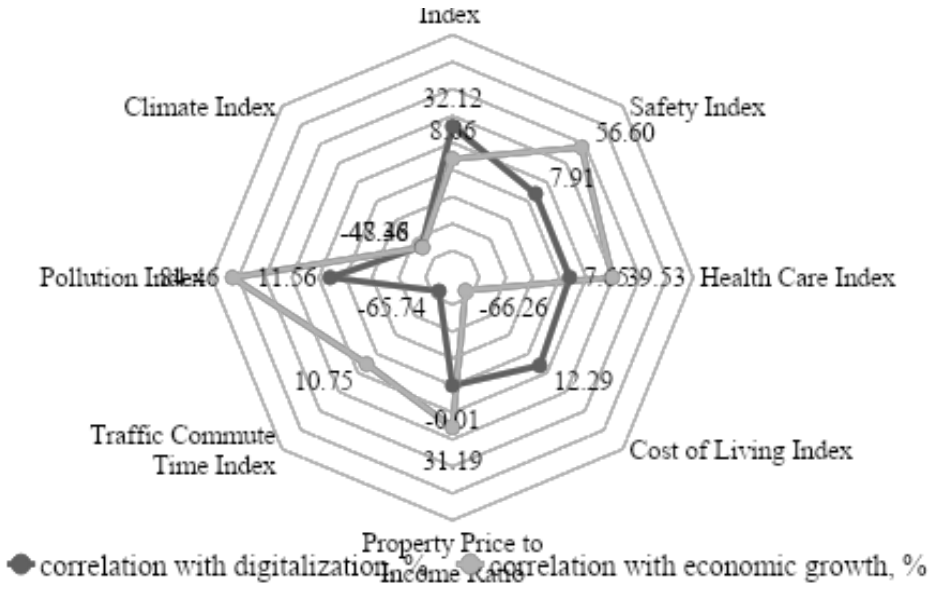

Fig. 1 Correlation of the indicators of quality of life with digitalization and economic growth in developing countries in 2017. *Source* Calculated and built by the authors

As is shown in Fig. 1, in 2017 – when developing countries just started digital initiatives and the effective from smart economy was not yet obtained – economic growth was the key factor of quality of life. In the course of economic growth, production waste grew (correlation – 84.46%), but the general state of environment improved (-47.36%). Growth of safety (56.60%) and development of healthcare (36.53%) were achieved, and inflation was restrained (31.19%). For comparison, let us consider the results for 2020.

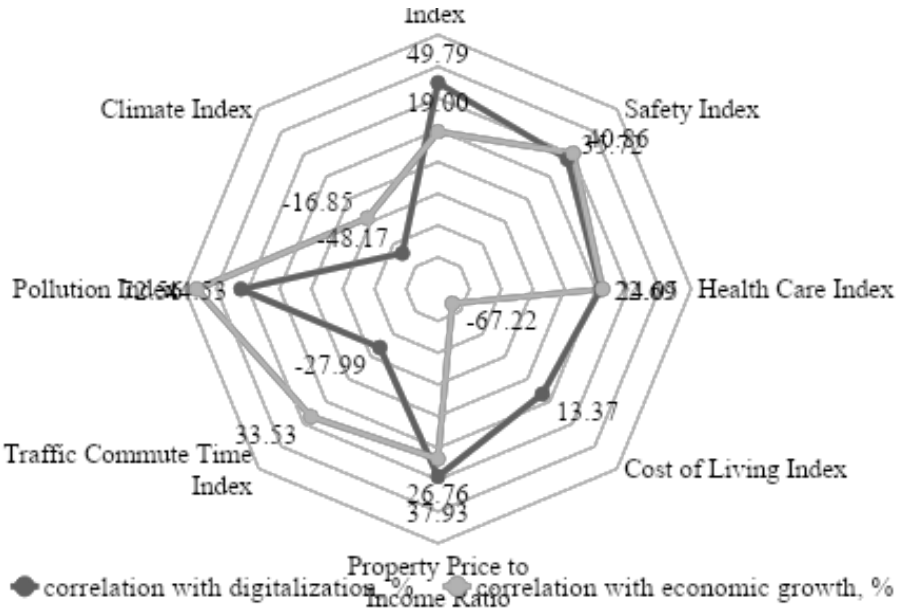

Fig. 2 Correlation of the indicators of quality of life with digitalization and economic growth in developing countries in 2020. *Source* Calculated and built by the authors

As is shown in Fig. 2, in 2020 digitalization defines quality of life in developing countries to the same extent as economic growth. Digitalization ensures fighting inflation (49.79%). However, economic growth still defines cost of living (-67.22%). The treatment of a new quality of economic growth in smart economy and its advantages for developing countries based on the values of correlation coefficients in 2020 (values) and their comparison with 2017 (growth) are shown in Table 3.

Table 3 Treatment of a new quality of economic growth in smart economy and its advantages for developing countries

Indicator	Correlation with digitalization		Correlation with economic growth		Qualitative treatment of consequences for developing countries
	Value	Growth	Value	Growth	
Purchasing Power Index	49.79	17.68	19.00	10.94	purchasing power is determined by digitalization and grows under the influence of economic growth

Safety Index	35.72	27.81	40.86	-15.73	the most important issue is cyber security, which decreases in the course of digitalization
Health Care Index	22.69	15.04	24.05	-15.48	healthcare grows under the influence of digitalization, potential of economic growth is depleted
Cost of Living Index	13.37	1.08	-67.22	-0.95	economic growth ensures reduction of cost of living, its influence grows
Property Price to Income Ratio	37.93	37.95	26.76	-4.43	digitalization leads to reduction of inflation, the role of economic growth decreases
Traffic Commute Time Index	-27.99	37.76	33.53	22.78	digitalization stimulates the development of a more effective – online – form of economic activities
Pollution Index	44.53	32.97	72.56	-11.89	under the influence of digitalization, economic growth is accompanied by sustainable development
Climate Index	-48.17	-0.81	-16.85	31.63	

Source Developed and compiled by the authors

As is shown in Table 3, the qualitative treatment of the consequences of economic growth in smart economy for developing countries is as follows:

- purchasing power is determined by digitalization (correlation – 49.79%, growth – 17.68%) and grows under the influence of economic growth (19%);
- the most important issue is cyber security, which decreases in the course of digitalization (negative dynamics: -15.73%);

- healthcare grows under the influence of digitalization (correlation – 22.69%, growth – 15.04%), potential of economic growth is depleted (negative dynamics: -15.48%);
- economic growth ensures reduction of cost of living (correlation: -67.22%), its influence grows (growth: -0.95%);
- digitalization leads to reduction of inflation (correlation – 37.93%, growth – 37.95%), the role of economic growth decreases (negative dynamics: -4.43%);
- digitalization stimulates the development of a more effective – online – form of economic activities (correlation with the traffic commute time index -27.99%);
- under the influence of digitalization (correlation with climate index -48.17%, growth by -0.81%), economic growth is accompanied by sustainable development (correlation with climate index -16.85%, negative dynamics of correlwation with pollution index: -11.89%).

4 Conclusion

Thus, the working hypothesis has been proved. Based on analysis of the dynamics of change of statistics, it has been substantiated that in 2020, under the influence of smart economy in developing countries, a new quality of economic growth has formed. The advantages of digitalization include growth of population's purchasing power, development of healthcare, reduction of inflation, and reduction transport commute time, due to development of online economic operations. Also, economic growth, which is defined by digitalization, stimulates reduction of cost of living.

However, the problem of cyber security is very urgent in smart economy. Its solution will determine further quality of economic growth and the perspectives of gaining advantages from it by developing countries. Future works on the topic of smart economy should be devoted to the perspectives of cyber security provision.

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