



Digital Economic Challenges and Economic Growth in Environmental Revolution 4.0

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Abstract

Nowadays, the world has transformed as an environmental revolution 4.0 eras. The revolution provides challenges and opportunities for future environmental development. In addition, digitalization, automation, and the use of artificial intelligence in economic activities will increase productivity and efficiency in modern production which also provides convenience and comfort for environmental issues. Digital technology also helps the development process in various fields including environmental improvements, like global warming, acid rain, air pollution, urban sprawl, waste disposal, ozone layer depletion, water pollution, climate change and many more affect every human, animal and nation on this planet. In addition, the growth of various environmental activities and online-based buying and selling has not been accompanied by efforts to optimize state revenue and supervise tax compliance on these transactions. This is very important part, because digital transactions are cross country and it's an aid for environmental changes.

Keywords: Economic growth, Economic challenges, Industrial revolution

1 Introduction

The products of the data society are anything but difficult to see, with a cellphone in each pocket, a PC in each rucksack, and enormous change innovation frameworks in back workplaces all over. In any case, less perceptible is simply the data. 50 years after PCs entered standard society, the information has started to amass to the point where something new and exceptional is occurring. Not exclusively is the data is becoming quicker. The difference in scale has prompted a difference in state. The quantitative change has prompted subjective one. The sciences The 2015-2019 Medium-Term Development Plan (RPJMN) implementation faced various challenges of global economic problems, such as the Greek debt crisis, Brexit, US policy uncertainty, for instance, trade protectionism and monetary policy normalization, China's economic rebalancing process, and the end of the commodity boom era. This has led to the slow recovery of world economic and trade growth after the 2008 global financial crisis (1-6).

However, the domestic economy continued to grow at an average of 5.0 percent per year during the first four years of

the implementation of the RPJMN (2015-2018), which is higher than the developing countries average at 4.5 percent per year. This achievement was supported by a variety of structural reform policies, including the policy to improve the investment climate, industrial competitiveness, logistics efficiency, export stimulus, tourism promotion and strengthening people's purchasing power (7-10, 12).

The relatively high economic growth was driven by various sectors' growth. The processing industry grows an average of 4.3 percent per year. Furthermore, the agricultural industry grows an average of 3.7 percent per year, such as by improving the agricultural infrastructure to encourage the productivity. Meanwhile, the service industry is able to become the engine of economic growth, including the information and communication services industry and the transportation and warehousing industry which grew respectively by 8.8 and 7.4 percent per year. From the expenditure, the investment grows on average of 5.6 percent per year and becomes a major encouragement of economic growth. The supporting investment growth is mainly supported by improving the investment climate, infrastructure development, and investment services. Furthermore, household consumption is able to grow an average of 5.0 percent per year. In addition, government consumption grew by an average of 3.0 percent per year amid the downward

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pressure on the state revenues. Meanwhile, both exports and imports of real goods and services grew at an average of 2.9 percent per year (11, 13-16).

2 Global Uncertainty

In the future, the risk of uncertainty will still color the world economic growth. The economic growth and world trade are estimated to be stagnant with a slowing trend, in which each is projected at 3.6 and 3.8 percent per year, for the 2020-2024. The price of Indonesia's main international export commodities is also expected to decline, including coal and palm oil, along with the shifting of world demand to other products. Other uncertainties that need to be anticipated include the trade war, the economic slowdown in China, and the pressure of normalizing monetary policy that moves from the US to the European region (17-20).

The macroeconomic stability must be maintained which is reflected as the controlled inflation and exchange rate, increased foreign exchange reserves and the current account which has the safe limits. During 2015-2018, the inflation reached an average of 3.3 percent per year, or within the target range. Meanwhile, in the exchange rate control and the current account deficit processing, the condition of Indonesia's payments balance is still relatively strong as reflected in the increase of Indonesia's foreign exchange reserves from USD111.9 billion in 2014 to USD120.7 billion on December 2018 (21-24).

At the fiscal side, policies will continue to be directed at supporting growth and maintaining economic stability, while constantly pays attention to the medium-term fiscal sustainability. This is reflected in the debt ratio which is lower than 30 percent of GDP and the budget deficit and primary balance that continues to shrink and lead to positiveness in 2018. Through a strong and stable economic performance, the welfare of the community has increased. The expansion of the domestic economy is estimated to create more than 9 million additional jobs in 2015-2018. The unemployment rate fell to 5.34 percent in 2018 which was 5.94 percent in 2014. Besides, GDP per capita continued to increase from USD3,531 in 2014 to USD3,927 in 2018, which is equal to GNI per capita. (Atlas Method) USD 3,820, it is on the threshold of high-middle income countries. The poverty rate was reduced to one digit (9.82 percent in 2018) which was encouraged by the effectiveness of poverty alleviation programs. The Gini ratio had decreased from 0.414 in 2014 to 0.389 in 2018, which reveals the reduction of income inequality. Another development target is the Human Development Index (HDI) which had increased from 68.9 in 2014 to 71.39 in 2018 (25-30).

3 The Stagnant Economic Growth

After the 1998 economic crisis, Indonesia's average economic growth was only around 5.3 percent per year, even in the last four years, Indonesia's economic growth tends to stagnate around 5.0 percent. This level of economic growth is difficult for Indonesia to upgrade to a high-income country or catch up with per-capita income of peer countries. The stagnant economic growth is mainly caused by the low level of productivity as the structural transformation does not go on. The inhibiting factors are: (1) overlapping regulations and

inhibiting bureaucracy; (2) the system and the amount of tax revenue have not been sufficient enough; (3) infrastructure quality is still low especially connectivity and energy; (4) low quality of human resources and labor productivity; (5) low financial sector intermediation and shallow financial markets; (6) ineffective innovation system; (7) the poor of upstream-downstream linkages. The undeveloped processing industry has an impact on Indonesia's international trade performance. Currently, Indonesia's exports are still dominated by commodity exports with foreign transportation services, which has no differences from 40 years ago. The ratio of exports to GDP had declined continuously from 41.0 percent in 2000 to 21 percent in 2018. As a result, Indonesia still has a current account deficit at 3 percent of GDP, while several peer countries have recorded a surplus. In the midst of tight global financial conditions, the increase of current account deficit is an obstacle for the acceleration of faster economic growth (31-34, 36).

Economic growth is expected to increase by an average of 5.4 to 6.03 percent per year and GDP per capita growth of 4.0 +/- 1 percent, which is driven by the productivity, sustainable investment, improvements in the labor market, and the quality of human resource improvement. By this target of economic growth, the GNI per capita (Atlas Method) is expected to increase to USD5,780 - 6,160 per capita by 2024. Beside in maintaining the economic growth, price stability has to be a priority. The inflation rate is targeted at 3.0 ± 1 percent throughout 2020 - 2024. This macro condition has an impact on improving the development quality. The poverty and unemployment rate are expected to decrease to 6.5 - 7.0 percent and 4.0 - 4.6 percent in 2024. The level of the gini ratio decreases to 0.370 - 0.374 in 2024, while the HDI is expected to increase to 75.54 in 2024, which indicates an improvement in the quality of human resources. To achieve the quality economic growth in the next five years, improving structural transformation is one of the main keys. The improvement in structural transformation was mainly driven by the revitalization of the manufacturing industry, while encouraging the development of other sectors through the modernization of agriculture, downstream mining, sustainable infrastructure development, and transformation of the service sector (35, 37).

4 Strengthening Domestic Demand and Diversification of Exports and External Stability

In domestic demand, public consumption (household and LNPRT) is expected to grow by an average of 5.16 - 5.29 percent per year. The increase of public consumption is driven by an increase in community income along with the creation of bigger and better jobs, price stability, and better targeted government social assistance. Government consumption will grow an average of 4.13 - 4.23 percent per year supported by an increase in government spending, both central and transfers to the regions, along with an increase in state revenues, especially tax revenues (38-40).

The economic expansion of 2020-2024 will be mainly driven by investment increasing (gross fixed capital formation) which grows 6.88 - 8.11 percent per year. To achieve this target, private investment (foreign and domestic)

will be encouraged through deregulation of investment procedures, synchronization and harmonization of licensing regulations, including increasing Indonesia's EoDB from rank 73 in 2018 to 40 in 2024. Increasing the investment is also driven by an increase of government investment, including BUMN, especially for infrastructure. This is indicated by an increase of infrastructure stock to 50.0 percent of GDP and capital expenditure to 2.3 - 2.8 percent in 2024. Increasing the investment will be aimed at increasing productivity, which will encourage investment efficiency increase (41).

Overall, exports of goods and services grew an average of 6.21 - 7.67 percent per year. The exports of goods increase in 2020-2024 will be supported by the revitalization of the processing industry that encourages diversification of non-commodity export products, and reduces dependence on imports. The increase will also be driven by exports of services increase, particularly travel services, through the development of the tourism sector, while imports of goods and services grew by an average of 6.42 - 7.42 percent a year driven by increased domestic demand, especially investment. The improved performance of international trade will encourage the strengthening of external stability, which is characterized by an improvement in the current account deficit to 2.0 - 1.3 percent of GDP and an increase in foreign exchange reserves to USD161.1 - 184.8 billion in 2024 (42-46).

5 Maintaining Fiscal and Inflation Sustainability

The government is committed to maintain a healthy state budget while continuing to provide stimulus to the economy. The country's income is targeted to increase to an average of 13.7 - 14.8 percent of GDP per year, with the taxation ratio reaching an average of 11.7 - 12.7 percent of GDP per year. This was achieved through continuous improvement both in terms of administration and policy. From the administration side, the tax administration system will continue to be updated to improve the tax database and increase compliance. From the policy side, the government will continue to explore the potential for revenue, including potential originating from cross-border digital service activities and extensification of excisable goods. Meanwhile, this policy is also balanced with the role of policy taxation as an instrument of investment through the provision of fiscal incentives that support the activity of creating economic addition value (manufacturing, tourism, creative and digital economy) (47, 48).

The stimulus of other economies is also carried out by sharpening state spending. Total state spending will average 15.8 - 16.8 percent of GDP per year, with central government spending averaging 9.9 - 10.3 percent of GDP per year and TKDD of 6.0 - 6.5 percent GDP. The deficit will be kept below the legal allowable limit of (2.2) - (2.0) percent of GDP per year with a primary balance close to zero, at an average (0.3) - (0, 2) percent of GDP per year. With this composition, the debt ratio will be maintained below 30 percent of GDP (49, 50).

A low and stable inflation rate is expected to maintain purchasing power and encourage public consumption so that it can support the acceleration of quality economic growth. The Government and Bank Indonesia are committed to

maintain a downward trend of low and stable inflation in the medium term. In the period 2020-2024, inflation control policies are directed to: (i) Increasing productivity, especially after harvest and increase Government Food Reserves (CPP); (ii) Reducing average inflation and volatility in 10 strategic food commodities; (iii) Reducing price disparities between regions with national average prices, and reducing inter-time price disparities; (iv) anchoring inflation expectations within the stated target; and (v) improving the quality of statistics. During 2020-2024, the exchange rate was stable at its fundamental level to maintain export competitiveness. This can be achieved through the implementation of pre-emptive and ahead the curve monetary policies by the central bank and policy synergies which aimed to implement structural reforms in improving the competitiveness of the domestic economy (51-52).

6 Conclusion

Economic growth in each region is expected to go hand in hand with national economic growth. Policies in each region are expected to be aligned with policies at the national level, while still taking into account the advantages and unique problems with the characteristics of each region. In the next five years, economic growth will not only focus on Java and Sumatra. The areas outside of Java and Sumatra are estimated to have become the center of new economic growth. To achieve the target of an average economic growth of 5.4 - 6.0 percent per year, an investment of Rp. 36,595.6 - 37,447.6 trillion is needed during 2020-2024. Overall the need total, the government and SOEs will contribute 11.6 - 13.8 percent and 7.6 - 7.9 percent respectively, while the rest will be met by the public or private sector. To finance investment needs in 2020 - 2024, efforts are needed to deepen financial markets, especially non-banking, increase access to financial services (financial inclusion), and optimize financing alternatives. In addition, The aspect of economic development in the future is the environmental aspect. Climate change and the low environmental support could cause a negative impact on achieving economic growth targets. Therefore future development must be directed to maintain a balance between economic growth, reduction targets, emission intensities, the capacity of natural resources support, and the current and future capacity of the environment.

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Ethical issue

Authors are aware of, and comply with, best practice in publication ethics specifically with regard to authorship (avoidance of guest authorship), dual submission, manipulation of figures, competing interests and compliance with policies on research ethics. Authors adhere to publication requirements that submitted work is original and has not been published elsewhere in any language.

Competing interests

The authors declare that there is no conflict of interest that would prejudice the impartiality of this scientific work.

Authors' contribution

All authors of this study have a complete contribution for data collection, data analyses and manuscript writing.

References

- Helbing D. Societal, economic, ethical and legal challenges of the digital revolution: from big data to deep learning, artificial intelligence, and manipulative technologies. In *Towards Digital Enlightenment 2019* (pp. 47-72). Springer, Cham.
- Said A. The Economic Impact of Digital Fiat Currency (DFC): Opportunities and Challenges. 2019.
- Nambisan S, Wright M, Feldman M. The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research Policy*. 2019 Apr 5;48(8):103773.
- Berg H, Wilts H. Digital platforms as market places for the circular economy—requirements and challenges. In *NachhaltigkeitsManagementForum| Sustainability Management Forum 2019 Mar 11* (Vol. 27, No. 1, pp. 1-9). Springer Berlin Heidelberg.
- Bezrukova TL, Kuksova IV, Kirillova SS, Gyiazov AT. Forecasting development of forest complex in the formation of digital economy. In *IOP Conference Series: Earth and Environmental Science 2019 Jan* (Vol. 226, No. 1, p. 012063). IOP Publishing.
- Cusumano MA, Yoffie DB, Gawer A. *The Business of Platforms: Strategy in the Age of Digital Competition, Innovation, and Power*. HarperCollins Publishers; 2019 May 1.
- Wei Ph D H, Gao Y. Challenges and Prospects for Merger Control in China in the Digital Economy.
- Srivastava N. Digital Financial Services: Challenges and Prospects for Liberalized and Globalized Indian Economy. Available at SSRN 3309294. 2019.
- Berg H, Wilts H. Digital platforms as market places for the circular economy—requirements and challenges. In *NachhaltigkeitsManagementForum| Sustainability Management Forum 2019 Mar 11* (Vol. 27, No. 1, pp. 1-9). Springer Berlin Heidelberg.
- Bezrukova TL, Kuksova IV, Kirillova SS, Gyiazov AT. Forecasting development of forest complex in the formation of digital economy. In *IOP Conference Series: Earth and Environmental Science 2019 Jan* (Vol. 226, No. 1, p. 012063). IOP Publishing.
- Danon R, Chand V. Addressing the Tax Challenges of the Digitalisation of the Economy—Comments on the Public Consultation Document. OECD; 2019 Mar 3.
- Voronin EA, Yushin IV. Objectives and challenges of ensuring economic and information security in the digital economy. *Dilemas Contemporáneos: Educación, Política y Valores*. 2019 Mar 2;6.
- Nansadiqa L, Masbar R, Majid MS. Does Economic Growth Matter For Poverty Reduction In Indonesia?. *East African Scholars Journal of Economics, Business and Management*. 2019;2(2):46-52.
- Farabi A, Abdullah A, Setianto RH. Energy consumption, carbon emissions and economic growth in Indonesia and Malaysia. *International Journal of Energy Economics and Policy*. 2019 Apr 8;9(3):338-45.
- Alam MM, Murad W, Noman AH, Ozturk I. economic growth; CO2 emissions; population growth; energy consumption; Environmental Kuznets Curve, Brazil, China, India, Indonesia. *Center for Open Science*; 2019 Jun 13.
- Kasayanond A, Umam R, Jernsittiparsert K. Environmental sustainability and its growth in Malaysia by elaborating the green economy and environmental efficiency. *International Journal of Energy Economics and Policy*. 2019;9(5):465-473.
- Jernsittiparsert K, Sriyakul T, Rodboonsong S. Power (Lessness) of the state in globalisation Era: Empirical proposals on determination of domestic paddy price in Thailand. *Asian Social Science*. 2013 Dec 1;9(17):209.
- Jernsittiparsert K, Sriyakul T, Pamornmast C. Minimum Wage and Country's Economic Competitiveness: An Empirical Discourse Analysis. *The Social Sciences*. 2014 Jul 1;9(4):244-50.
- Jernsittiparsert K, Pamornmast C, Sriyakul T. An Empirical Discourse Analysis on Correlations between Exchange Rate and Industrial Product Export. *International Business Management*. 2014;8(5):295-300.
- Jernsittiparsert, K., Sriyakul, T., Pamornmast, C., Rodboonsong, S., Boonprong, W., Sangperm, N., Pakvichai, V., Vipaporn, T. and Maneechote, K., 2016. A Comparative Study of the Administration of Primary Education between the Provincial Administration Organisation and the Office of the Basic Education Commission in Thailand. *The Social Sciences*, 11(21), pp.5104-5110.
- Jernsittiparsert K, Trimek J, Vivatthanaporn A. Fear of Crime among People in Muang-Ake, Lak-Hok, Muang, Pathumthani. *The Social Sciences*. 2015;10(1):24-30.
- Jernsittiparsert K, Akahat N. Fear of Crime among Students of Kalasin Rajabhat University. *Research Journal of Applied Sciences*. 2016 Mar 1;11(2):54-61.
- Bashir A, Thamrin KH, Farhan M, Mukhlis M, Atiyatna DP. The causality between human capital, energy consumption, CO2 emissions, and economic growth: Empirical evidence from Indonesia. *International Journal of Energy Economics and Policy*. 2019 Feb 14;9(2):98-104.
- Rath BN, Hermawan D. Do Information and Communication Technologies Foster Economic Growth in Indonesia?. *Buletin Ekonomi Moneter dan Perbankan*. 2019 Apr 30;22(1):103-22.
- Adam P, Rahim M, Rosnawintang R. The Effect of Crude Oil Prices on Economic Growth in South East Sulawesi, Indonesia: An Application of Autoregressive Distributed Lag Model. *International Journal of Energy Economics and Policy*. 2019 Feb 14;9(2):194-8.
- Badriah LS, Alisjahbana AS, Wibowo K, Hardiyanto F. The Determinants of Large and Medium Industrial Sectors Productivity Growth in Indonesia. *Economics Development Analysis Journal*. 2019 Apr 26;8(1):94-107.
- Meiria E, Hamid A, Aishah R. Sme's Growth Pattern as a Success Business Indicator Through Sharia Economic in Reducing Poverty in Indonesia. *Archives of Business Research*. 2019 Jan 15;7(1).
- Yamauchi F, Larson DF. Long-term impacts of an unanticipated spike in food prices on child growth in Indonesia. *World Development*. 2019 Jan 1;113:330-43.
- Sarungu JJ, Soesilo AM, Rahayu SAT. Oil price and Indonesian economic growth. *Problems and Perspectives in Management*. 2019;17(1):152.
- Cao Y, Huang L, Li Y, Jernsittiparsert K, Ahmadi-Nezamabad H, Nojavan S. Optimal scheduling of electric vehicles aggregator under market price uncertainty using robust optimization technique. *International Journal of Electrical Power & Energy Systems*. 2020 May 1;117:105628.
- Yu D, Wang Y, Liu H, Jernsittiparsert K, Razmjoooy N. System identification of PEM fuel cells using an improved Elman neural network and a new hybrid optimization algorithm. *Energy Reports*. 2019 Nov 1;5:1365-74.
- Tian MW, Ebadi AG, Jernsittiparsert K, Kadyrov M, Ponomarev A, Javanshir N, Nojavan S. Risk-based stochastic scheduling of energy hub system in the presence of heating

- network and thermal energy management. *Applied Thermal Engineering*. 2019 May 31;113:825.
33. Yu D, Wang J, Li D, Jermstittiparsert K, Nojavan S. Risk-averse stochastic operation of a power system integrated with hydrogen storage system and wind generation in the presence of demand response program. *International Journal of Hydrogen Energy*. 2019 Nov 29;44(59):31204-15.
 34. Jabarullah NH, Jermstittiparsert K, Melnikov PA, Maselena A, Hosseinian A, Vessally E. Methods for the direct synthesis of thioesters from aldehydes: a focus review. *Journal of Sulfur Chemistry*. 2019 Sep 5:1-20.
 35. Jiao Y, Jermstittiparsert K, Krasnopevtsev AY, Yousif QA, Salmani M. Interaction of thermal cycling and electric current on reliability of solder joints in different solder balls. *Materials Research Express*. 2019 Aug 7;6(10):106302.
 36. Yu D, Ebadi AG, Jermstittiparsert K, Jabarullah NH, Vasiljeva MV, Nojavan S. Risk-constrained Stochastic Optimization of a Concentrating Solar Power Plant. *IEEE Transactions on Sustainable Energy*. 2019 Jul 10.
 37. Jermstittiparsert K, Sriyakul T, Sutduean J, Singa A. Determinants of Supply Chain Employees Safety Behaviours. *Journal of Computational and Theoretical Nanoscience*. 2019 Jul 1;16(7):2959-66.
 38. Sriyakul T, Singa A, Sutduean J, Jermstittiparsert K. Effect of Cultural Traits, Leadership Styles and Commitment to Change on Supply Chain Operational Excellence. *Journal of Computational and Theoretical Nanoscience*. 2019 Jul 1;16(7):2967-74.
 39. Sutduean J, Singa A, Sriyakul T, Jermstittiparsert K. Supply Chain Integration, Enterprise Resource Planning, and Organizational Performance: The Enterprise Resource Planning Implementation Approach. *Journal of Computational and Theoretical Nanoscience*. 2019 Jul 1;16(7):2975-81.
 40. Singa A, Sriyakul T, Sutduean J, Jermstittiparsert K. Willingness of Supply Chain Employees to Support Disability Management at Workplace: A Case of Indonesian Supply Chain Companies. *Journal of Computational and Theoretical Nanoscience*. 2019 Jul 1;16(7):2982-9.
 41. Jermstittiparsert K, Chankoson T. Behavior of Tourism Industry under the Situation of Environmental Threats and Carbon Emission: Time Series Analysis from Thailand. *International Journal of Energy Economics and Policy*. 2019;9(6):366-72.
 42. Maselena A, Huda M, Jasmi KA, Basiron B, Mustari I, Don AG, bin Ahmad R. Hau-Kashyap approach for student's level of expertise. *Egyptian Informatics Journal*. 2019 Mar 1;20(1):27-32.
 43. Huda M, Maselena A, Teh KS, Don AG, Basiron B, Jasmi KA, Mustari MI, Nasir BM, Ahmad R. Understanding Modern Learning Environment (MLE) in Big Data Era. *International Journal of Emerging Technologies in Learning*. 2018 May 1;13(5).
 44. Huda M, Maselena A, Atmotiyoso P, Siregar M, Ahmad R, Jasmi K, Muhamad N. Big data emerging technology: insights into innovative environment for online learning resources. *International Journal of Emerging Technologies in Learning (iJET)*. 2018 Jan 22;13(1):23-36.
 45. Alipour E, Alimohammady F, Yumashev A, Maselena A. Fullerene C60 containing porphyrin-like metal center as drug delivery system for ibuprofen drug. *Journal of Molecular Modeling*. 2020 Jan 1;26(1):7.
 46. Namdarian A, Tabrizi AG, Maselena A, Mohammadi A, Moosavifard SE. One step synthesis of rGO-Ni3S2 nano-cubes composite for high-performance supercapacitor electrodes. *International Journal of Hydrogen Energy*. 2018 Sep 13;43(37):17780-7.
 47. Romprasert S, Jermstittiparsert K. Energy Risk Management and Cost of Economic Production Biodiesel Project. *International Journal of Energy Economics and Policy*. 2019;9(6):349-57.
 48. Zafar MW, Shahbaz M, Hou F, Sinha A. From nonrenewable to renewable energy and its impact on economic growth: the role of research & development expenditures in Asia-Pacific Economic Cooperation countries. *Journal of cleaner production*. 2019 Mar 1;212:1166-78.
 49. Widodo W, Sugiyanto FX. Tourism And Economic Growth Nexus In Indonesia: The Dynamic Panel Data Approach. *Regional Science Inquiry*. 2019;11(2):83-91.
 50. IBATOVA AZ, NEZHMETDINOVA FT, SITDIKOV FF. Global challenges for the agrarian sector of russian economy and its human resources. *Revista ESPACIOS*. 2018 Jun 30;39(26).
 51. Vorotnikov, A.A., Buinov, M.A., Bushuev, S.V., Poduraev, Y.V. and Chunihin, A.A., 2018. Standard Deviation from the Average Cutting Velocity as a Criterion for Comparing Robot Trajectories and Manual Movements of a Doctor for Performing Surgical Operations in Maxillofacial Surgery. *International Journal of Mechanical Engineering and Robotics Research*. 2018;7(3): 319-323.
 52. Tikhonov AI, Sazonov AA, Novikov SV. Digital Aviation Industry in Russia. *Russian Engineering Research*. 2019 Apr 1;39(4):349-53.