The impact of digital transformation on macroeconomic stability: Evidence from EU countries

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Abstract. The article deals with investigating the role of digital transformation in achieving competitive advantages of the economy. The paper identifies the benefits and risks of the digital transformation for macroeconomic stability of the economy. The comparison of the average level of the digital transformation and indicators of macroeconomic stability of EU countries for the period 2001–2020 allowed the authors to distinguish clusters of countries by the nature and direction of the relationship between the analyzed indicators. The results of VAR

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modelling on the example of EU countries proved the relationship between the level of digitalization of the economy and indicators of its macroeconomic stability. The paper simulates the responses of macroeconomic stability parameters to single and accumulated shocks of digital transformation. The results show the bidirectional causality between the digital transformation of the economy and indicators of its macroeconomic stability. The findings of the study are beneficial for authorities to form competitive advantages of the economy and its sustainable development.

**Keywords:** macroeconomic stability, digital transformation, competitive advantages, sustainable development, financial innovation

**JEL Classification:** H20, H71, F49, K34

**1. INTRODUCTION**

Transformational processes in the economy, one of the manifestations of which is the COVID-19 pandemic, exacerbate the existing problems of the economic development of countries and only increase their negative impact on indicators of macroeconomic stability. In the context of COVID-19, in most countries, the need to transform models of doing business through the implementation of online economic transactions has become urgent. At the same time, the implementation of these processes required, in addition to the appropriate IT support, a certain level of knowledge and skills of working in the information environment, both among consumers and business entities. Digitalization is large-scale, and affects the areas from individuals' lifestyle and micro-business activity till large enterprises functioning and state police regulation. Today, the EU countries have developed and adopted many legislative documents that regulate the processes of digitalization of the economy at both individual entities and the country level. International organizations, governments of individual countries are guided by the provisions defined in The Digital Europe Program, Digital Education Action Plan, 2030 Digital Compass: the European way for the Digital Decade, and others. However, most developing countries were unprepared for these challenges, which had many economic (significant decline in GDP, business bankruptcy (especially SMEs)) and social (deterioration of living standards, social security) effects. The businesses of most countries with a low level of digital literacy are not ready to quickly reorient their activities to an online format. This has led to significant economic losses at both the micro and macro levels. This situation highlighted the need to minimize the gap between the existing and necessary for the stable development of the economy levels of digital development of all economic entities and increase their readiness to operate with the digital technologies.

**2. LITERATURE REVIEW**

Macroeconomic stability of the countries constitutes a constant search for ways to achieve the desired level of their economic growth, which implies a high economic potential for financing programs and activities, brings up and holds its position within the world. Some scientists consider macroeconomic stability as the ability to quickly adjust to market turbulence, changes in business conditions, crises in the economy through combinations of economic and managerial measures. This contributes to achieving competitive advantages in investing and starting a business in the country. In this sense, governments seek to identify specific properties and combinations of instruments and state programs that increase their economic stability.
Today there is a significant amount of papers exploring the role of digital transformation of the economy in the macroeconomic stability of the country. Nowadays, there is no unified understanding of the link between the digitalization of the economy and the indicators of its macroeconomic stability. According to the results of the paper’s analysis, it can be concluded that the diffusion of digital innovation in the economy has a lot of manifestations (Shkarlet et al., 2020; Bilan et al., 2019; Wolnicki and Płasecki, 2019; Vasilyeva et al., 2021; Novikov, 2021; Skrynnyk, 2020). Lyon (1996) considers the digitalization of the economy as a new stage in the historical development of society, which is the result of the second industrial revolution and is based mainly on microelectronic technology. Kozubikova and Kotaska (2019) concluded the significant role of digital innovation in the efficiency of public administration and their huge influence on its social development indicators. A similar opinion has Miller (1986), who claimed that digital innovations are one of the most important ingredients for economic progress. Countries that implement digital innovation can produce financial instruments aimed at minimizing or transferring financial risks.

According to Bacik et al. (2020), Cwiklicki and Wojnarowska (2020), Karaoulanis and Karaoulanis (2020), Kaya (2021), Mokhtar et al. (2020), the digitalization of the economy changes economic relations, the process of production, exchange, distribution, and consumption, affecting the economic policy of the government, the strategy of economic development of the state, and its economic security. Sekhar (2013) claimed that the higher level of digital innovation activity of the country is, the higher levels of its macroeconomic stability are. According to the author’s calculations in the context of digitalization of the economy, a significant share of gross domestic product is provided by activities for the production, processing, storage, and transmission of information and knowledge.

The digitalization of the economy has a significant impact on the development of the country’s financial market. Thus, Basri (2018), Redda et al. (2017), Njegovanovic (2018), Brychko et al. (2021) argued that the active use of digital technologies has a significant impact on the share of non-cash payments, contributes to the diversification of financial services, the development of online and mobile banking in the country.

A direct link between the digitalization of the economy and the stability of the financial sector was proved by Bhatt (1989). Based on empirical calculations, the author proved the impact of digitalization of the economy on the level of risk in the country’s financial market, the degree of diversifying investments.

In general, digital transformation of the economy influence the level of GDP (Chou and Chin, 2011; Vasilyeva et al., 2020; Obeid et al., 2020; Melnyk et al., 2018; Tuttiunyk et al., 2021), the competitive advantage of business (Bondarenko et al., 2020; Petroye et al., 2020; Chigrin and Pimonenko, 2014), its investment potential (Kliestik et al., 2020; Zolko and Georgiev; 2020; Kotenko & Bohnhardt; 2021; Kuzmenko et al., 2020), indicators of its financial (Kuek et al., 2021; Leonov et al., 2019) and labor (Smianov et al., 2020; Didenko et al., 2021) markets, ecology security (Vasilyeva et al., 2019; Leonov et al., 2019) etc.

Frolov and Lavrentyeva (2019), Kolosok et al. (2018), Lopez and Alcaide (2020), Vasilyeva et al. (2020), Skvarciany et al. (2021), Vorontsova et al. (2020); Lyeonov et al. (2021) emphasized the significant role of digitalization in the effectiveness of public policy. The link between the digitalization and the social and ecological development of the country was investigated by Didenko et al. (2020), Petrushenko et al. (2020), Pimonenko et al. (2021), Samusevych et al. (2021).

Thus, according to the Press Releases of Gartner, the results of the companies that have implemented artificial intelligence in their business in turnovers over the last four years is increased by 270%. According to Eurostat, the share of European companies that sell their products through e-commerce in 2016 reached 20%. At the same time, this indicator varies significantly in terms of countries and types of enterprises by size. Thus, in 2016, the highest share of companies involved in e-commerce was in Ireland, Denmark, Germany, Belgium, the Netherlands, Sweden, and the Czech Republic (over 25%), and the lowest (less than 10%) - in Latvia, Bulgaria and Romania. According to the report of the International Federation of Robotics, the robotics market is forecasted to grow by 175% over the next decade. However, at the same time, the
effects of digital transformation are not always positive. First of all, despite the significant advantages of introducing digital technologies in the activities of economic entities in developed countries, for developing countries today there are some undeniable strengths and certain barriers. Thus, while creating new jobs digitalization destroys or changes existing ones (workforce) greatly increasing the necessity for professional labor. It results in becoming jobless by many people and leading to inequality in wages. Moreover, the more governments and businesses rely on digital technologies the more they become vulnerable to attack, which brings up a threat of cyber terrorism. Furthermore, low indicators of economic development of developing countries and the lack of financial resources form the preconditions for determining the latest raw material bases for the leading countries. Digital processes and transformation within economic and financial sectors provide the intensive increase of shadow transactions. Everything mentioned above is just some challenges developing countries will have to face during their attempts at digitalization. Given that the production of most goods and services in a pandemic is impossible without digital resources it would be appropriate to analyze the statistical significance between macroeconomic stability and the level of digitalization of the country.

Some authors argue that the digitalization of the economy leads to financial malpractice, increasing the level of the shadow economy and reducing the level of macroeconomic stability in the country (Brychko, 2019; Koibichuk et al., 2021; Limba et al., 2020; Lydeka and Karaliute, 2021; Kobushko et al., 2021; Papík and Papíková, 2021; Bilan et al., 2020b, Samoilikova et al., 2021; Lyulyov et al., 2021). Authors based on indicators of the development of the banking sector substantiated the link between the growth of the banking sector and its fragility and level of digitalization of the economy. At the same time, the authors emphasized the existence of a two-way relationship between the indicators. The level of economic development of the country determines the degree of spread of digital technologies in the economy. Countries with higher GDP growth rates, financial and investment potentials tend to have a higher level of digitalization of the economy.

It should be noted that our previous studies focus mainly on a more general analysis of indicators of macroeconomic stability of the countries in the context of economic and social determinants of its achievement. The analysis concludes that some economic indicators (tax revenues, tax rates, the level of shadow economy) harm the macroeconomic stability of the country and achieving its economic sustainable goals. Lyeonov et al. (2021), based on OLS and GMM estimators for 32 countries, conclude a positive and significant relationship between global growth opportunities of a country and a higher level of financial innovation.

At the same time, a considerable amount of our paper is devoted to the investigation of the digitalization of the economy and its impact on the indicators of economic and development of EU countries.

This paper aims to investigate the link between macroeconomic stability and the level of the digitalization of the economy based on the hypothesis about the linear relationship between these indicators.

3. METHODOLOGY

Given that the level of readiness of individual countries for digitalization differs significantly, the issues of ensuring the comparability of indicators between individual countries are relevant to conduct an interstate comparative analysis of the digitalization of the economy of these countries. Existing studies demonstrate attempts to conduct such an intergovernmental analysis, but most of them are based on individual indicators (Afonasova et al., 2019), which complicates the qualitative interpretation of the results, providing a generalized assessment and ranking of countries according to the relevant criteria. Instead, using the index method or the method of integrated assessment helps to avoid these shortcomings and to conduct a
comparative assessment of the degree of development of certain economic phenomena in different countries.

Comparative analysis of the theoretical basis for assessing the level of digitalization of the economy (Biegun and Karwowski, 2020; Roszko-Wójtowicz and Grzelak, 2020; Zolkover and Renkas, 2020; Yarovenko et al., 2021) testified that the simplest and most effective way to accumulate information about the country's digital transformation is to use international indices developed by leading rating agencies. One of the most popular indexes is the Digital Evolution Index (DEI). This index provides a comprehensive assessment of the level of the digital transformation for 90 economies based on 160 indicators into four key drivers: Supply Conditions, Demand Conditions, Institutional Environment, and Innovation and Change. The calculation of this index is based on 35 aspects of digitalization.

In addition to international indices that directly characterize the level of digitalization of the economy, there are a significant number of indices, some sub-indices of which reflect the level of digitalization of the economy. Systematization of indices that reflect the level of digitization of the economy is carried out in table 1.

### Table 1

<table>
<thead>
<tr>
<th>Indexes of Digital Transformation of economy</th>
<th>Sub-index</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Readiness Score (DRS)</td>
<td>Includes seven components: basic needs, human capital, ease of doing business, business and government investment, start-up environment, technology infrastructure, technology adoption</td>
<td>Cisco Corporate Affairs</td>
</tr>
<tr>
<td>Digital Economy and Society Index (DESI)</td>
<td>DESI is a composite index that summarizes relevant indicators on digital performance and tracks the evolution of countries in digital competitiveness. Includes 6 index groups: Connectivity, Human Capital/Digital Skills, Use of Internet, Integration of Digital Technology, Digital Public Services, Research and Development ICT</td>
<td>European Commission</td>
</tr>
<tr>
<td>Financial Development Index (FDI)</td>
<td>FDI is aggregate of the Financial Institutions index (Financial Institutions Depth index, Financial Institutions Access index, Financial Institutions Efficiency index) and the Financial Markets index (Financial Markets Depth index, Financial Markets Access index, Financial Markets Efficiency index)</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>Global Innovation Index (GII)</td>
<td>The Global Innovation Index is based on 80 indicators within these categories: political environment, education, infrastructure and business sophistication.</td>
<td>Cornell University, the World Intellectual Property Organization</td>
</tr>
<tr>
<td>Digital Competitiveness Index (DCI)</td>
<td>Knowledge (Talent Training and Education Scientific Concentration), Technology (Regulatory Framework Capital Technological Framework) and Future Readiness (Adaptive Attitudes Business Agility IT Integration).</td>
<td>World Competitiveness Center</td>
</tr>
<tr>
<td>Digital Evolution Index (DEI)</td>
<td>Supply Conditions, Demand Conditions, Institutional Environment, and Innovation and Change</td>
<td>Tufts University</td>
</tr>
<tr>
<td>ICT Development Index (ICTDI)</td>
<td>ICT readiness (reflecting the level of networked infrastructure and access to ICTs); ICT intensity (reflecting the level of use of ICTs in the society); ICT impact (reflecting the results/outcomes of more efficient and effective ICT use).</td>
<td>International Telecommunication Union</td>
</tr>
</tbody>
</table>

*Source:* developed by the authors based on Cisco Corporate Affairs, European Commission, International Monetary Fund, Cornell University, INSEAD, The World Intellectual Property Organization, World Competitiveness Center, Tufts University, International Telecommunication Union data

The Digital Transformation Index will be estimated by the following formula:
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\[ DTI = w_{DRS} \times DRS + w_{DESI} \times DESI + w_{FDI} \times FDI + w_{GII} \times GII + w_{DCI} \times DCI \\
+ w_{DEI} \times DEI + w_{ICTDI} \times ICTDI \]

(1)

where, \( w_i \) – a weighting coefficient of sub-index \( i \).

The weighting coefficients for sub-indices will be performed using the Fishburne formula.

<table>
<thead>
<tr>
<th>The rank</th>
<th>Weighting coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Readiness Score (DRS)</td>
<td>1,50</td>
</tr>
<tr>
<td>Digital Economy and Society Index (DESI)</td>
<td>5,00</td>
</tr>
<tr>
<td>Financial Development Index (FDI)</td>
<td>7,00</td>
</tr>
<tr>
<td>Global Innovation Index (GII)</td>
<td>3,50</td>
</tr>
<tr>
<td>Digital Competitiveness Index (DCI)</td>
<td>3,50</td>
</tr>
<tr>
<td>Digital Evolution Index (DEI)</td>
<td>1,50</td>
</tr>
<tr>
<td>ICT Development Index (ICTDI)</td>
<td>6,00</td>
</tr>
</tbody>
</table>

Source: developed by the authors.

The assessment of the level of macroeconomic stability of the country will be carried out using a model of the pentagon of macroeconomic stability "Macroeconomic stabilization Pentagon". This model is one of the most common in assessing the level of macroeconomic stability (Lyulyov et al., 2021) because it most fully achieves the goals of public policy to stabilize the country's economic development.

This model was developed by the director of the Institute of Finance in Warsaw, Professor of Economics Kolodko G. W. (1993) as a response to the need to stabilize the economy under the influence of internal and external imbalances. The basis for building this model is to consider 5 key indicators that characterize certain components of economic development:

\[ MSP = [(GDP \times U) + (U \times IR) + (IR \times SBB) + (SBB \times CA) + (CA \times GDP)] \times k \]

(2)

where GDP is the level of GDP growth; \( U \) – unemployment rate; \( IR \) – inflation rate; \( SBB \) – state budget balance to GDP; \( CA \) – current account; \( k = 1/2 \sin 72^\circ \)

Graphical interpretation of the obtained results is carried out using a pentagon, the vertices of which reflect the stability of individual indicators of macroeconomic stability. The area of the pentagon reflects the overall level of macroeconomic stability of the country.

All information and data appearing in the article correspond to 2001-2020. They were obtained through Cisco Corporate Affairs, European Commission, International Monetary Fund, Cornell University, INSEAD, The World Intellectual Property Organization, World Competitiveness Center, Tufts University, International Telecommunication Union data.

The practical implementation of the proposed approach to the analysis of the link between the level of digitalization of the economy and the level of macroeconomic stability was carried out based on statistics for EU countries: Croatia, Germany, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

The selection of such a sample of countries and the study period is due to the limited statistical data for calculating the digital transformation index and level of macroeconomic stability.
4. EMPIRICAL RESULTS AND DISCUSSION

According to the results of the analysis conducted in Table 3, the levels of macroeconomic stability and digitalization of economies have different rates of change. Most indicators are characterized by significant variability in their values. The levels of macroeconomic stability of the country are characterized by the greatest variability. During the period 2001-2020, the lowest levels of macroeconomic stability were in the Netherlands (20.15) and Romania (25.64). Significant fluctuations in the levels of macroeconomic stability of countries indicate the lack of effective and consistent policy to achieve a high level of macroeconomic stability of the country. Spain, Germany and Poland, as countries with high annual GDP growth rates, showed the best levels of macroeconomic stability.

In contrast to macroeconomic stability, the index of digitalization of the economy is characterized by greater stability. Sweden (35.91) and Germany (38.96) have the highest values, while the Netherlands (30.10) and Slovenia (29.85) have the lowest Index of Digital Transformation.

The correlation between the macroeconomic stability and the Digital Transformation Index is carried out by the Ordinary Least Squares method. The results showed the link between the indicators of macroeconomic stability and the Digital Transformation Index in terms of EU countries. Most results are statistically significant at 0.05%. For all EU countries, the link between the level of macroeconomic stability and the Digital Transformation Index has been confirmed. The correlation between MEC and GE is presented in table 4.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Max</th>
<th>Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Croatia</td>
<td>MEC</td>
<td>30.47</td>
<td>5.12</td>
<td>40.90</td>
</tr>
<tr>
<td></td>
<td>DTI</td>
<td>31.74</td>
<td>2.41</td>
<td>33.85</td>
</tr>
<tr>
<td>Germany</td>
<td>MEC</td>
<td>41.98</td>
<td>6.48</td>
<td>56.78</td>
</tr>
<tr>
<td></td>
<td>DTI</td>
<td>36.54</td>
<td>1.98</td>
<td>38.96</td>
</tr>
<tr>
<td>Netherlands</td>
<td>MEC</td>
<td>27.85</td>
<td>5.96</td>
<td>36.98</td>
</tr>
<tr>
<td></td>
<td>DTI</td>
<td>28.25</td>
<td>1.94</td>
<td>30.10</td>
</tr>
<tr>
<td>Poland</td>
<td>MEC</td>
<td>41.01</td>
<td>8.32</td>
<td>55.70</td>
</tr>
<tr>
<td></td>
<td>DTI</td>
<td>36.17</td>
<td>2.17</td>
<td>34.26</td>
</tr>
<tr>
<td>Portugal</td>
<td>MEC</td>
<td>31.44</td>
<td>6.85</td>
<td>37.89</td>
</tr>
<tr>
<td></td>
<td>DTI</td>
<td>35.06</td>
<td>2.23</td>
<td>32.96</td>
</tr>
<tr>
<td>Romania</td>
<td>MEC</td>
<td>30.95</td>
<td>7.05</td>
<td>35.98</td>
</tr>
<tr>
<td></td>
<td>DTI</td>
<td>33.28</td>
<td>1.96</td>
<td>35.96</td>
</tr>
<tr>
<td>Slovakia</td>
<td>MEC</td>
<td>32.74</td>
<td>6.95</td>
<td>38.98</td>
</tr>
<tr>
<td></td>
<td>DTI</td>
<td>31.07</td>
<td>1.25</td>
<td>33.69</td>
</tr>
<tr>
<td>Slovenia</td>
<td>MEC</td>
<td>34.96</td>
<td>6.72</td>
<td>40.85</td>
</tr>
<tr>
<td></td>
<td>DTI</td>
<td>27.85</td>
<td>1.03</td>
<td>29.85</td>
</tr>
<tr>
<td>Spain</td>
<td>MEC</td>
<td>40.25</td>
<td>5.47</td>
<td>47.98</td>
</tr>
<tr>
<td></td>
<td>DTI</td>
<td>30.42</td>
<td>1.57</td>
<td>32.65</td>
</tr>
<tr>
<td>Sweden</td>
<td>MEC</td>
<td>38.65</td>
<td>7.98</td>
<td>46.52</td>
</tr>
<tr>
<td></td>
<td>DTI</td>
<td>31.62</td>
<td>2.08</td>
<td>35.91</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations
Inna Tiutiunyk, Josef Drabek, Nataliia Antoniuk, Valentin Navickas, Pavlo Rubanov

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Since all series are nonstationary, and there may be a cointegration relationship between them. To select a model of the relationship between the macroeconomic stability and Digital Transformation Index we will test the hypothesis of the cointegration of data series by Johansen tests. The data in Table 6 indicate the cointegration of the analyzed data series. For all EU countries, the absolute values for 0 rank are more critical. For example, for Poland, the trace statistic (24.0*2) is more than 5% (15.41) and 1% critical value (20.04). It means that the series of variables MEC and DT are non-stationary and allows to accept the hypothesis of co-integration of the data series.

### Table 6: Johansen tests for cointegration

<table>
<thead>
<tr>
<th>Country</th>
<th>Rank</th>
<th>5% critical value</th>
<th>1% critical value</th>
<th>Trace statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Croatia</td>
<td>0</td>
<td>15.41</td>
<td>20.04</td>
<td>28,853</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3.76</td>
<td>6.65</td>
<td>8,345</td>
</tr>
<tr>
<td>Germany</td>
<td>0</td>
<td>15.41</td>
<td>20.04</td>
<td>25,703</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3.76</td>
<td>6.65</td>
<td>8,115</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0</td>
<td>15.41</td>
<td>20.04</td>
<td>14,163</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3.76</td>
<td>6.65</td>
<td>1,655</td>
</tr>
<tr>
<td>Poland</td>
<td>0</td>
<td>15.41</td>
<td>20.04</td>
<td>13,613</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3.76</td>
<td>6.65</td>
<td>1,451</td>
</tr>
<tr>
<td>Portugal</td>
<td>0</td>
<td>15.41</td>
<td>20.04</td>
<td>37,819</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3.76</td>
<td>6.65</td>
<td>10,938</td>
</tr>
<tr>
<td>Romania</td>
<td>0</td>
<td>15.41</td>
<td>20.04</td>
<td>33,690</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3.76</td>
<td>6.65</td>
<td>10,636</td>
</tr>
<tr>
<td>Slovakia</td>
<td>0</td>
<td>15.41</td>
<td>20.04</td>
<td>18,564</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3.76</td>
<td>6.65</td>
<td>2,169</td>
</tr>
<tr>
<td>Slovenia</td>
<td>0</td>
<td>15.41</td>
<td>20.04</td>
<td>17,844</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3.76</td>
<td>6.65</td>
<td>1,902</td>
</tr>
<tr>
<td>Spain</td>
<td>0</td>
<td>15.41</td>
<td>20.04</td>
<td>27,496</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3.76</td>
<td>6.65</td>
<td>7,953</td>
</tr>
<tr>
<td>Sweden</td>
<td>0</td>
<td>15.41</td>
<td>20.04</td>
<td>24,494</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3.76</td>
<td>6.65</td>
<td>7,733</td>
</tr>
</tbody>
</table>

The data in Table 6 indicate the causality of the data series with high statistical significance. That is, increasing the level of digitalization of the economy could increase the level of macroeconomic stability of the country, and conversely, reducing the level of macroeconomic stability could increase the level of digitalization of the economy. The stationary and the cointegration of the data series indicate the causality expediency of build the VAR model of the relationship between the level of digitalization of the economy and macroeconomic stability.

To determine the optimal lag structure in the VAR model, we use tests for maximum lag and exclusion. According to the tests for maximum lag and exclusion the maximum lag for Croatia is 2 years, Poland – 2

Source: Authors’ calculations
years, Slovakia – 3 years. The Akaike, Hannan-Quinn, Schwarz Bayesian criteria for the VAR model are shown in Table 7.

The Akaike, Hannan-Quinn, Schwarz Bayesian criteria for VAR model

<table>
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Source: Authors’ calculations

The results of the assessment allow us to build a VAR model that confirms the existence of a link between the level of macroeconomic stability and the Digital Transformation Index in EU countries. To visualize the responses of the model parameters to single and accumulated shocks of the Digital Transformation Index we build a graph of single shocks (Figure 1).

Figure 1. Impulse function of the macroeconomic stability to the shocks of the Digital Transformation Index

Source: Authors’ calculations

The simulation results showed the sensitivity of the macroeconomic stability of the analyzed countries to the shocks of the Digital Transformation Index. Thus, the obtained results confirm the importance of implementing measures aimed at increasing the level of digitalization of the economy as a prerequisite for increasing its macroeconomic stability.
5. CONCLUSION

The study shows that there is a statistically significant link between the level of macroeconomic stability and the Digital Transformation Index for the majority of EU countries. Considering the important role of digital transformation in doing business, the correlation between them indicates, on the one hand, the relationship between the economic and technical development of the country, and on the other hand, can serve as a tool of prediction of the level of the macroeconomic stability. Based on the put forward hypothesis, an approach was proposed to estimate the Digital Transformation Index, based on the set of international indexes.

Thus, the results of the analysis indicate the necessity to consider the level of digitalization of the economy in the process of developing a methodological toolkit for increasing the level of the macroeconomic stability of the country.

Despite the current limitation of the sample size for some countries it is impossible to make general and fundamental conclusions. However, the reasons for the significant differences in the obtained results and the results of research conducted by scientists using other methods of assessing the level of macroeconomic stability are not analyzed in more detail.

Secondly, we do not consider the fact that for some factors an average correlation can be increasingly caused by the similarity of tendencies regarding the changes in these indicators, but not by the close relationship between them.

The aim of further research may be to define the tightness and nature of the relationship between the level of business competitive advantages and the Digital Transformation Index.

ACKNOWLEDGEMENT

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