CENTRAL AND EASTERN EUROPE IN THE FACE OF GLOBAL TRENDS:

Economy, Society and Business

SGH WARSAW SCHOOL OF ECONOMICS REPORT

Eliminating wealth gap between Central and Eastern Europe and Western Europe

Average annual GDP growth rate in 1990-2018 in Poland was the highest in the group of eleven countries of Central and Eastern Europe and almost three times higher than in the 'old' EU-15 states.
Poland has closed the development gap in respect of GDP per capita as compared to Greece in 2015 and in 2019 it will probably exceed Portugal. Assuming that the average growth tendencies will remain at the current level, Poland will need 14 years to achieve the average income per EU-15 citizen and 21 years to catch up with Germany.

The assessment of economic growth in the Central and Eastern Europe countries in 1990-2018 should take into account deep economic breakdown (so called 'transformation recession') that occurred as a result of launching the process of system transformation. Switching former centrally planned economy to market economy caused in the beginning of transformation accumulated drop of production and national domestic product by as much as 18% in Poland and almost 65% in Lithuania. The period of transformation recession in the region lasted from 2 years in Poland to even 8 years in Bulgaria.

The transformation recession made the wealth gap between Central and Eastern Europe and Western Europe even bigger in the initial years of the system transformation. While in 1989 (the last year of socialist economy) GDP per capita calculated considering purchasing power parity (PPP) in Poland accounted for 38% of the average GDP in EU-15 countries, in 1991 (when the transformation recession ended) it fell down to 32%. It should be added that before the beginning of the transformation Poland was one of the least economically developed countries in the CEE-11 group and in respect of GDP per capita based on PPP it exceeded only Romania.

The table below shows economic growth in 11 countries of CEE compared to the Western Europe (EU-15 average), taking into account effects of the transformation recession. The fastest growing economy in the entire group was Poland. The average GDP growth rate in Poland in 1990-2018 was 3.2% and was the highest among CEE-11 and almost three times higher than in the 'old' EU-15 states (1.3%). The only country that had undergone transformation and had a similar development rate was Slovakia (2.5% annually).

In the period following Poland's accession to the EU, Poland's GDP grew by 72% (i.e. on average by about 4.2% a year). Similarly to the entire period of system transformation, our country was in this respect a leader in the group of new EU Member States (only Slovakia had a similar growth rate at that time

GDP growth in Central and Eastern Europe countries in 1990-2018

Country	Average annual growth rate in %	GDP in 2018		
	1990-2018	1989=100	2004=100	2010=100
Poland	3.2	246	172	131
Bulgaria	0.9	128	153	121
Croatia	0.4	113	116	109
Czech Republic	1.7	165	144	120
Estonia	2.0	178	144	135
Lithuania	1.0	132	152	133
Latvia	0.9	129	143	132
Romania	1.6	157	161	134
Slovakia	2.5	202	169	126
Slovenia	1.8	169	130	115
Hungary	1.6	157	126	122
UE15[a]	1.3	147	118	112

[a] Weighted average
For calculating growth rate based on 1989 = 100 historical data of the European Bank for Reconstruction and Development (EBRD) for the year 1989 were used.
Source: own study by SGH Warsaw School of Economics based on data of Eurostat, European Commission and the Polish Central Statistical Office.

– 69%). Simultaneously, Poland also had a much higher growth rate than EU-15 countries. It should be highlighted that in 2004-2018 all the CEE-11 countries, except Croatia, had a higher economic growth rate than the average for EU-15 economies, which meant reduction of the historic wealth inequality with the Western Europe.

The process of real convergence in Poland was the fastest, compared for example to Portugal and Greece. As for Greece, Poland eliminated the development gap with this country in 2015, and in subsequent years exceeded it in respect of GDP per capita. It is highly probable that this scenario will be repeated in the coming years for Portugal. The scenario is confirmed by the latest forecast of IMF, according to which in respect of wealth measured in such way Poland will exceed Portugal as soon as by the end of 2019.

Forecasts of closing income gap for Poland are optimistic. If the average growth rate from the period after Poland's joining the EU maintains the same, Poland will need 14 years (from 2018) to reach the EU-15 average income per capita. This period would extend to 21 years if Germany was taken as a reference point.

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Condition of the economy and banking sector in the Central and Eastern Europe

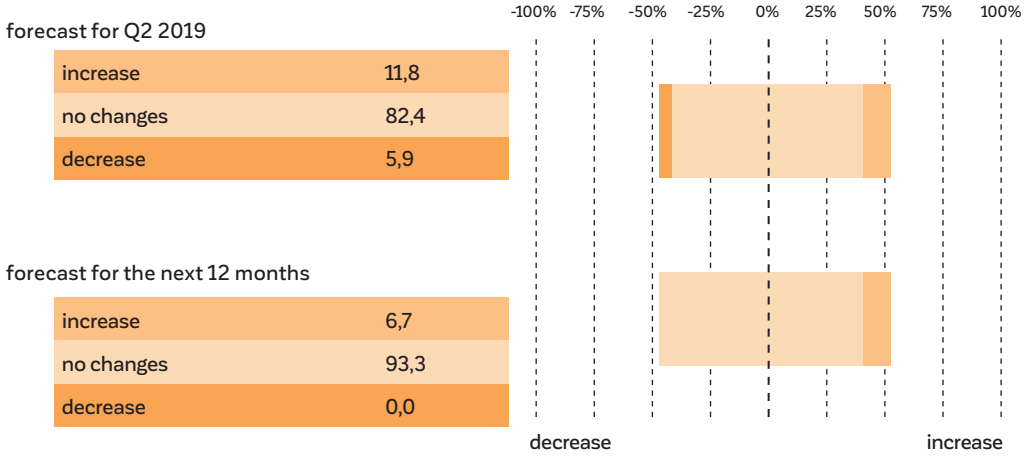
The economic slowdown in the Central and Eastern Europe forecast a year ago is happening. The slowdown is not well visible in the changes of variables analysed for a classical cycle, which may be calming for politicians responsible for the economy.
The banking sector perceives the national economic situation slightly better than conditions for carrying out banking business.

The economic slowdown in the Central and Eastern Europe forecast a year ago is happening. The tendencies visible in the autumn 2018, mainly in the qualitative data collected as a part of the analysis of the economic condition using the test method, seem to be visible also in the quantitative data collected by statistical offices. It should be stressed however, that the slowdown is not well visible in the changes of variables analysed for a classical cycle, which may be calming for politicians responsible for the economy. It is true though that increment of these variables in subsequent months is smaller. Clear symptoms of a slowdown are visible in the variables' deviation from a long-term trend. Values of cyclical components, distinguished both for the European Union and for some countries of the Central and Eastern Europe, are falling, which means that these variables are undergoing a decline stage of the deviation (growth) cycle. It is visible for all the examined variables: gross domestic product, sold processing industry output, household consumption, investment, as well as economic condition indicators. Analysis of cyclical components of the examined variables allows to distinguish them in the upper turning points signifying the beginning of a decline phase of the deviation cycle. For most countries it is the year 2018. The analysis shows significant similarities of cyclical fluctuations between the Central and Eastern Europe countries and the European Union. Economic indicators were showing even two quarters beforehand that the slowdown was coming, thus proving the usefulness of the economic condition examination for monitoring economic activities.

The analysis indicates the following threats for the economic growth in the region: pan-European nature of the EU economic area slowdown spreading to individual Central and Eastern Europe countries; economic growth maintained mainly by consumption, which is effective in the short term; and a decline in expenditures, which are a source of long-term economic production growth, especially in the private sector.

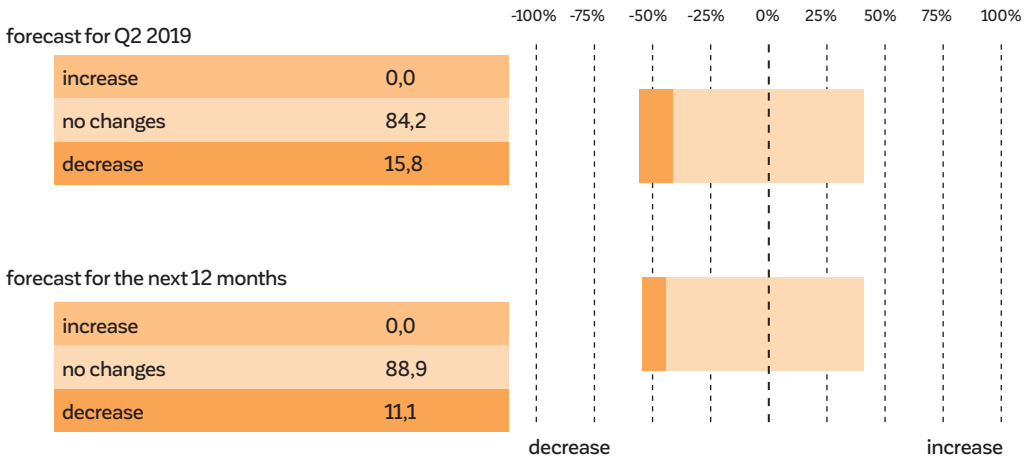
One of the first symptoms of economic situation changes may be lending activities in the enterprise sector. The banking sector, responding to this process, could have been used to assess the tendencies and possible changes in the economic condition. In crisis situations feedback between banks and the economy can be observed. Financial crises have usually made recession processes more serious and slowdowns have resulted

Figure 1. General economic condition of Poland irrespective of the financial sector condition



Source: own study on the basis of IRG SGH data.

Figure 2. General situation of the financial sector versus the Polish economy



Source: own study on the basis of IRG SGH data.

in aggravation of the banking sector condition. At present the banking sector perceives the national economic situation slightly better than conditions for carrying out their business.

Notably, the banks' perception of the future economic condition is very changeable. It has been so for about five years. During this time the European Union has carried out a lot of reforms to increase the security and stability of the banking sector by creating institutions and regulations for a banking union. Also in Poland, despite a high rate of economic development, the banks have been focusing on extending their capital base and increasing capital adequacy ratio. It is a response for the regulators' expectations.

Since the 4th quarter of 2008 most respondents of a survey on the banking sector condition have been predicting that the currently observed economic situation in the country will be maintained. Similar views can also be found among forecasts for the 2nd quarter of 2019. The share of respondents expecting lack of any changes of the economic condition in the short term is 82.4% (figure 1). Other banks predict improvement of the economic situation (11.8%) or its deterioration (5.9%). In the coming period we should therefore expect a similar rate of economic growth to the rate observed so far. Long-term forecasts also indicate that the current situation will not change (93.3% – no changes, 6.7% –growth).

Currently the share of banks with a negative assessment of the financial sector is higher than the share of those with a positive assessment. The percentage of respondents not predicting any changes in the sector situation in short-term perspective is 84.2%, while the remaining respondents express negative views on short-term perspectives for the financial industry (figure 2). Long-term forecasts are similar – 88.9% of respondents predict lack of any changes, while 11.1% predict that the situation will become worse.

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Strategies of development of mobility service in Central and Eastern Europe against the background of global challenges

Local authorities should create urban mobility systems in such a way so as to ensure their inhabitants good access to public services, at the same time protecting public budgets from excessive expenses for roads development, and the urban environment – from degradation.

In recent years the word 'transport' has been more and more commonly replaced by the word 'mobility'. It is supposed to highlight two issues in the transport system theory applied so far. The first issue is a greater emphasis on the needs of the transport system users, connected not only with the intention of moving, but also with the basic need to have the simplest possible access to specific services. The second issue is more and more clearly expressed significance of non-motorised transport in order to satisfy this need, which is somewhat paradoxical if we consider growing popularity of motorisation, but also problems it entails.

Therefore, while solving the problem of transportation to work or school in line with classical transport paradigms consists mainly in facilitating movement by e.g. building roads, underground lines or launching bus connections, solving the same problem in line with the mobility paradigm consists in looking for the easiest access to work or school. Firstly, there is a tendency to reduce the necessity to cover a long distance. It can be achieved by popularisation of ICT and co-working solutions and reduction of distance by proper spatial planning (which gives the adults and children more possibilities to walk or go by bicycle). Secondly, by a suitable location of work and education facilities, as well as dwelling houses along effective transportation lines, and lastly – by effective creation of the transportation system, including its linear and nodal infrastructure.

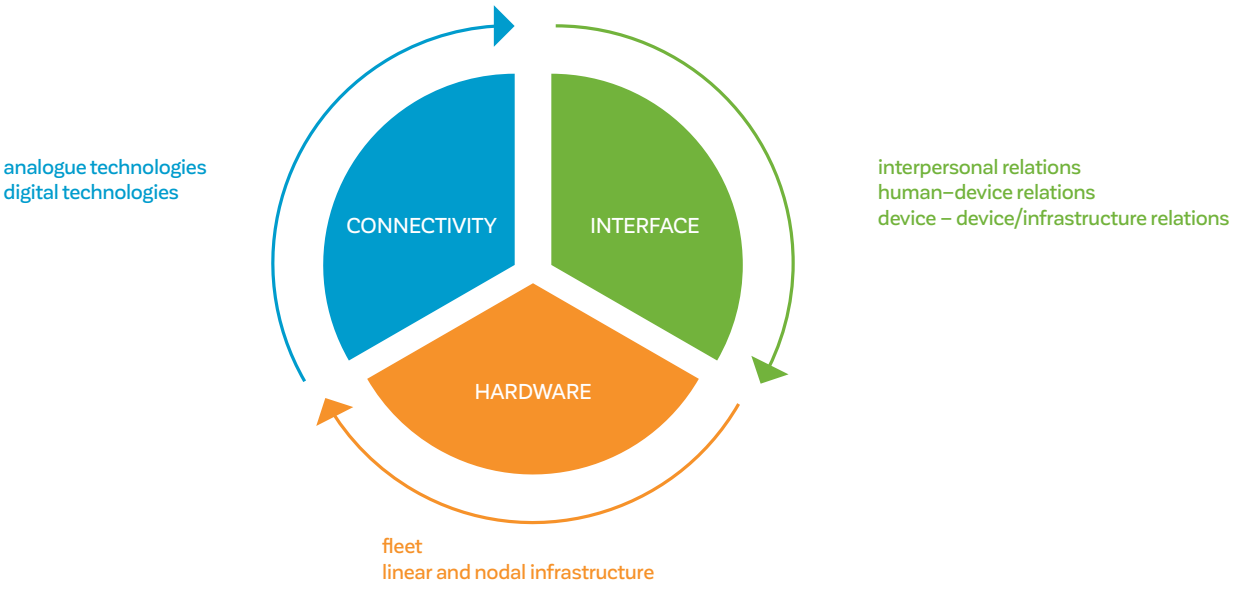
Mobility defines accessibility of points of physical and social space – both due to proper planning of travel generators in space, and effective construction of transport system, taking into account non-motorised travels, needs of people with disabilities and the necessity to reduce the negative environmental impact. What should be considered is both conditions related to the freedom of choice as well as social and economic impact (including ensuring access to work, education and consumption), and environmental and climate requirements.

Previous failures of infrastructure development lead to the conclusion that local authorities should create urban mobility systems in such a way, so as to ensure the inhabitants good access to public services, at the same time protecting public budgets from excessive expenses for roads development, and the urban environment – from degradation.

The first group of solutions that guarantees implementation of sustainable mobility is connected with so called **Transport Demand Management** (TDM). These measures include, among others, designing so called *mixed-use developments*, i.e. districts, streets or even buildings which combine various functions – of a residential area, services or workplace, as well as polycentric development, consisting in locating the largest possible number of central functions (e.g. universities, secondary schools) also in local (district) centres. Such design naturally reduces demand for transport, but does not limit access to public services, and even improves it. Such spatial development is very effective also in respect of protection from noise, as areas along main transport lines may be used for service facilities, which serve as a screen, protecting buildings located behind them from noise. The opposite of *mixed-used developments* are single-purpose districts, where providing transport services is very difficult: traffic there is very heavy during a short period of time and it moves in one direction. It therefore needs expensive infrastructure with large capacity, which in fact is fully used only for a few hours a day.

The second group of solutions ensuring sustainable mobility is related to **creating competitiveness of public transport**. It should be therefore highlighted that the attractiveness depends mainly on frequent, reliable movement of means of transport and ensuring a short time of travel. These features are easiest to create in highly urbanised areas with relatively large flows of commuters, whose needs are satisfied almost 24/7. Additionally, the time of travel depends also on the time of walking to or from a bus or tram stop. That is why the basis of building public transport attractiveness is so called *Transit Oriented Development* (*TOD*) – orientation towards public transport users by, for example, locating rail transport separated from road transport in the centres of districts. A good example may be housing quarters from 1960s, 1970s and 1980s built in the entire region of Central and Eastern Europe, such as Gropiusstadt in Berlin or Ursynów in Warsaw.

Three elements of mobility service system in line with the MaaS concept: connectivity, interfaces as intangible assets and hardware as tangible assets.



Source: own study by SGH Warsaw School of Economics

In recent years a concept of Mobility-as-a-Service (*MaaS*) has been more and more popular. The figure presents three basic elements of the mobility service system pursuant to the MaaS concept: connectivity, interfaces and hardware. The era of digital transformation provides conditions for connectivity covering all the participants of the social and economic system, most of whom use mobile devices. Consequently, they can participate in the functioning of real and virtual world at all times and in all places. All the connections between these participants, between a human, a fixed facility and a mobile device, including means of transport such as connected car, and also between mobile devices and facilities (V2X) are some kind of interfaces. Their functioning determines the quality and quantity of intangible assets. The processes of transportation (when a person assumes the active role of a prosumer of mobility services) and travel (when a person is a passive consumer of mobility services) happen in the real world made of tangible assets.

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Ecology (eco-innovations) in Central and Eastern Europe in the face of global challenges

Most CEE countries, especially Member States of the European Union, in their public policies take into account the need of development of eco-innovation to protect the climate.

Climate change is currently the major environmental threat for the humanity. Growth of CO^2 emissions, despite long-term international efforts to reduce them and thereby stop climate change and its devastating effects for international relations stability and economic development, as well for the quality of life of global population, results in an intensified search for zero-emission technologies.

The analysed group of countries is institutionally diversified in respect of eco-innovation support. The factor of division is the European Union membership. In this group of countries the system of institutions and eco-innovation support oriented towards obtaining technologies of electricity generation, energy effectiveness and zero-emission transport is most developed. In Bulgaria a plan of technology development *The Innovation Strategy for Smart Specialisation for (2014-2020)* is being implemented. A programme *Enhancing the energy efficiency in large enterprises* financed by *Operational Programme 'Innovation and Competitiveness'* (2014-2020) (OPIC), pursuant to which large companies receive support to implement regulations for sustainable growth and competitive economy. Innovative activities may be carried out according to the European *Strategic Energy Technology Plan for Europe* (SET plan).

In Croatia a range of strategic documents are in force, regulating development of renewable sources of energy and zero-emission technologies. These include *Strategy of Education, Science and Technology, the Smart Specialization Strategy of the Republic of Croatia 2016-2020)* and *Innovation Promotion Strategy of the Republic of Croatia 2014-2020*. Tools for effecting the Croatian strategies are 'Competitiveness clusters' gathering small and medium-sized enterprises research centres and local authorities.

The Czech Republic recognises the need for innovation in the area of low-emission technologies. This country has introduced THETA programme, which focuses on the power sector. It is managed by the Technology Agency of the Czech Republic. The programme is divided into sub-programmes: research carried out in public interest, strategic energy technologies, long-term technology perspectives. They are based on the priorities of the EU SET Plan, but THETA is a programme based purely on energy. As a part of THETA implementation Competence Centres have been established such as Competence Centre for Energy Recovery of Waste, Centre for Advanced Nuclear Technology (CANUT), Advanced Technologies for Heat and Power Generation, Centre for Research and Experimental Development of Reliable Energy, and Centre for the Development of Technologies for Nuclear and Radiation Safety: RANUS – TD and National Energy Centre.

Estonia has an innovation strategy for the years 2014-2020 entitled *Knowledge-based Estonia*. The strategy focuses the technological efforts on the provision of electric power, biomass and transport fuels, as well as energy efficiency. As a small country, Estonia participates in the SET Programme and develops cooperation in the Baltic Sea region as a part of Nordic Energy Research (EST 2018). The aim of the policy is to look for technologies which would reduce CO_2 emission in 2012-2030 in the most cost-effective way.

Latvia has its *Research and Innovation Strategy of Latvia for Smart Specialisation* (RIS3), which is to reach objectives provided for by Guidelines for the Development of Science Technology and Inovation 2014–2020. One of GDSTI2020 objectives is improvement of industry competitiveness. RIS3, which is an economic development strategy, assumes "areas of smart specialisation", which involve concentration of resources on areas which may gain advantage.

Slovakia introduces *Draft State R&D programmes for 2019-2023 with outlook to 2028*, comprising the following activity areas: improvement of transmission and security of power grid, smart grid, RES and nuclear power. The strategic objective is low-emission industry, ensuring good quality, safe and effective resources of all forms of energy, although it has been highlighted that electric power is of key importance. Slovakia stresses the need to integrate RES in the system and to develop prosumers, i.e. producers and consumers of energy.

Slovenia implements the *Slovenian Industrial Policy* (SID) (2013-2020), aimed at restructuring the energy sector through innovations so that it becomes more sustainable, and better international business flows. A more detailed strategy was adopted by Slovenia in 2015 – *Slovenia's Smart Specialisation Strategy (S4)*, the aim of which is to enhance innovation in economy, including its new fields. The goal is to find market niches.

The institutional system in the group of analysed countries being the Member States of the European Union is functioning well. To a considerable extent it is a derivative of requirements of the EU climate and energy policy. In a sense it is a result of the membership of these countries in the European Union, which makes them adopt regulations already in force and subsequently participate in their creation and implementation. European Union policy and related obligations have a crucial effect on the institutional framework of their functioning, as well as goals set by them.

In countries which are not members of the European Union it is more difficult to analyse the institutional system, since regulations in this respect are non-existent although they are being prepared, as for example in Ukraine. Ukraine has established *National Energy Efficiency Fund* aimed at improvement of energy efficiency of multi-family and single-family houses. It is of key importance for the improvement of energy security of Ukraine, since it allows for reduction of gas consumption in the construction sector. Therefore, the aim in this case is not to build competitive advantage, but to maintain security, which is a major value for Ukraine. The programme *Road Map on Renewable Energy Development 2020* (RMRED 2020), has also been established to introduce solar and wind energy. The effect of the RMRED 2020 programme will be an increase in the share of RES in power production to 11% in 2020. Since 2014 the volume of investment has reached EUR 2 billion, and in 2018 alone it was EUR 800 million. The parliament processes regulations concerning the auction system, biodiesel, electric cars and co-generation. They are to be adopted in 2019.

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Health Condition and provision of care for the elderly in Central and Eastern Europe

The highest percentage of elderly people experiencing support gap is reported in countries such as Hungary, Poland, Slovenia or Estonia, characterised by familiarism. Appropriate actions should be taken to prepare individuals and the society for demographic old age

Since the beginning of 1990s Central and Eastern Europe countries have been experiencing deep demographic changes, as a result of which in two decades they will become demographically the oldest societies. Increase in the share of the elderly, including old-aged people, means higher demand for care for seniors. The analysed countries are characterised by familiarism, or a care model where care is provided mainly within informal support network, and in some cases it is also backed by a formal care service.

These countries differ in respect of the rate of advancement of the population ageing process, health condition of old people and the rate of satisfaction of their care needs. According to results of analyses, the health condition of old people is relatively the best in the Czech Republic and Slovakia, while it is worse in Poland, Estonia, Slovenia, Croatia and Romania.

The divergence between care needs resulting from the health condition of elderly people and the rate of their dependency, as well as received help and support creates a **support gap**, i.e. unsatisfied care needs. The support gap may be defined in two respects. The first respect refers to care needs not satisfied by the family network and informal support networks, or the gap between a person's care needs and their satisfaction by relatives and close non-relatives (neighbours, acquaintances, friends). The second respect refers to a gap remaining after receiving care from family members or non-relatives, purchasing care services, receiving support provided by non-government organisations or local and central government authorities.

The table below presents assessment of support gap I and II for six Central and Eastern Europe as a share of people aged 65 and more for whom unsatisfied care needs have been reported.

The highest percentage of elderly people experiencing support gap is reported in countries such as Hungary, Poland, Slovenia or Estonia, characterised by familiarism. This means that it is mainly the family who provides care for an older person, and public institutions help only when the care dysfunction is already advanced. A visibly smaller percentage of the elderly whose care needs were unsatisfied was reported in Croatia (about 15%) and Czech Republic (about 11%). The Czech Republic, despite the fact of being a post-communist country, has a much smaller support gap than other countries from this group, which places it among states with social-democratic model of social policy. Social policy in countries with social-democratic model aims to create conditions providing the best care for the elderly. The state not only supports family and caregivers, but actively provides care-related infrastructure and services for the elderly.

The predicted increase in the number of the elderly by 2050 and fast growth of old people with the current system of care based on family will generate greater demand for care. It can be therefore presumed that with the lack of proper actions of individuals, families, public institution and care services market, the support gap in the future can affect even more seniors. It is therefore recommended to take relevant steps to prepare individuals and the society for demographic old age.

Support gap I and II in some European countries (%)

Country	Support gap I	Support gap II
Czech Republic	10.7	10.4
Croatia	14.7	14.6
Estonia	17.8	17.6
Slovenia	21.8	21.8
Poland	26.4	26.4
Hungary	30.7	30.6

Source: own calculations of SGH Warsaw School of Economics based on SHARE survey (wave 4 - Hungary, wave 6 - Croatia, Estonia, Slovakia, wave 7 - Poland, Czech Republic). Unweighted data.

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The role of digitisation and modern technologies in raising innovativeness of the Central and Eastern Europe countries

Most economies of the Central and Eastern Europe (CEE) are still at the stage of Economy 3.0. The only positive exceptions are Estonia and Czech Republic. Enterprises from the rest of the CEE countries, including Poland, only to a small extent engage in the processes of production automation, use of 3D print, big data analysis and use of computing clouds.

In respect of rate of economy innovation, CEE countries are only moderate innovators.

The rate of innovation of CEE countries in the light of objectives of the Europe 2020 strategy is relatively low, especially in the area of expenses for research and development. The worst situation in this respect is in Romania, where expenditures for R&D account only for 0.38% of its GDP, especially considering its ambitious target of 2% in 2020. Also Estonia has set a high target (3%), but this country already dedicates the most money for R&D, i.e. 1.44% of its GDP. Slovakia and Hungary have relatively good results (measured by the pace of reaching the target). Poland gradually gets closer to its assumed goals, but in the case of investment in R&D in 2020, the 1.7 percent share of R&D in GDP seems infeasible. In 2016 in Poland expenses for research and development still accounted for less than 1% of GDP. For the two remaining targets of Europe 2020 strategy, i.e rate of early school leavers and share of people having completed higher education most CEE countries either have reached the targets or are close.

Most economies of our region are still at the stage of Economy 3.0. The only positive exceptions are Estonia and Czech Republic. Both these countries are reaching clearly higher rates of innovation, competitiveness and digital transformation than the remaining Central and Eastern Europe countries, and often even above the UE-28 average. Enterprises from the rest of the CEE countries, including Poland, only to a small extent engage in the processes of production automation, use of 3D print, big data analysis and use of computing clouds. Slovakia, Bulgaria, Poland, Lithuania and Romania have been found among the countries with conditions which are the least advantageous for digital transformation development. These countries are threatened by a lack of possibility to bring their industries closer to the EU average and gaining competitiveness in the conditions of Economy 4.0. Hungary, Lithuania and Estonia are considered to be countries where the business environment is moderately conducive to such transformation. They have the potential to catch up and reach convergence with the EU-28 countries, provided they make correct decisions concerning their industry policies.

It is impossible to indicate one aggregate measurement tool for all the aspects of economy innovativeness. Institutions developing these rates use many various measurements, both macroeconomic and microeconomic. Consequently, simple comparisons are impossible, but a general conclusion is that the CEE countries are not more than moderate innovators, although some progress can be observed in some areas (e.g. in Poland in the field of environment conducive to innovation). Also, it can be generally stated that most countries of the CEE region experience weaknesses in the area of cooperation between science and business, as well as poor academic entrepreneurship and low rate of internationalisation of research. Poor innovativeness of small and medium-sized enterprises is also a problem in many countries. It may result both from insufficient amount of funds for financing innovative ideas, and from insufficient investment in raising digital qualifications of workers. A positive sign is a relatively large population of doctoral studies graduates of natural science, engineering and IT faculties in Poland, as well as the fact that Poland is a leader in respect of share of women on these faculties. Education on the exact science faculties is desirable from the point of view of digital economy.

Solutions that could help accelerate digital transformation of enterprises and economies include:

- Designing and regular implementation of the digital transformation strategy;
- Incentives for enterprises stimulating investment in R&D;
- Stimulating academic entrepreneurship in the field of digital transformation;
- Initiating common undertakings of scientists and enterprises;
- Ensuring grants for scientists and enterprises for initiatives connected with digital transformation;
- Increasing the role of private funds (e.g. in the form of business angels or venture capital funds) in financing innovative solutions;
- Improvement of processes of recruitment and selection of staff with digital competences.

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Current trends in optimisation and tightening tax systems in Central and Eastern Europe

The stage of development of contemporary taxation systems in Central and Eastern Europe in respect of income tax does not differ significantly from the schemes applied in highly developed European countries. Generally, they are simpler and less strict.
The states which, according to European Commission's calculations, deal (have been dealing) with the biggest VAT gap, have recently made the biggest efforts to tighten the system.

An empirical evidence of growing problems with the effectiveness of VAT (value-added tax) collection is the increase in the so called "VAT gap". It shows the difference between theoretical (assessed, according to the most popular top-down method, on the basis of macroeconomic aggregates) and actual receipts from VAT. It can be therefore interpreted as a measurement of potential (enforceable with certain VAT rates) receipts from this tax. However, it must be highlighted that the 'VAT gap' reflects not only phenomena such as fiscal crime, tax avoidance or grey market, but also consequences of enterprises bankruptcies' or errors in tax settlement. What is more, the size of the 'VAT gap' depends on the adopted methodology and assumptions, as well as estimation errors, which is common in the case of reference to theoretical values.

A review of legislation changes in the area of VAT regulations introduced in various European Union states in recent years leads to the conclusion that it is those states which, according to the European Commission's calculations, deal (have been dealing) with the biggest VAT gap (fraudulent VAT refund) that have recently made the biggest efforts to tighten the system.

The applied solutions are multi-faceted and cover various areas. Undoubtedly they are supported by technological development (as in the case of VAT Control Statement, or electronic fiscal cash registers). It can be also noted that the introduced changes are supposed to directly counteract fraudulent tax refund, taking into account the ways in which dishonest taxpayers act. It is also worth highlighting that some of these modifications applied in the European Union states (including Central and Eastern Europe) are of a similar nature (especially when the Czech and Slovak regulations are compared).

The stage of development of contemporary taxation systems in Central and Eastern Europe in respect of income tax does not differ significantly from the schemes applied in highly developed European countries. Generally, they can be defined as a bit simpler and less strict in fiscal respect. This phenomenon is a consequence of the need, recognised by CEE countries, to adapt established, relatively simple schemes resulting from the transformation. The lack of complexity of fiscal administration and a more or less visible tendency to take advantage of a simple tax competition were the reasons why these countries adopted simple schemes that only with time were being gradually complicated.

The main contemporary trend in the development of taxation systems of the CEE countries is adapting fiscal solutions to legal standards introduced by the European Union. There are also specific objectives, different in individual countries, which in general are supposed to reduce taxation burden, support investments and activities conducive to growth, such as making the tax scheme more comprehensible, tightening tax collection rules, which usually entails greater efficiency of fiscal administration. Sometimes, apart from defence against tax abuse of neighbouring countries, also disloyal measures are used, aimed at overtaking part of the tax base of the neighbouring countries. This phenomenon is never an official policy.

The overall trends that can be observed do not differ much from schemes affecting taxation systems of EU Member States. Trends in Western Europe comprise solutions supporting employment and environmental policies. In the long-term perspective these phenomena will probably also occur in the Central Eastern Europe countries.

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A list of changes introduced to tighten taxation systems in some CEE countries.

Regulation feature /country	Poland	Czech Republic	Slovakia	Hungary	Bulgaria	Romania
Transfer pricing						
Application of the arm's length principle	Yes	Yes	Yes	Yes	Yes	Yes
Significance of OECD guidelines	No implementation, the guidelines are taken into account by assessment methods	No implementation recommendation of tax authorities to apply the guidelines	An explanatory instrument without a clear legal basis	Reference to the guidelines	The guidelines are observed, without clear reference, with some deviation	Reference to the guidelines
Methods of income assessment provided for by the OECD guidelines	Yes, without a hierarchy	Yes, without a hierarchy	Yes, without a hierarchy	Yes, without a hierarchy	Yes, hierarchy, CUP method is preferred	Yes, hierarchy, CUP method is preferred
TP documentation	Yes, sanctions	Yes, sanctions	Yes, no specific sanctions	Yes, sanctions	Yes, sanctions	Yes, sanctions
GAAR						
Scope of implementation	Broad (defined GAAR terms, specific procedure and institutions)	Simple	Simple	Simple	Simple	Simple
Specific procedure	Yes	No (apart from evidence interpretation)	No (apart from evidence interpretation)	No	No	No
Scope of implementation	All taxes except VAT	All taxes	All taxes	Income tax	Income tax	All taxes
Thin capitalisation						
Scope of implementation	Broad (rare safe harbours)	Simple	Simple	Simple	Simple	Numerous safe harbours
Controlled Foreign Corporation (CFC)						
Scope of implementation	Broad	Simple	Simple	Simple	Simple	Simple
Exit tax						
Scope of implementation	Simple	Simple (safe harbours are provided for)	Simple	No implementation	No implementation	Simple
Hybrid mismatches						
Scope of implementation	No implementation	Implementation from 2020	Implementation from 2018	No implementation	No implementation	No implementation

Source: own study by SGH Warsaw School of Economics

Labour markets in Central and Eastern Europe in the face of global challenges

Central and Eastern Europe countries do not appreciate the opportunities provided by the development of human capital and labour market potential as a result of lifelong learning. Children, young people and adults in CEE countries often have poorer skills than their counterparts in EU and OECD.
By 2040 the number of the employed in individual Central and Eastern Europe countries will be falling on average faster than in most Western Europe countries.

The influence of technological changes on the labour market is increasing. The scope of tasks performed by people and machines and algorithms is changing quickly. This poses a challenge for the labour markets. Facing this challenge involves development of high quality of the labour markets. Not adapting to changes related to globalisation and technological development may result in growing skills differentiation, greater inequalities and polarisation.

Another important challenge that Central and Eastern Europe countries are facing is the fast pace of labour resources shrinking in the next three decades. In the last decade (2009-2018) the total working age population was growing, although the pace of growth was lower in CEE countries Bulgaria, Lithuania, Latvia and Romania however reported a decrease in the number of working age citizens. In the next decades potential labour resources will be shrinking. The decrease in Central and Eastern Europe countries will be much deeper than in the European Union as a whole. The drop will be especially noticeable in the countries mentioned above, but also in Poland, especially after 2038.

The response to these challenges and changing demand for skills is an improvement of population education structure, which makes it easier to adapt to labour market challenges. At the same time however Central and Eastern Europe countries have a low share of population participating in trainings and education courses. Another measure of employment policy is investing in the development of skills of children and youth, but also of adult people, which would improve human capital. High quality of human capital and skills also improves the rate of human resources utilisation on the labour market, measured by employment rate.

An important issue is eliminating the difference between professional situation of men and women. The employment rate gap between men and women is low in the Baltic states (4-8 pp), and significantly higher in Visegrad states (14-15 pp). In Poland the employment rate for men is by 14.9 pp higher than for women. The gap decreased in the last decade in all the Central and Eastern Europe countries, except Romania. Working women still earn evidently less than men. Adjusted pay gap in 2014 was between 15.7% in Hungary to more than 24% in Lithuania. In Poland it was 16.8%, so it was relatively high compared to the gender pay gap in the Western Europe countries, but still lower than in most its Central European neighbours.

Central and Eastern Europe countries are going to experience faster decrease in potential labour resources, while higher education among workers in the most productive age (35-44 years) in many countries is less than the EU average. In this respect Estonia, Lithuania and Slovenia are positive exceptions. It should be noted however that the share of people with higher education in this age group was growing faster in Croatia, Latvia, Lithuania, Poland and Slovenia than the EU average. Another weakness is the percentage of adults participating in trainings and education, which only in Estonia is slightly higher than the EU average.

The CEE countries also have a lower rate of employment among people aged 20-64 (except for Czechia and Estonia), although in all of them (apart from Croatia and Latvia) the rate in the last decade was growing faster than in the EU-15 states.

Improving skills among youth and adults is also a challenge for the Central and Eastern Europe region. 15-year-olds get better results than OECD average only in Estonia, Poland and Slovenia, while for adults it is the case (according to mathematical reasoning) for Czechia, Estonia, Lithuania and Slovakia (among 6 CEE countries covered by the study). Computer and ICT skills exceed the OECD average only in Czechia. CEE countries invest less than EU average, relative to their wages, in human capital covering education and health, except Lithuania and Slovenia.

Also changes in education have brought or exposed range of problems and cases of negligence requiring revision of education policy applied so far. They concern both the quality of education on all the education stages (which has been proven by PISA results or international universities ratings), social education inequalities (e.g. Bulgaria, Poland), financing inadequate to the state's potential (e.g. Bulgaria, Romania, Poland, Russia), weak connection between education and labour market, poor international mobility of students or disregarding expert knowledge in education system changes.

The societies of Central and Eastern Europe still do not appreciate the benefits of lifelong learning, including the opportunity of flexible choice of periods and intensity of learning, adapting the pace of learning, acquiring selected skills useful for a specific professional specialisation. Lifelong learning also provides a chance to eliminate education inequalities for people with deficits and disabilities. Lifelong learning is necessary to acquire knowledge and skills expected by employers and provides opportunity to acquire new professional competences and mobility.

Central and Eastern Europe countries do not take full advantage of these opportunities. It is due to a range of barriers that hamper lifelong learning development. These include

Changes in working age population aged 20-64 in the Central and Easter Europe countries compared to EU countries, 2009-2078

	2009-2018	2019-2028	2029-2038	2039-2048	2049-2058	2059-2068	2069-2078
EU 28	9,1%	-2,5%	-3,7%	-2,6%	-1,8%	-0,6%	-1,2%
BG	-5,2%	-10,5%	-9,9%	-12,1%	-9,7%	-2,4%	-5,5%
CZ	2,9%	-1,8%	-2,8%	-8,2%	-4,6%	1,2%	-2,6%
EE	3,3%	-3,5%	-3,5%	-5,9%	-7,5%	-0,8%	-4,2%
HR	1,9%	-7,3%	-5,7%	-6,3%	-5,6%	-5,2%	-4,9%
LV	-8,6%	-14,1%	-9,9%	-10,6%	-10,6%	2,0%	-2,5%
LT	-7,0%	-19,0%	-14,8%	-10,3%	-10,2%	0,3%	-0,8%
HU	2,5%	-5,2%	-4,4%	-7,2%	-4,3%	-2,2%	-1,6%
PL	5,1%	-7,1%	-4,6%	-10,4%	-10,5%	-4,3%	-5,5%
RO	-1,4%	-9,6%	-10,4%	-10,0%	-6,4%	-2,0%	-2,4%
SI	4,3%	-4,5%	-4,5%	-6,7%	-2,6%	1,0%	-1,9%
SK	7,9%	-4,6%	-4,0%	-9,2%	-8,0%	-2,6%	-3,7%

Source: own calculations of SGH Warsaw School of Economics based on Eurostat data, including EUROPOP 2015 (2019-2078) projections

- Insufficient level of creating skills and awareness of the need of lifelong learning in the process of formal education, which reduces willingness to participate in education programmes among the adults;
- Commercialisation of many adult education forms and supply of education services directed to people already having high skills, and a lack of educational offer for socially marginalised people, such as the long-term unemployed and people excluded from the labour market, which results in growth of education inequalities.
- Unequal development of education infrastructure: education facilities for adults are usually located on economically developed and relatively wealthy territories, usually in towns and cities, but they are scarce where education needs and negligence are the greatest.

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Best practices of stock exchanges of the Central and Eastern Europe in respect of institutional infrastructure stimulating corporate social responsibility of publicly listed companies

Among stock exchanges of the Central and Eastern Europe countries, the highest number (i.e. ten) of best practices aimed at stimulating CSR policy has been observed on the markets of Lithuania, Latvia, Estonia, which is related to the stock exchanges' membership of a global alliance, the part of which is American NASDAQ.
Slightly less, namely nine, best practices have been identified on the Polish stock exchange.

Attractiveness of a stock exchange depends not only on the attractiveness of companies which are listed there, but also such factors as the number and structure of investors on the market or the rate of information asymmetry. Development of institutional infrastructure stimulating corporate social responsibility of publicly listed companies may help stock exchanges to win new institutional investors, especially those dealing with socially responsible investment. This is especially important for the stock exchanges of the Central and Eastern Europe region, as such investors are not common there, and a limited access to capital is one of significant barriers for the development of these markets. Meanwhile, only in the last two years (between 2016 and 2018) the value of assets managed pursuant to the SRI principle grew by almost one third (from USD 22.9 trillion to USD 30 trillion), according to Global Sustainable Investment Alliance. More than a half of these assets has been invested in publicly listed companies stocks. Growth of the number of socially responsible investors also leads to advantageous changes in the structure of entities representing the demand side of the market, by allowing to keep greater balance between speculators ensuring liquidity and portfolio investors stabilising the market.

Also reducing information asymmetry is conducive to raising stock market attractiveness. Involvement of these entities in promoting corporate social responsibility and encouraging companies to meet higher standards in this respect can contribute to reduction of information asymmetry. This is due to the development of independent evaluation of companies, the results of which are available for the investors; the information covering assessment of various aspects of enterprise activities is provided by ethical indices. The asymmetry is also reduced when non-financial reporting is effectively popularised among companies, especially when it is based on the existing Global Reporting Initiative (GRI) guidelines, ensuring slightly greater credibility of disclosed information and comparability of data.

Among stock exchanges of the Central and Eastern Europe countries, the highest number (i.e. ten) of best practices aimed at stimulating CSR policy has been observed on the markets of Lithuania, Latvia, Estonia, which is related to the stock exchanges' membership of a global alliance, the part of which is American NASDAQ. Slightly less (i.e. nine) best practices have been identified on the Polish stock exchange. These four markets have been found in the group of leaders in applying such practices. The next group included stock exchanges of Bulgaria, Croatia, Slovenia and Romania. On the Bulgarian stock exchange seven best practices have been applied and on each of the three remaining ones – six. These stock markets can be defined as acting proactively in respect of best practices. A smaller number of best practices has been found on the stock exchanges of Serbia, Belarus, Hungary, Macedonia and Slovakia: five such practices have been reported on the markets of each of the first three countries, and four in the two remaining ones. This group of stock exchanges can be defined as trend followers. The smallest number of best practices has been found on the stock exchanges of Czech Republic, Bosnia and Herzegovina, Montenegro and Ukraine. Three best practices have been reported on the the Czech Republic stock market, two on each of the Balkan stock exchanges and one on the Ukrainian stock market. This group of entities can be defined as hesitant.

Best practices applied by stock exchanges to stimulate CSR policy among companies listed there can be divided into two basic categories. The first one covers actions aimed at raising social responsibility of the stock exchanges themselves, while the second one covers initiatives addressed directly to the companies. Among the analysed entities as a whole, practices from the second category were prevailing.

The most common initiative on all the stock markets of the CEE region was the introduction of code of good practices addressed to listed companies. A relatively popular practice was also supporting the development of CSR reporting by publicly listed companies and organising conferences dedicated to corporate social responsibility, which can be regarded as an element of stock markets' educational activities. Less common best practices from the category of actions addressed to companies included CSR trainings and drawing up and publishing review reports on the application of various corporate social

responsibility practices by publicly listed companies. Initiatives of this type have been reported for less than a half of the stock markets. The least common practice in this category was promoting ESG measures.

Stock exchanges of the countries of the CEE region have also been implementing best practices aimed at improvement of their own CSR standards. The most common one was creating trade platforms for smaller companies, the purpose of which was to reduce barriers in access to capital for MSP entities, whose situation in this respect is worse than that of large businesses. Such solutions were being applied on most of the stock exchanges covered by the study. Slightly less common were initiatives consisting in membership in international CSR organisations (all the stock exchanges on which this initiative has been identified belonged to Sustainable Stock Exchange Initiative) and drawing up and publishing their own CSR reports. The least common best practices were: offering trade in specially marked ethical products (e.g. green bonds) and introduction of ESG indices. The latter was observed on only three stock markets: Warsaw Stock Exchange (RESPECT index), Bulgarian Stock Exchange (CGIX index) and Sarajevo Stock Exchange (SASX-BBI index). On the Sarajevo Stock Exchange one of the criteria of including companies in the index is their observance of Sharia law.

Stock exchanges of CEE countries differ among each other. The differences refer not only to the number of applied best practices, but also their structure. Taking into account the criterion of the addressee of corporate social responsibility initiatives – the stock exchanges themselves versus companies listed there – capital markets of these countries can be divided into four groups: demanding, balanced, example setters and late movers. The division is presented on the figure below.

The "demanding" group of stock exchanges applies mostly initiatives addressed to companies. These stock exchanges seem to put less emphasis on raising their own CSR standards. This group includes markets in Croatia, Slovenia, Serbia and Slovakia. The "balanced" group comprises stock exchanges which are considerably active in implementing best practices, both those aimed at raising their own social responsibility and those dedicated to companies. This group comprises stock exchanges in Poland, Baltic states (Lithuania, Latvia, Estonia) and Bulgaria. The third group of "example setters" includes entities that want to set the highest standards. These stock exchanges mostly implement actions directed at developing their own CSR practices with less involvement in initiatives addressed to companies. This group comprises stock exchanges from Romania and Hungary. The last, most numerous group is that of "late movers". It covers stock exchanges showing small interest in their own CSR activities, which do not implement broadly best practices dedicated to companies listed on these markets. This group includes stock exchanges in Belarus, Macedonia, Czech Republic, Montenegro, Bosnia and Herzegovina and Ukraine.

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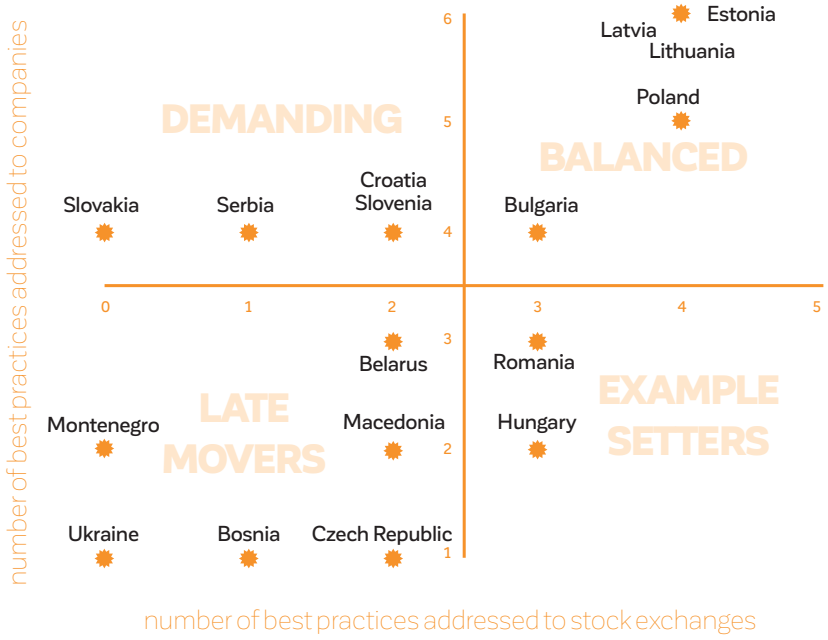
Division of stock exchanges in the Central and Eastern Europe region in respect of the structure of best practices applied by them.

Source: own study by SGH Warsaw School of Economics



Capital outlays as a method of counteracting certain types of exclusion in the regions and countries of Central and Eastern Europe

The Central and Eastern Europe (CEE) countries recognise the key role of public institutions, in particular use of financial resources or institutional solutions in reaching sustainable development goals.
Capital outlays as a method of counteracting exclusion is different for each of the listed exclusion types.

Currently the idea of sustainable development, assuming a balance between economic growth, protection of natural environment and social advancement, is the basic rule reflected in the EU treaties and policies, as well as in all development policies of the Member States, including those from CEE. An analysis of development processes and counteracting energy-related, spatial and financial exclusion is a significant development challenge for the countries of this region.

From the point of view of the CEE energy situation, **energy-related exclusion** is a contemporary dimension of energy poverty in this group of countries. This problem is most serious in Bulgaria. It is a country that has to deal with the biggest problems with heating buildings and settlement of payments for this service. The scope of the problem, not only in Bulgaria, but also in other countries of CEE, is a result of the age of the buildings, but in particular the historical housing and construction policy. A method of counteracting energy-related exclusion covers capital outlays for thermal modernisation of buildings or institutional schemes (e.g. in Estonia) supporting such investment. The major source of financing, due to the buildings ownership structure, are public funds. This shows clearly that the common feature of energy-related and spatial exclusion in the CEE region is the role of the public sector, which in both cases can serve as an originator of the process or can undertake mitigating measures.

A characteristic feature of gentrification in CEE is its slow pace and smaller intensity of changes. The process accelerated in the beginning of the 21st century. The most important factors of gentrification in the countries of the region are secondary investments (e.g. urban regeneration), primary investments (new-build gentrification), ownership changes (privatisation and restitution), commercialisation of space. What is more, gentrification in CEE often takes the form of local gentrification or commercialisation, and its major stakeholders, unlike in Western Europe and North America, are real estate developers and city authorities. The middle class, or the creative class, does not initiate any changes because of low income and lack of accumulated wealth, and it mainly plays the role of a consumer of the changes.

The last of the analysed development challenges in CEE is **financial exclusion**. Despite a clearly visible progress after the system transformation in these countries, this issue remains to be a significant problem. It is evident that exclusion intensity in individual countries is diversified: the rate of banking penetration varies from 58% in Romania to 98% in Estonia and Slovenia, which is comparable to most Western Europe countries. Due to multi-faceted conditions of inclusion (including connection to digital inclusion processes) and its character, the measures undertaken should be long-term and comprehensive. A significant role in this process is attributed to expenditures directed both at the excluded and those threatened by exclusion and institutions offering financial products and services. Active cooperation of public and private sector entities, as well as creating an advantageous institutional environment seem to be of key importance for the effectiveness of the programmes. Additionally, in the case of energy-related and spatial exclusion the public sector plays a double role, since its tasks include also control over adequate utilisation of expended resources.

To sum up, **capital outlays as a method of counteracting exclusion is different for each of the listed exclusion types.** In the case of energy exclusion the very inflow of capital for financing thermal modernisation is a key expenditure issue. In the case of spatial exclusion it is the expenditures that play a significant role in the way of transforming the regenerated areas so as to protect them against gentrification. In the case of financial exclusion however capital outlays are connected to skilful involvement in the improvement of access to financial products and services by considering also disadvantaged groups (particularly threatened by financial inclusion) as the programmes beneficiaries.

The analysis proves that the public sector plays a role of accelerator of capital outlays counteracting all the exclusion types discussed above. It is evident that the CEE countries recognise, in line with the UN, the key role of public institutions, in particular **use of financial resources or institutional solutions** in reaching the sustainable development goals. A financial example can be co-funding of thermal modernisation projects or raising awareness of financial services, while in institutional respect – the role of public institutions in city authorities' function in the gentrification process, improvement of access to financial

services or activities of organisations such as KredEx. Arguably, reaching these goals would be more difficult without public support.

Bearing this in mind, **it is recommended for economy practice** to continue the involvement of the public sector in the outlays counteracting certain types of inclusion in CEE countries. At the same time, in order to broaden the scope of investment, it should be considered to involve, more than so far, private investors by means of public-private partnership. This measure would probably allow to reach sustainable development goals in a significantly shorter time. A possible problem however may be unwillingness of private investors to engage in undertakings with low profitability. That is why it would be reasonable to prepare a list of individualised incentives for such entrepreneurs. This matter is not discussed here in detail due to its complexity and the aim of this work. It should be however highlighted as a potential issue affecting the effectiveness of actions.

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System of support for start-ups in the Central and Eastern Europe

Estonia and Poland are the leaders of development of start-up support systems in Central and Eastern Europe.

Start-ups, defined as organisations looking for repeatable and scalable business model, are perceived as a source of economic growth. Due to jobs they create and their participation in the exchange of goods and services, the share of innovative industries in the economy is rising. The development of start-up environment today is therefore a key element of innovative policy for the increasing number of countries.

How are Central and Eastern Europe countries dealing with these issue? Individual countries have been analysed as for the maturity of their support system, taking into account 10 factors making up the system of support for start-ups: from the rate of social and economic development to taxation systems, to intellectual property protection, to academic entrepreneurship and governmental entrepreneurship support programmes and the position of VC funds.

The rate of economic development of Central and Eastern Europe is in many respects different than in the Western Europe. This significantly affects the perceived potential attractiveness of the market and its absorption rate, and thus the decisions on starting a business and directions of start-ups expansion. What counts from the start-ups' point of view are mainly tax incentives, red tape reduction and support in raising capital. The CEE countries have undertaken a range of measures to support entrepreneurs and investors. However, a key issue remains the stability of fiscal law, which is a problem in some of the analysed countries. A negative example is Poland – EU leader in respect of the number and volume of issued legal provisions. The countries with the most stable law in Central and Eastern Europe are Lithuania and Estonia. Tax systems of Central and Eastern Europe countries in the analysed period (2004-2018) have been subject to numerous changes and modifications, as a result of which various measures have been introduced, such as exit tax, double taxation avoidance clause, mandatory reporting of tax schemes, split VAT payment or tax incentives concerning costs for research and development. However, none of the countries of the region has introduced comprehensive solutions dedicated only to start-ups, although many have started to work on them.

Innovative enterprises in Central and Eastern Europe give more and more attention to protection and use of intellectual property. In the conditions of knowledge-driven economy it is the intangible assets that are the basic source of competitive advantage. In respect of the number of patent applications the leader among the analysed countries is Slovenia (48 applications per 1 million inhabitants), followed by Estonia (35 applications per 1 million inhabitants) and Czech Republic (23 applications per 1 million inhabitants). Poland is also taking a relatively high place with 14 applications to the European Patent Office per 1 million inhabitants. Apart from the number of applications an important criterion showing the effectiveness of the system is the time of patent application processing. It is the shortest in Lithuania where it takes only 5 months. The longest period of patent application processing is in Bulgaria (60 months!) and Croatia (58 months).

Increasing significance of intellectual resources results in greater importance of research and scientific institutions as the main sources of innovation in the economy. A brief look at the largest start-up centres in Europe (London, Paris, Copenhagen, Berlin) allows to notice their concurrence with the activities of major academic centres. Classical concepts of universities' functioning are replaced by a vision of an entrepreneurial university adopting an active role in response to changes in the surrounding business environment. Research shows that among the countries of the region the highest rate of entrepreneurship integration in education programmes has been reached in Estonia. To examine the rate of implementation of the entrepreneurial university concept in practice, an analysis has been carried out of tools of support for the best universities of the region countries. It showed that the best in this respect were universities in Poland, Estonia and Slovenia. Implementation of an entrepreneurial university concept in Central and Eastern Europe is carried out in the form of a regional experiment (adapted to the specific system features and characteristics of a given centre). European universities, in spite of a high level of research, are not able to translate them into innovation in the market practice.

Another element of the environment supporting entrepreneurship are government agencies. Diversified models can be observed involving these institutions in support for start-ups development. Most comprehensive activities are carried out by institutions in Estonia. KredEx agency carries out financing activities and is in charge of education, mentoring, acceleration and incubation projects. Estonia, Latvia and Lithuania are also exceptional in supporting an attractive image for foreign start-up investors, also by programmes such as Startup Visa (facilitation of obtaining residence permit and running a business). A considerable part of the CEE countries opts for financing activities of their government agencies. A special element of these programmes is creating funds to activate investors, considering their insufficient activities in Central and Eastern Europe. Comparison of the activities of VC funds in Central and Eastern Europe to their counterparts in highly developed countries shows clearly their early stage and enormous potential for further development. An average value of VC funds investment per capita was a few times smaller in the CEE countries than in highly developed systems of entrepreneurship and innovation support.

In Central and Eastern Europe there are organisations uniting start-ups and having elaborate international relations. The number of cluster organisations differs greatly from country to country, but the share of organisations with a business ecosystem advantageous for start-ups is low. One of the most important instruments supporting the development of start-ups are accelerators supporting entrepreneurs at an early stage of their business. Among the Central and Eastern Europe countries, the largest number of accelerators is in Poland, Estonia, Romania and Ukraine. However, their scope is insufficient, as in London alone there are more accelerators than in the leading countries of the region. Direct institutional support for start-ups is also provided by "regulatory sandboxes", a new instrument for enterprises acting on the basis of new business models or technologies irrelevant to the current legal order. Regulatory sandboxes are not currently used in the Central and Eastern Europe countries. They have been found only in 2 countries (Lithuania, Hungary). Works on establishing a regulatory sandbox in Poland have been stopped at an advanced stage. The region's states' involvement in supporting innovation by public procurement is also low. A public partnership is only emerging in the strategies of the Central and Eastern Europe countries, but there are no specific tools allowing to use innovative solutions flowing from the start-up environment through public institutions.

The research results made it possible to identify two countries that are leaders in start-up support (Estonia, Poland), two raising-star countries (Czech Republic, Slovenia, Hungary) and six developing countries (Albania, Bulgaria, Croatia, Romania, Slovakia). The table shows detailed results.

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Elements of start-up support systems in the Central and Eastern Europe countries

		Product of evaluation within a criterion from 1 (very low) to 5 (very high) and weight of a factor											
Factor	**Weight**	**Albania**	**Bulgaria**	**Croatia**	**Czech Republic**	**Estonia**	**Lithuania**	**Latvia**	**Poland**	**Romania**	**Slovakia**	**Slovenia**	**Hungary**
Development	10.91%	0.33	0.33	0.44	0.44	0.44	0.33	0.55	0.55	0.44	0.44	0.33	0.55
Taxes	13.64%	0.27	0.27	0.41	0.55	0.68	0.68	0.68	0.41	0.41	0.41	0.55	0.41
IP	9.09%	0.36	0.09	0.18	0.18	0.27	0.45	0.27	0.27	0.18	0.18	0.27	0.27
Education	11.82%	0.12	0.35	0.35	0.47	0.59	0.35	0.24	0.59	0.24	0.35	0.59	0.35
Government agencies	8.18%	0.08	0.16	0.08	0.25	0.41	0.25	0.25	0.33	0.08	0.33	0.33	0.16
Accelerators	12.73%	0.13	0.25	0.13	0.51	0.64	0.38	0.13	0.64	0.51	0.38	0.38	0.51
Regulatory sandboxes	6.36%	0.06	0.06	0.13	0.06	0.19	0.25	0.19	0.19	0.19	0.19	0.19	0.19
Clusters/BEI	8.18%	0.08	0.33	0.25	0.16	0.25	0.33	0.08	0.41	0.33	0.25	0.25	0.25
PPI	1.82%	0.05	0.05	0.05	0.04	0.09	0.07	0.05	0.05	0.05	0.05	0.05	0.04
VC	17.27%	0.17	0.52	0.35	0.69	0.86	0.86	0.52	0.86	0.52	0.35	0.35	0.69
Total evaluation	**100.00%**	**1.66**	**2.43**	**2.36**	**3.35**	**4.42**	**3.96**	**2.95**	**4.30**	**2.95**	**2.93**	**3.28**	**3.42**

leaders raising stars developing

Source: own study by SGH Warsaw School of Economics

The potential of agriculture in Central and Eastern Europe in the face of global challenges

Agriculture in the Central and Eastern Europe (CEE) countries has substantial, but relatively poorly used potential. This also means a large potential for export expansion and taking a leading position on the global food market. Agriculture of the CEE region already has profitable output rate per capita. For example production of meat per capita in the CEE region is 76.7 kg (82.1% of the EU-28 average) and the rate of production of milk per capita is almost 95% of the EU-28 average.

The aim of this study is the attempt to assess the potential of agriculture of the Central and Eastern Europe (CEE) countries, as compared to the European Union potential. It has been assumed that this group covers EU countries of this part of Europe (CEE-10) and Ukraine and Belarus. This potentially debatable criterion has been assumed because agriculture of the countries of the region defined in this way has a lot of common features both in respect of climate and natural environment, and directions of agrarian structure evolution, as well as past experience. Additionally, increasing critical views and opinions on the globalisation of agriculture and agribusiness, including its environmental impact, make it necessary to focus on the possibility to ensure food security based on regional and local sources and systems.

Agriculture in the Central and Eastern Europe countries has considerable production potential, which is relatively poorly utilised, thus creating opportunities for global expansion as a consequence of improvement of relations of basic production factors, which is beneficial for increased capital resources and implementation of more up-to-date organisation (evolution of the agrarian structure) and technology solutions (modern methods of crops cultivation and animal breeding).

The research allows to draw a range of specific conclusions:

- EE countries experience an exceptionally fast restructuring of the agrarian structure. While in 2005-2016 in the EU-18 countries the number of agricultural holdings fell by 18.5%, in CEE-10 it fell by 26.2%. These changes can also be observed in the Ukrainian agriculture. Only the agrarian structure of Belarus remains unchanged;
- CEE countries have a diversified agricultural ownership structure. At least four different models can be distinguished: (1) Belarusian, (2) Ukrainian, (3) Czech and Slovak and (4) Central European referring to the remaining countries of the region;
- the analysed region has a high rate of labour resources in agriculture, which reflects relative retardation of its development compared to the rest of the EU;
- thanks to considerable agricultural land resources the CEE region has a high (twice higher) rate of arable land per capita. In 2016 the rate for the CEE region was 0.65 ha per capita, while the EU-28 average was only 0.34 ha per capita;
- the biggest difference between the agriculture of CEE region and EU-28 refers to the resources and inflow of capital. The value of fixed net assets is on average 3 or 4 times lower than for the rest of the EU countries. Also capital expenditures for fixed assets are lower (expenses for fixed assets in the CEE region in 2017 were EUR 86.2/ha of arable land while in EU-28 they were EUR 334.9/ha of arable land).
- the rate of current expenditure (mineral fertilisers, use of pesticides) is similar to the EU-28 average,
- agriculture of the CEE region already has profitable output rate per capita. For example meat production per capita in the CEE region is 76.7 kg, which accounts for 82.1% of the EU-28 average. The rate of milk production per capita in the CEE region is almost 95% of the EU-28 average;
- exports of agricultural goods in the CEE region in 2016 accounted for 16.5% of the EU-28 exports, however the balance of green trade for the CEE region in the same period was over 161% of the EU-28 balance. This means that the region has a large potential for export expansion and taking a leading position on the global food market.

The research has confirmed that the CEE countries have a considerable agricultural production potential. It is an important statement in the situation of increasing competition on the global food market and growing significance of regional and local agricultural and food markets, with increasing threats for natural environments caused by the globalisation processes. To become an important player on the European food market, the agriculture of the region requires however further changes, both in respect of agrarian structure and organisation and technology model. The point is not to unify the model, which would be difficult to accept, but to modernise and upgrade it.

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