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Global Trends of Green Investmentment

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ABSTRACT

The study aims to consider the full range of issues of "green" investment and identify problems, opportunities, and potential ways to mobilize investment resources for a "green" economy. The publication summarizes the features of "green" investment: the preconditions, the main determinants, global development trends, as well as the current state, and prospects for their accumulation. The study provides an opportunity to fill the gap in the definition of "green investment" and analyze trends in the accumulation of such investment by industry and use. Considering the lack of a comprehensive statistical assessment of investment in all sectors related to the SDGs, this study focuses on the international practice of "green" investment in key areas and sectors, especially in low-emission infrastructure, energy-saving measures, renewables, and "clean" technologies.As a result, the principles of "green" investment policy are formed: (1) identification of the main principles of "green" investment policy; (2) analysis of the current obstacles to the implementation of green investment policy; and (3) offer of the mechanisms and tools for its implementation.

Keywords*: sustainable development, SDGs, "green" economy, green investment, low-carbon technologies, energy efficiency, climate-resistant infrastructure.*

Introduction

Environmental threats related to global climate change and environmental degradation have been at the forefront of global development risks in recent years. This is confirmed by the United Nations and its specialized agencies, the G20 and G7, and the World Economic Forum. These growing threats have changed the world`s political agenda to restore natural ecosystems adhering to the principles of economic efficiency, social justice, and sustainable development. Trends of the first two decades of the XXI century created a "window of opportunity" for radical reforms and the transition to principles of "green" economic development. It has gained popularity at international, regional, and national levels, becoming, on the one hand, a response to the global financial crisis and, on the other hand, a driver of the transition to a new model of growth. Technological progress, economies of scale, and political elites` support have contributed to accumulating "green" investment. Also, national programs and strategies aimed at "green" growth have determined the redistribution of domestic finance and foreign investment.

In the context of the “green” economy concept preventing the spread of environmental threats requires long-term investment and integrated approaches. Changing the “trajectory” of the world economy towards sustainable development determines the desire of governments, TNCs, institutional investors, and households to mobilize “green” investment in low-carbon and climate-resistant infrastructure, renewable energy resources, low-emission transport, sustainable agriculture and forestry, and energy-efficient construction; implementation of clean technologies; enhancement of waste management system.

Green investment help reduce GHG emissions, streamline waste management, manage wastewater, effectively address various environmental risks, maintain ecosystem stability, implement energy efficiency measures and develop renewable energy and environmentally friendly technologies. The benefits of “green” investment that can be experienced in economic sectors are apparent, as they have a powerful influence on the SDG`s implementation. Such investment can have a positive impact on the country`s energy balance, increase the level of energy efficiency of the economy and the competitiveness of products, as well as the solvency of the population in terms of payments for housing and communal services. They can create new (“green”) jobs and provide decent wages to employees. Increasing “green” investment in the world's economy is a medium-term climate goal and an opportunity to strengthen the energy security of each country.

Methods

A methodological basis is formed by a set of general scientific and special methods, the use of which is determined by the purpose of the study. In particular, the dialectical method of scientific knowledge, including scientific abstraction is used to reveal the nature and essence of “green” investment; methods of analysis and synthesis – to determine the place of such investment in the “green” economy; the historical-logical method – to study current trends in green investing and regulatory practices. Methods of synthesis and logical generalization are used to determine the main benefits and risks of "green" investments and assess their attractiveness.

The study is based on fundamental works of foreign economists in the field of “green” investment, official reports, analytical publications, and statistical databases of the United Nations, the World Bank, the International Energy Agency, UNCTAD, and information and analytical materials of foreign think tanks, as well as the author's analytical calculations.

Results

Investing in low-carbon infrastructure is a key to sustainable development

"Green" investment is important not only because of the need to resolve pressing issues of energy conservation and energy security of the state.

- From an economic point of view, they could contribute to the reduction of the energy intensity of GDP and increase goods and services` production efficiency.
- From a social point of view, they increase the level of income and living standards, contribute to the growth of jobs, *etc*.
- From an environmental point of view, they minimize the pressure on the environment, reduce GHG emissions, and improve the quality of foodstuffs.
- From a political point of view, they alleviate (and in some cases reduce) the country`s dependence on energy purchases.

Sustainable and climate-resilient development is the goal of many countries. Investment in low-carbon infrastructure (energy, water, transport, construction, etc.) is extremely important in achieving this goal. And understanding the importance of such infrastructure for climate goals and what should be done to build it, is the first step toward structural reforms that will help to mobilize investment. Investing in low-carbon infrastructure is particularly "difficult" because of barriers: one of them directly related to the implementation of the infrastructure project itself, and the other related to climate change.

The low-carbon infrastructure includes the construction and reconstruction of energy and transport facilities, water systems, and buildings aiming at GHG emissions reduction. This infrastructure has to be more adapted to extreme weather conditions. But at the same time, low-carbon infrastructure is not only environmentally friendly facilities but also the physical ones that support the development of "green" growth. Such infrastructure could either reduce GHG emissions (through *e.g*. low or zero-emissions technologies, clean energy production, sustainable forestry and agriculture, carbon capture, disposal or utilization, and the energy efficiency) or influence climate change (*e.g.* in water, forestry, agriculture/animal husbandry, urban planning or infrastructure sector) (OECD, 2012).

Investment can focus on both adaptation and climate change mitigation measures (for instance, in forestry and land use, and energy efficiency). Such as in construction, increased insulation of walls can either save energy or increase the resistance of homes to extreme temperatures or energy losses. However, some adaptation measures could be undesirable from the mitigate point of view. For example, air conditioners could generate significant GHG

emissions. Water desalination can be important for areas with a resource deficit, but desalination requires significant electricity consumption.

Construction of traditional infrastructure has never been cheap, and its modernization, in the long run, can only increase the cost of investment than if it had been built from scratch with an ecological emphasis. Thus, sustainable investment can be directed to the rehabilitation of physical infrastructure, the construction/expansion of new ones, or the services sector (engineering or management consulting services).

IMF experts (Eyraud et al, 2011) have identified the main areas of sustainable (green) investment: low-emission energy supply (RES, biofuels, and nuclear energy); energy efficiency measures (in terms of energy supply and consumption); carbon sequestration (deforestation and agriculture) (Table 1).

Table 1. Structure of Green Investment by Category

	Component	Item and Sub-Item
Supply Factors	Low-emission energy supply	➢ Low-emission electricity supply – Nuclear – Renewable sources of electricity: – Hydropower – Wind – Solar – Biomass
		✓ Other low-emission/renewable energy supply – Biofuels – Biomass – Solar and geothermal for heating – R&D in clean energy
	Carbon sequestration	➢ Agriculture ➢ Deforestation ➢ Carbon capture and storage technologies
Demand Factors	Energy efficiency in energy-consuming sectors	➢ Households ➢ Services ➢ Industry ➢ Agriculture ➢ Transport
Mixed Factors*	Energy efficiency in the electricity sector (generation, transmission, distribution)	

** The electricity sector both demands and produces energy, making it difficult to categorize efforts to improve energy efficiency in this area into those that affect energy demand or supply.*

Source: Eyraud & others (2011)

In addition to the noted above, OECD analysts (OECD, 2016) distinguish investment in sustainable agriculture, waste management and wastewater treatment, and control over surface and groundwater abstraction.

- *Low-emission energy supply*. Green investment is shifting the focus from fossil fuels to less polluting alternative energy sources (wind, solar, hydropower, and biofuels). The concept of "green" investment covers not only new environmental and energy-saving technologies, such as wind and power plants but also nuclear and hydropower. Renewable energy sources include wind, solar, geothermal, ocean, hydropower, and biomass power plants. The exception is nuclear energy. Although this source is low-carbon, it carries other risks associated with waste management and radiation emissions. Some experts argue that nuclear energy should be excluded from the concept of "green" investment through radioactive waste. However, in terms of GHG emissions, nuclear energy is positive. Moreover, for example, biofuels are generally considered to be "clean" fuels, despite their conflicting impacts in terms of CO_2 emissions (Golub, 2011). As for biomass, this resource is carbon-intensive because plants absorb and store carbon as they grow and generate one when they burn or decompose.

- *Energy efficiency*. The green investment includes technologies that aim at reducing energy consumption during the production of goods and services. In the energy sector, it is the transition from sub-critical coal; in transmission and distribution of energy, it is the use of smart grids[1]. It should be noted that supercritical coal-fired power plants are highly efficient ones that burn less coal per megawatt-hour of output. Thus, in the transport sector – it is economical (hybrid) and electric cars. In industry – it is using energy-saving equipment and improving the waste management system. In construction – it is improving insulation and cooling systems.

- *Carbon capture*. After burning fossil fuels, deforestation is the world's second-largest source of carbon emissions, accounting for 20% of total emissions. Suspending deforestation, reforestation, and carbon sequestration through new agricultural practices are important steps in reducing carbon emissions. "Greening" global economic growth is the only way to meet the needs of the growing population (that could reach 9 billion by 2050), improving their well-being, stimulating development, reducing GHG emissions, and increasing the productivity of the natural resources. Since 2014, several agencies and Think Tanks have begun to assess investment needs to achieve these goals and rethink overall funding needs. Thus, for the first time, the investment requirements related to the SDG were assessed by UNCTAD in the 2014 World Investment Report (Table 2).

[1] This is a form of electrical grids that uses digital technology.

Table 2. Current Investment, Investment Needs and Gaps and Private Sector Participation in Key SDG Sectors in Developing Countries

Sector	**Estimated current investment**	**Total investment required**	**Investment gap**	**Average private sector participation in current investment, %**	
	(latest available year) $ billion	Annualized $ billion (constant price)		Developing countries	Developed countries
Power (investment in generation, transmission and distribution of electricity)	~260	630-950	370-690	40-50	80-100
Transport (investment in roads, airports, ports, and rail)	~300	350-770	50-470	30-40	60-80
Telecommunications (investment in infrastructure (fixed lines, mobile, and internet)	~160	230-400	70-240	40-80	60-100
Water and sanitation (provision of water and sanitation to industry and households)	~150	~410	~260	0-20	20-80
Food security and agriculture (investment in agriculture, research, rural development, safety nets, *etc.*)	~220	~480	~260	~75	~90
Climate change mitigation (investment in relevant infrastructure, renewable energy generation, research and deployment of climate-friendly technologies, *etc.*)	170	550-850	380-680	~40	~90
Climate change adaptation (investment to cope with the impact of climate change in agriculture, infrastructure, water management, coastal zones, *etc.*)	~20	80-120	60-100	0-20	0-20
Eco-systems/ biodiversity (investment in conservation and safeguarding ecosystems, marine resource management, sustainable forestry, *etc.*)	n/a	70-210	n/a	n/a	n/a
Health (infrastructural investment, *e.g.* new hospitals)	~70	~210	~140	~20	~40
Education (infrastructural investment, *e.g.* new schools)	~80	~330	~250	~15	0-20

Source: UNCTAD (2014)

Overall investment needs in 10 of 17 SDGs cover basic infrastructure (roads, railways, and ports; power plants; telecommunications; water and sanitation); food security (agriculture and rural development); climate change mitigation and adaptation; health and education. Among the conclusions:

- ✓ Annual additional investment to achieve SDGs in developing countries are estimated at $2.5 trillion per year, but could increase to $ 3.9 trillion (globally, total investment needs (for all countries) vary from $5 to $7 trillion per year)) (Gaspar & others, 2019).
- ✓ Growing needs in private investment, including international investment flows, will bridge the gap and complement public investment. Attracting private investment often depends on government investment policy. For instance, R&D in the food security sector, health, and energy sustainability are supported by the state, *e.g.* tax incentives.
- ✓ Foreign direct investment attraction in the SDG through the different initiatives/projects.

Table 2 illustrates the levels of funding required for "green" growth targets. As we can see, estimates vary and several determinants can directly affect the "green" investment flow: thrust (sectors), volume, scale (within countries and regions), and perspective (medium- or long-term) (Eyraud & others, 2011):

– *Economic growth and income level*. It is proved that the country`s economic growth boosts the demand for energy resources, and, consequently, investment in the energy sector development. S. Kuznets`s hypothesis of the "ecological curve" explains that economic development, structural changes in industrial production and services, international relocation, raising environmental awareness, and compliance with environmental norms and standards lead to increased investment in environmental goals.

– *Technological progress and innovation*. For instance, new methods of collecting and storing energy promote the use of "intermittent" energy sources, such as solar or wind. Investment in new "clean" technologies also depends on the technological level of the country/industry and the degree of human capital.

– *Population*. Population change can have an impact on green investment flows and volumes. Countries with rapidly growing populations face additional energy needs that require investment in RES, especially when fossil fuels are scarce or expensive, and/or when RES are numerous.

– *Interest rates*. High-interest rates reflect a lack of financing and tend to reduce investment.

– *Costs on fossil fuels*. High costs of fossil fuels help to foster "green" investment, in particular, thanks to the cost reduction of electricity generated from RES. This effect could be exacerbated because of a carbon tax.

– Government *support of "green" production*.

– Public policies aimed at *stimulating "green" investment* (for instance, fiscal incentives).

– *Geophysical conditions*. Green investment inflow also depends on the availability of natural conditions/resources, such as the number of sunshine hours per year or the water and wind availability.

First statistical inquiries of investment in the low-carbon infrastructure sector were carried out in 2004 but were characterized by their inconsistency and contradictory. Limited availability of data doesn`t allow for making a comprehensive assessment of investment flows in all sectors related to SDG. At the same time, there are obvious signs of progress in the "green" investment needed for SDG.

Global trends in renewable energy investment

In terms of energy security and environmental compatibility, RES is the key to a better future. They could significantly minimize GHG emissions, improve air quality and human health, and open up new opportunities for low-income and developing countries. However, in this decade, neither the Paris Agreement nor the 2030 Agenda for Sustainable Development will be able fully implemented unless the share of renewable energy in the energy mix increase (replacing fossil fuels). The need to build the capacity of renewable energy at the global level is indicated by one of the SDGs. Goal 7 proclaims "*ensuring access to affordable, reliable, sustainable and modern energy for all*".

Investing in RES is an economic advantage for a large number of investors, especially in developing countries. Global trends in investment in RES indicate that investors from year to year invest billions of dollars in renewable energy resources.

The history of renewable energy began in the 2000s when it was difficult to predict the future of RES and their ability to compete with fossil fuels. At that time, "modern" RES (wind, solar, hydropower, geothermal, biofuels) were called "alternative energy" and were considered a narrow, unpromising, and expensive niche. It was quite difficult to understand which of the new technologies would be important in the coming decades and how to "embed" variable sources of generation, such as wind and solar, in the traditional grid. However, despite some challenges, during the first ten years of the XXI century, governments, investors, and the public had begun to be interested in renewable energy technologies. Along with concerns about climate change, most countries have reoriented their energy policy and started to attract investment in the construction of solar, wind, and biofuels plants. As a result, in

2010 the world invested a record $238 billion in new RES capacity (excluding large hydropower plants).

However, at the turn of the first and second decades of the 21st century, there was considerable uncertainty surrounding the RES. On the one hand, sluggish economic growth caused by the global financial and economic crisis in 2008-2009 reduced energy demand, on the other hand, the US shale revolution boosted gas and oil supply (Markevych &Omelchenko, 2016). Owing to the depletion of traditional oil and natural gas resources the United States lifted restrictions on the exploration and production of hydrocarbons[2].

Since the middle of the last decade, renewables have begun to gather momentum. It happened because of the reassessment of investment priorities in most countries, the need to comply with international climate agreements, "shifting" fiscal incentives towards "clean" energy as well as improving the use of core equipment. The cost reduction of green technologies has been achieved through economies of scale, technological progress (accelerated by R&D incentives), weakening monetary policy, and lowering interest rates. Today, "green" energy can confidently compete with fossil fuels. The development of RES has been supported by international financial organizations – EIB, EBRD, and World Bank. Through financial instruments such as credit lines, these organizations help private banks to finance major offshore and offshore wind and solar projects.

According to IEA (IEA, 2021a), it is important to take necessary measures over the coming decades to avoid the dangers of climate change and move from fossil fuels to cleaner ones as quickly as possible. Unfortunately, global investment in renewable energy facilities remains significantly lower than the assessed needs for sustainable development transition (Fig. 1).

[2] These restrictions applied primarily to environmentally sensitive or strategic areas controlled in particular by the Department of Defence.

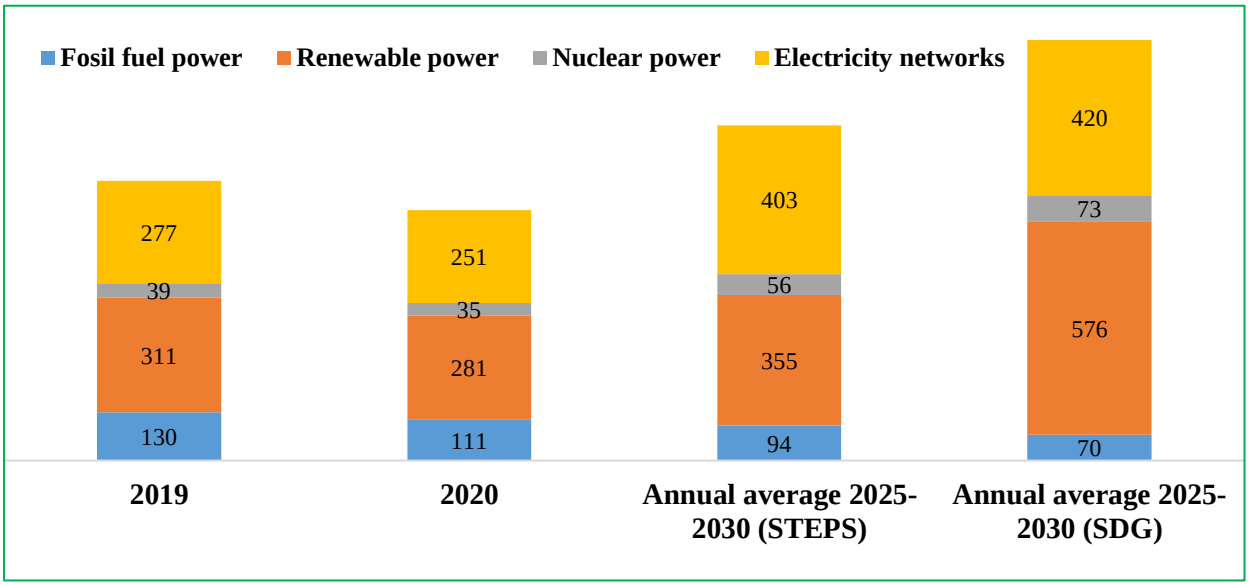


Fig. 1. Global power sector investment, 2019-2020 compared with annual average investment needs 2025-2030 in the Sustainable Development Scenario and Stated Policies Scenario, $ billion

Source: IEA (2020a)

The global energy sector consists of two subsectors: the fuel supply sector and the energy sector (production, transmission, and distribution). In 2021 global investment in the energy sector amounted to $ 1.5 trillion – 1.7% of world GDP (Table 3). $823 billion were invested especially in the energy sector, of which $367 billion were invested in renewables. It is about 3 times more than global investment in fossil fuels. Solar, wind, and hydropower power plants received the largest volumes of investment.

Table 3. Investment in the global energy sector in 2019-2021, $ billion

	2019	**2020**	**2021**
Upstream oil and gas	475	326	351
Mid/Downstream oil and gas	281	197	252
Coal supply	99	90	91
Low-carbon fuels	9	8	15
Renewable power	336	359	367
Fossil fuel power	130	113	119
Nuclear	39	42	44
Electricity networks	277	265	293
Total	**1 646**	**1 400**	**1 532**

Source: IEA (2021b)

RES is a global trend that becomes more relevant every year and plays an important role in electricity generation. Since 2010 investment activity in renewable energy increased more than 60%. This was made possible by cheap technologies, which allow investing in new "clean" generating capacities.

Over the last 10 years, investment in renewables has undergone significant structural changes. Thanks to the government`s support development of renewables in the United States and the EU has intensified. Before the economic crisis, investment was constantly growing in all regions of the world. The largest volume of investment was recorded in Europe and North America. But soon "green" investment shifted from Europe and the United States to the Asian region – China and India.

It is worth mentioning the unfair competition in the renewable energy market, which occurred at the end of the first decade of the XXI century because of the state mechanisms in different countries. For instance, due to the constant decline in equipment prices Chinese, solar panel manufacturers increased their share to 80% in the EU market. The cost of solar panels in China during 2009-2012 had decreased almost three times, while the production of solar panels had increased by 40% annually.

In the domestic market, supply exceeds demand, leading to diversification and an increase in sales, Chinese companies have entered the US and the EU markets by dumping and pushing out local producers from the renewable energy market. However, neither the EU`s anti-dumping investigation nor the imposition of special import duties on imports of solar panels and their components from China has been able to influence Chinese suppliers, who continue to hold a leading position in the European market. From 2008 to 2020 China has accumulated the largest amount of investment – $967,8 billion, the United States accounted for $501,6 billion, and Europe invested $959,8 billion, with the largest amount in Germany and the UK. India is also gaining popularity in renewables and has accumulated more than $100 billion (Fig. 2).Since the end of the first decade of the XXI century, "green" investment in RES have become a global phenomenon.

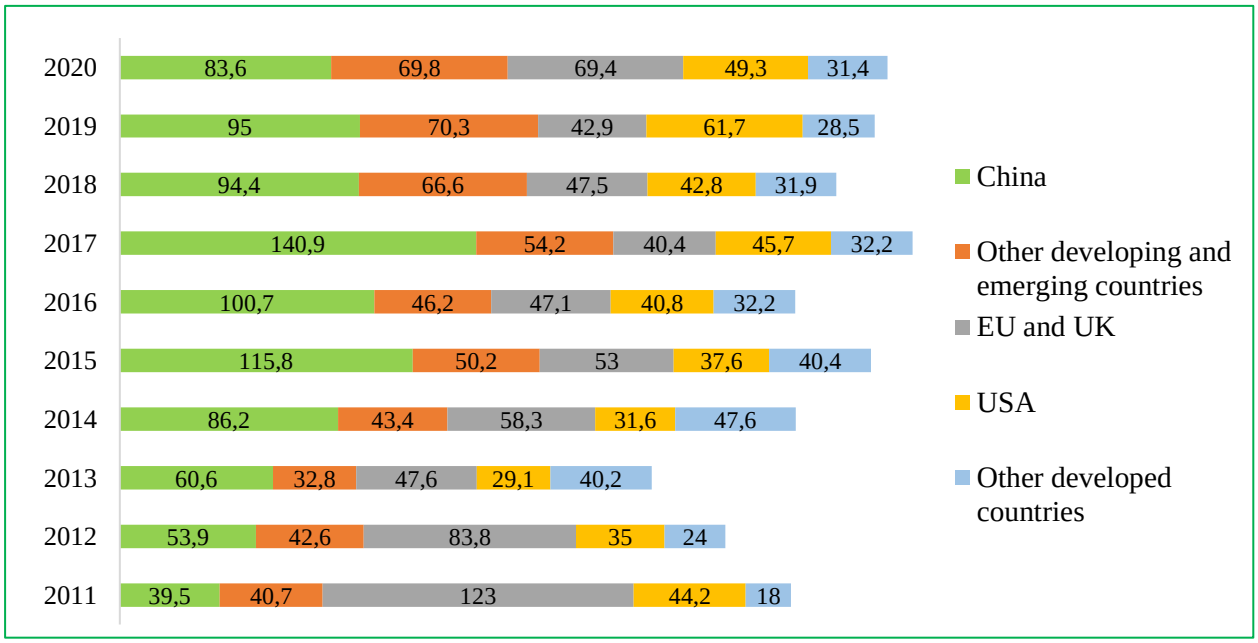


Fig. 2. Global Investment in Renewable Power Capacity, by countries, $ billion

Source: REN21 (2021)

One of the trends in recent years has been the widening geographical spread of investment in renewables. According to BloombergNEF, in 2021, China`s investment in renewables and low-carbon measures rise by 60% to $266 billion (Fig. 3).

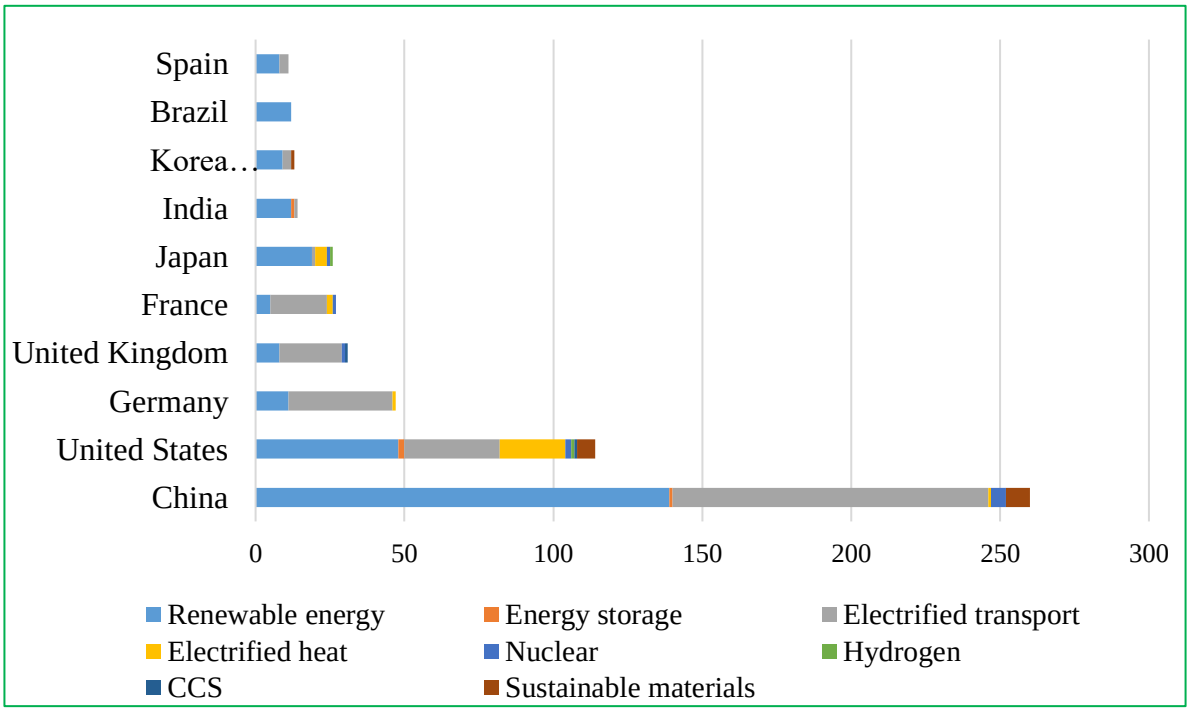


Fig. 3. Global investment in energy transition by country in 2021, $ billion

Source: BloombergNEF (2022)

The increase was due to the support mechanism of solar and wind energy – the transition from fixed tariffs to auctions. The country has a nationwide trend for solar energy and funding major offshore wind projects. In general, investment inflows have increased across the United States, and Europe. The U.S., for instance, was the second-biggest investing country once again, achieving a total of $114 billion in 2021 – up 17% from 2020. European countries invested $219 billion in 2021, with EU member states accounting for $154 billion of that. In the European market, the increase in investment in solar capacity in Spain was obvious. Also in Sweden and Norway – due to significant cost reductions and continued construction of large wind farms. The main initiators of the transition to RES – are Germany, the UK, Sweden, France, and Ukraine.

Global investment in new renewable energy capacity (excluding large hydropower) withstood the economic crisis triggered by the COVID-19 and amounted to $303.5 billion in 2020. With mobility restrictions affecting the entire renewables construction chain in the first half of 2020, new renewable capacity was expected to fall 10% for the year. 2020 characterized changes in the sectoral distribution of investment, in particular (Table 4): investment in solar energy increased by 12% to $ 148.6 billion, while investment in the wind energy sector decreased by 6% – from $151,3 billion to $142,7 billion. Solar power was the only renewable energy technology to experience an increase in investment and this sector created twice as many jobs as in the coal or gas industry.

Table 4. New investment in Renewable Energy Capacity, by technology, $ billion

Technology	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Solar power	60,4	63,3	101,7	158,6	141,8	121,3	147,4	176	145,4	180,2	139,7	132,4	148,6
Wind power	73,6	73,3	98,6	86,5	77,8	82,9	110,8	122	126,3	130,9	134,1	151,3	148,6
Biomass and waste-to-energy	16,1	13,4	17	20,4	15,4	13,7	12,9	10,2	13	5,7	8,7	10,3	10
Biofuels	17,6	9,4	10,1	10,4	7,3	5,1	5,3	3,6	2,1	3,2	3	1,7	0,6
Geothermal	1,7	2,5	2,8	3,9	1,5	2,7	2,9	2,5	2,7	2,4	2,2	1	0,7
Small-scale hydropower (<50MW)	7,6	6	8,2	7,7	6,1	5,7	7,1	4	4,1	3	0,9	1,7	0,6
Ocean power	0,2	0,3	0,3	0,3	0,3	0,2	0,4	0,2	0,2	0,2	0,2	0	0

Source: REN21 (2019b); REN21 (2021)

Barriers to investment in small hydropower include the high upfront cost, the lack of a regulatory framework encouraging the deployment of the technology, and a high degree of risk and uncertainty in the different development stages.

Geothermal and marine power projects face high risks and expensive early-stage development or technical challenges and a lack of specific policy support in the key markets. Investment in new biomass and solid waste-generating capacity has been funded in two main markets – the United Kingdom and Japan. However, today investment activity in this sector remains extremely low, compared to investment made annually until 2016. Investment in biofuels decreased by 65%, and barriers include the regulatory uncertainty regarding sustainability criteria (especially in the European market), lack of effective government support, high financing costs, and doubts regarding technological readiness.

An overview of "net" investment in new generating capacity is only a partial picture of renewable energy investment. It is advisable to consider such investment by sources of financing, the distribution of which has varied considerably over the last decade (Table 5). For instance, venture capital has become less significant than it was in 2013-2018, also annual R&D (conducted by large companies, both specialized and diversified) has almost doubled since then. In total, up to the end of 2019 corporate R&D amounted to $57,4 billion, at almost the same level – $58,1 billion – funded by the state R&D. Over the past few years, the largest percentage of R&D funding growth in both the public and private sectors was recorded in China and the Asia-Pacific region (excluding India and China).

Table 5. Global trends in Renewable Energy Investment, by stage, $billion

Stage	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Government R&D	2,8	5,4	4,9	4,8	4,7	5,2	4,5	4,4	5,1	5,1	5,5	5,7
Corporate R&D	3,3	3,3	3,8	4,3	4,1	4	4,3	4,1	4,3	6,7	7,5	7,7
Venture capital	3,3	1,6	2,6	2,6	2,4	0,8	1	1,4	0,8	0,7	0,2	0,5
Public markets	10,5	11,7	10,6	9,9	3,8	9,8	14,9	12	6,2	5,6	6	6,6
Private equity expansion capital	6,3	3	5,3	2,5	1,6	1,3	1,7	1,8	1,7	0,7	1,8	2,5
Asset finance	132,8	112,3	152,4	190,8	166,5	171,3	226,9	269,2	247,5	267,8	236,5	230,1
Small-scale distributed capacity	22,2	34,7	60,9	75,1	70	40,4	37,1	32,4	32,7	42,4	36,3	52,1

Source: REN21 (2019b); REN21 (2020a)

Public funding amounted to about $110 billion, and venture and private equity accounted for the least – just over $ 48 billion. Venture capital and private equity in RES in 2019 was only $3 billion, well below the record $10 billion a decade earlier. Asset financing accounts for the largest share of total investment in RES. Although in 2019 there was a decrease of 2,7% compared to 2018, recording the lowest figure since 2015 – $230,1 billion (including financing of electricity generation projects: wind farms, solar parks, biomass power plants, and energy plants using biofuels, small hydropower plants, and geothermal plants).

An important factor in investment trends (in rapid attraction and accumulation of investment) is the cost reduction of "clean" technologies. This made RES less dependent on government support in different countries. Thus, BNEF data show that the cost of energy (Levelized cost of energy, LCOE) has decreased by 83% for solar power plants, 47% – for onshore wind power plants, and 45% – for offshore wind power plants since 2009 (Fig. 5). LCOE – an indicator based on market data, that measures the all-in expense of producing one MWh of electricity from a new project, taking into account costs of development, construction, equipment, financing, feedstock, operation, and maintenance (BloombergNEF, 2020). The main factors influencing the LCOE are the capacity utilization rate and the weighted average cost of capital. LCOE is used to compare the cost of energy produced by different technologies and is needed to ensure cost recovery from projects.

RES remains the cheapest energy resource in many countries. Costs reduction was caused by economies of scale, fierce competition, the introduction of auctions, and increasing efficiency of generating equipment. The cost of renewable technologies varies from region and depends on factors such as resource quality, industrial development, labor costs, availability and cost of land, and licensing and permitting processes. During the last ten years, cost reduction has provided the building of new capacities in "new" developing markets in an economically competitive way.

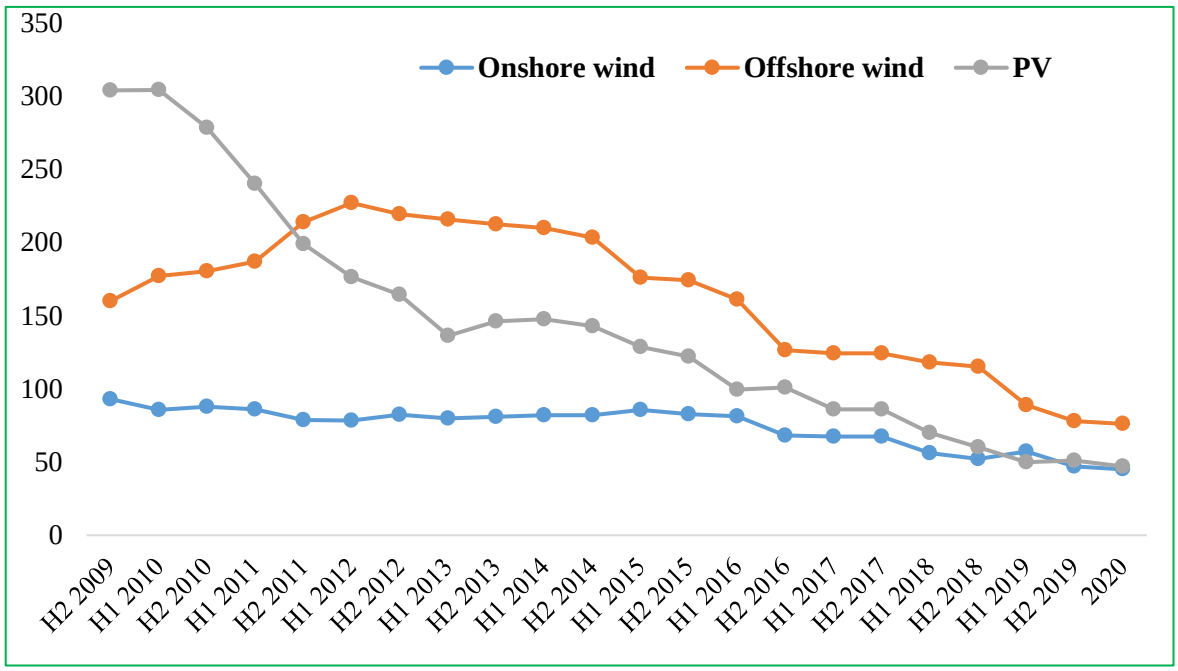


Fig. 5. Levelized cost of electricity, by main renewable energy technology, $/MWt

Source: Frankfurt School-UNEP Centre/BNEF(2019); IRENA (2020)

Assessing the scale of renewables, it is advisable to analyze data on capacities. In 2021 addition of renewable capacity increased by 6% (IEA, 2022a). During last year almost 295 GW of RES had been put into operation worldwide, and this amount is almost enough to achieve the climate goals set by the Paris Agreement. According to the IEA Sustainable Development Scenario in the period between 2018-2030 renewable energy capacity should increase by an average of more than 300 GW per year (IEA, 2021a) (Table 6).

Table 6. New capacity by type of RES, GWt

	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Solar power plant	0	1	1	1	2	2	6	8	17	31	30	37	40	49	75	97	97	115	139
Wind power plant	7	8	9	11	15	18	24	35	31	39	47	33	49	68	51	48	50	60	93
Hydroelectric power plant	14	19	22	21	25	31	32	34	33	33	34	44	38	34	36	25	20	15	20
Bioenergy	2	3	2	5	3	2	4	8	7	8	6	7	6	7	9	7	9	8	8
Other	0	0	0	0	0	0	0	1	1	1	1	2	1	1	1	1	1	1	0
Total	**23**	**31**	**34**	**39**	**44**	**54**	**67**	**85**	**88**	**111**	**118**	**122**	**135**	**158**	**171**	**177**	**177**	**199**	**260**

Source: REN21 (2020b); IEA (2021c)

Concerning types of energy technology, despite the 17% decline in wind capacity additions, it was offset by an increase in solar PV and growth in hydropower installations. In terms of speed of growth, renewable capacity's year-on-year increase last year was slower. The reason was the phase-out of subsidies, especially for onshore wind in China. The Chinese market accounts for 46% of worldwide renewable capacity additions. However, the new Chinese capacity declined 2% year on year. However, offshore wind, residential solar PV, and bioenergy annual additions broke new records thanks to the availability of subsidies through 2021. For instance, offshore wind new installations increased almost six-fold in 2021 compared with 2020.

The European Union was the second-largest market in terms of increased capacity last year. Solar PV accounted for the majority of the European Union's expansion last year due to project acceleration in Spain, France, Poland, and Germany. This was made possible by government-led auctions and distributed solar PV incentives. Regarding the United States, lower production tax credit rates led to onshore wind additions.

Even though new renewable capacities have grown over the last two decades, RES still accounts for only a relatively small share of global electricity production: according to the IEA, in 2020 it accounted for about 29% (including large hydropower plants). The global energy balance share of RES has grown from 12.1% in 2007 to 14,1% in 2019 (includes wind, solar, geothermal, hydro, and biofuels) (Fig. 6). This is a gradual increase in "green" electricity generation caused by a huge fleet of power plants in the world. Moreover, wind and solar energy depend on weather conditions, and therefore can usually produce less electricity per year compared to their nominal capacity than, for instance, coal-fired and nuclear power plants.

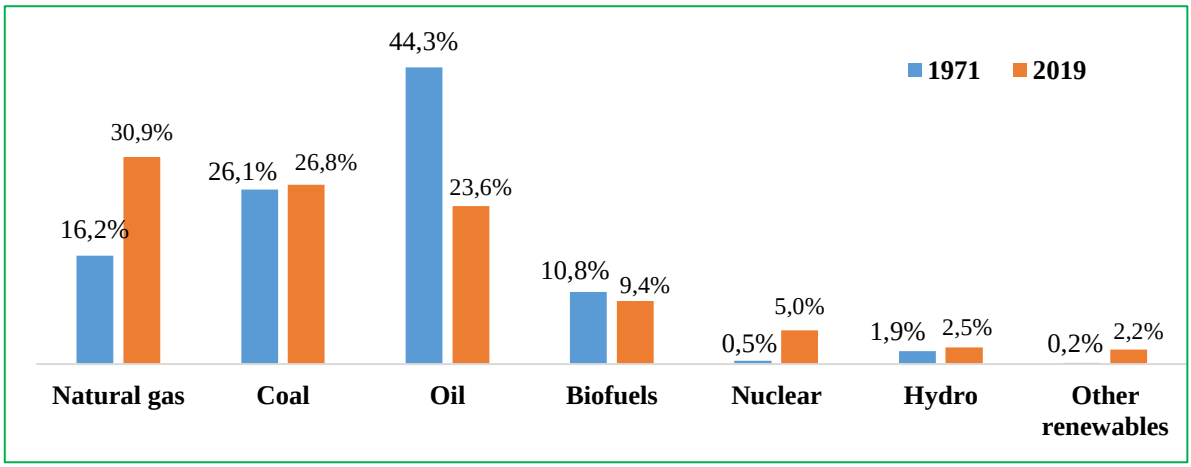


Fig. 6. Total primary energy supply by fuel, 1971 and 2019

Source: IEA (2021d)

Improvements in technologies and location of renewable capacities in low-cost regions, government tendering schemes, and tax incentives have made investment in RES more competitive compared to fossil fuels. At the same time, the potential stumbling blocks on the way to RES remain the problem of capital intensity, the issue of balancing electricity capacity, and the growing need for financial resources. Only a well-thought-out policy could eliminate uncertainties about the profitability of spread RES in the power grid.

Global trends in investing in "clean" technologies and developments

At the beginning of the XXI century, the development of innovations was one of the key factors that result in radical structural changes in the world economy. They improve manufacturing processes and generate new ways to meet the needs of different businesses. In this regard over the last twenty years, an effective innovation policy has been an important

condition of socio-economic development in a vast majority of countries, e.g. actions aimed at implementing innovations in the technological sector, labor organization system, and management system based on scientific and technological progress. Together with innovation and infrastructure, sustainable industrialization can unleash competitive economic forces that create jobs and generate new income.

In pursuing long-term policy, technological innovations expand the range of potential strategies for achieving goals, reducing the cost of implementing them overtime the period. Innovations are not created, developed, and implemented by themselves, everything depends on market structure, demand, opportunities and speed of implementation, and most importantly – government assistance (in particular, through fiscal and financial support).

Technological innovations are often described as a linear approach that includes four stages: research, development, demonstration, and deployment. And although technological innovations are implemented rather slowly, the linear approach greatly simplifies the relationship between these stages. Innovations are even more complex. Only a tiny share of technologies "follow" from one stage to another, as this approach cannot cover all aspects and conditions that may arise during the implementation of the whole process. In addition, separate technology could be successful in one country, but may not be in line with general market realities and may not be suitable in other countries.

Despite the complexity of innovations` implementation, in particular, in production processes, the transition to a post-industrial society demonstrates the intensification of innovation processes as one of the leading factors of sustainable development (Markevych & others, 2022). In recent decades this manifests in the transition from low-tech production activities to medium and high-tech. The latest technologies are forming new high-tech industries and producing a wide range of consumer goods, e.g. computers, various communication devices, and household appliances. Despite the large differences across regions, the share of medium-high and high-tech industries in manufacturing value-added increased from 40.5% in 2000 up to 44.7% in 2016 (United Nations, 2019). For instance, in 2016 in East and South-East Asia, Europe, and North America, more than 47% of the total value added in manufacturing value-added came from high-tech industries. At the same time, African countries stunt significantly, in particular, the proportion of medium-high- and high-tech manufacturing value-added in total manufacturing value-added fell between 2000 and 2016 from 18% to less than 15%.

The pandemic hit the manufacturing sector, resulting in a drop in the share of manufacturing value-added in global GDP in 2020. At the same time, the share of manufacturing value-added in the least developing countries` total GDP grew from 10.1% in 2010 to 12.8% in 2020 (Fig. 7). However, it is too slow to reach the target of doubling that share by 2030. On a per-capita basis, manufacturing value-added was only $136 in the least developing countries in 2020, compared with $4 296 in Europe and Northern America.

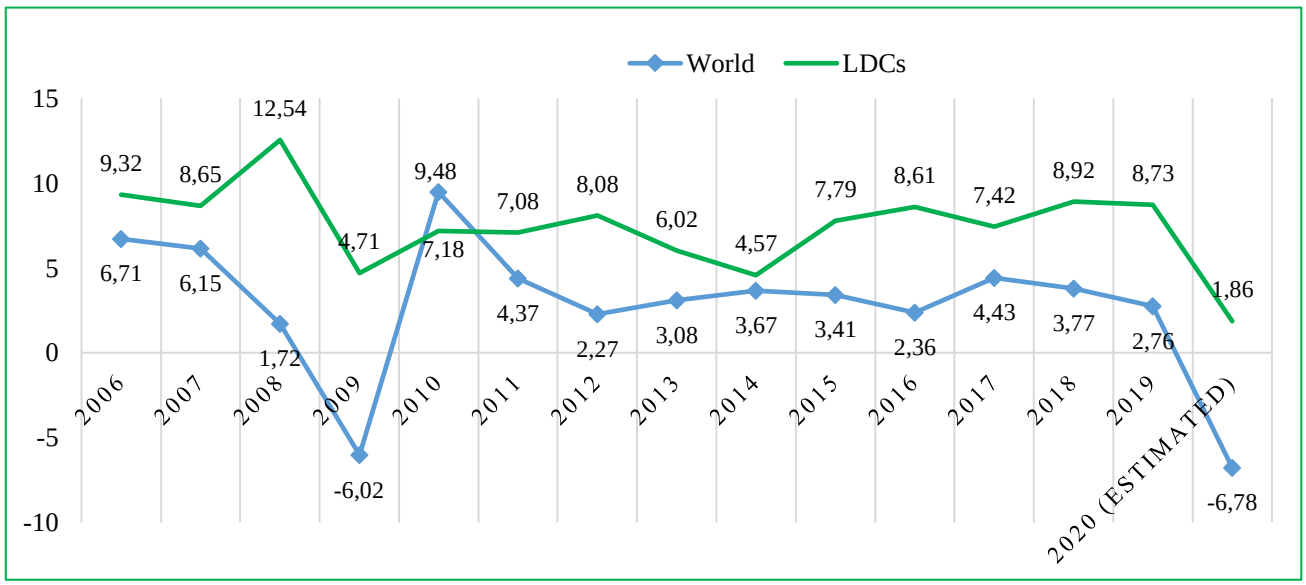


Fig. 7. Growth of manufacturing value-added, 2006-2020, %

Source: United Nations (2021)

The current development of the world economy is accompanied by a strong scientific and technical potential, as evidenced by the data in the field of R&D. Its share in global GDP increased from 1.52% in 2000 to 1.73% in 2018. In monetary terms, global investment in R&D reached $ 2,2 trillion (according to PPP) in 2018, compared to $741 billion in 2000 (United Nations, 2020). The data also differ in geographical distribution: in Europe and North America in 2018 R&D accumulate 2.28% of GDP, compared with 0.37% and 0.86% in Northern Africa and Western Asia, respectively (Fig. 8). One of the reasons for these differences is the lack of political support for R&D funding in the least developed and landlocked developing countries.

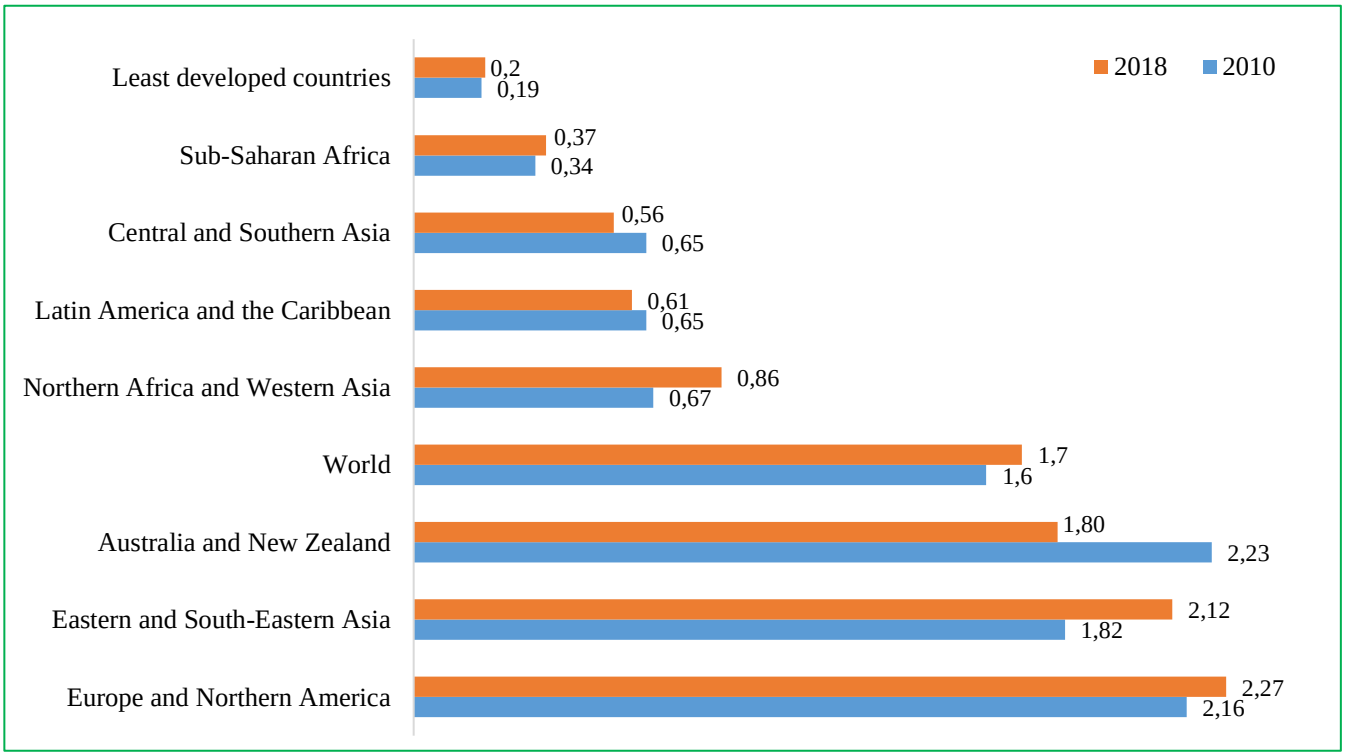


Fig. 8. Research and development expenditure as a proportion of GDP, 2010 and 2018, %

Source: United Nations (2021)

Innovations are also important for a sustainable energy future. It should be noted that governments in the future would have to pay more attention to the features of funding technologies and research developments used in the energy sector (with an emphasis on low-carbon). A growing number of countries are trying to solve the problem of efficient and economical use of energy resources by introducing emerging technologies. Innovations in the energy sector are changing at a slow pace because they are quite large-scale, complex, and designed for long-term operation. But "changes" are taking place, especially under the pressure of the geopolitical situation (*e.g.*, the oil crisis of 1973, known as the "oil embargo"), changes in energy policy (*e.g.*, the country`s rapid transition to RES or waiver of nuclear energy), structural changes (*e.g.*, "demographic tipping points", provoked by population decline, and consequently lead to energy consumption decrease). Today the main "changes" are the rapid development of solar energy (photovoltaics), the production of electric vehicles, energy storage, *etc*.

Accompanied by low fossil fuel prices during the 1990s, the end of the Cold War reduced public awareness of energy efficiency. But today, due to domestic political challenges and global climate change it is important to respond to new risks.

Among them are threats to public health and the environment. Developing "clean" energy technologies that would reduce the use of expensive and at the same time "dirty" energy resources (based on fossil fuels) is becoming an increasingly important dimension.

Governments play an important role in the development of innovation processes in the energy sector, often financing high-risk research, as well as new low-carbon technologies, which are usually not cheap and have an uncertain market value. One of the effective ways to assess the implementation of clean energy technologies is to estimate the level of public RD&D (research development and remonstration) investment and identify the ties between these investment and technology development. In 2020, the global public energy RD&D budget reached about $34.9 billion, confirming the upward trend that began in 2017 after a decline during 2013-2016 (IEA, 2022b). The EU budget (Horizon 2020 program), and the USA and Japan`s budgets were the largest with respect to RD&D. The growth was mostly driven by Europe and the United States, while public spending on energy RD&D stayed constant in China after two years of strong growth in 2017-2018. The budgets of the EU and European countries reached more than $10 billion (31% of total funding) in 2020.

According to the IEA (IEA, 2022c), in 2021 IEA governments have spent about $23 billion for energy research, development, and demonstration, which is more by 2% than in 2020, although it is still much lower than in 2009 (a peak of public investment in energy RD&D) (Fig. 9).

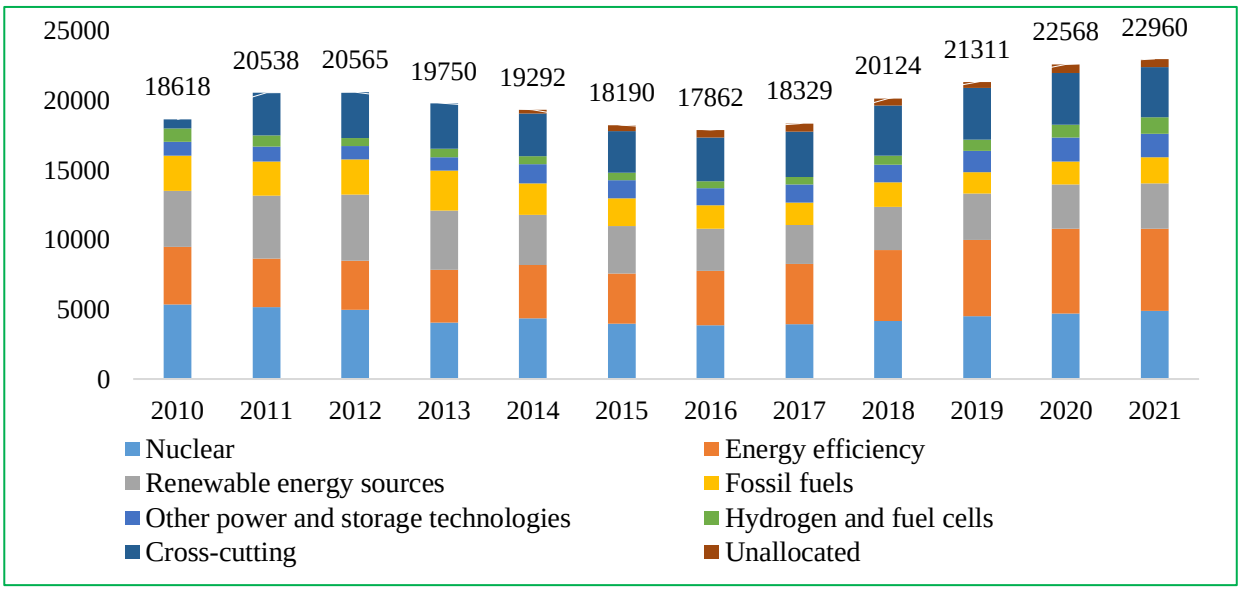


Fig. 9. Total public energy RD&D budget for IEA countries, by technology, 2010-2021, $ billion

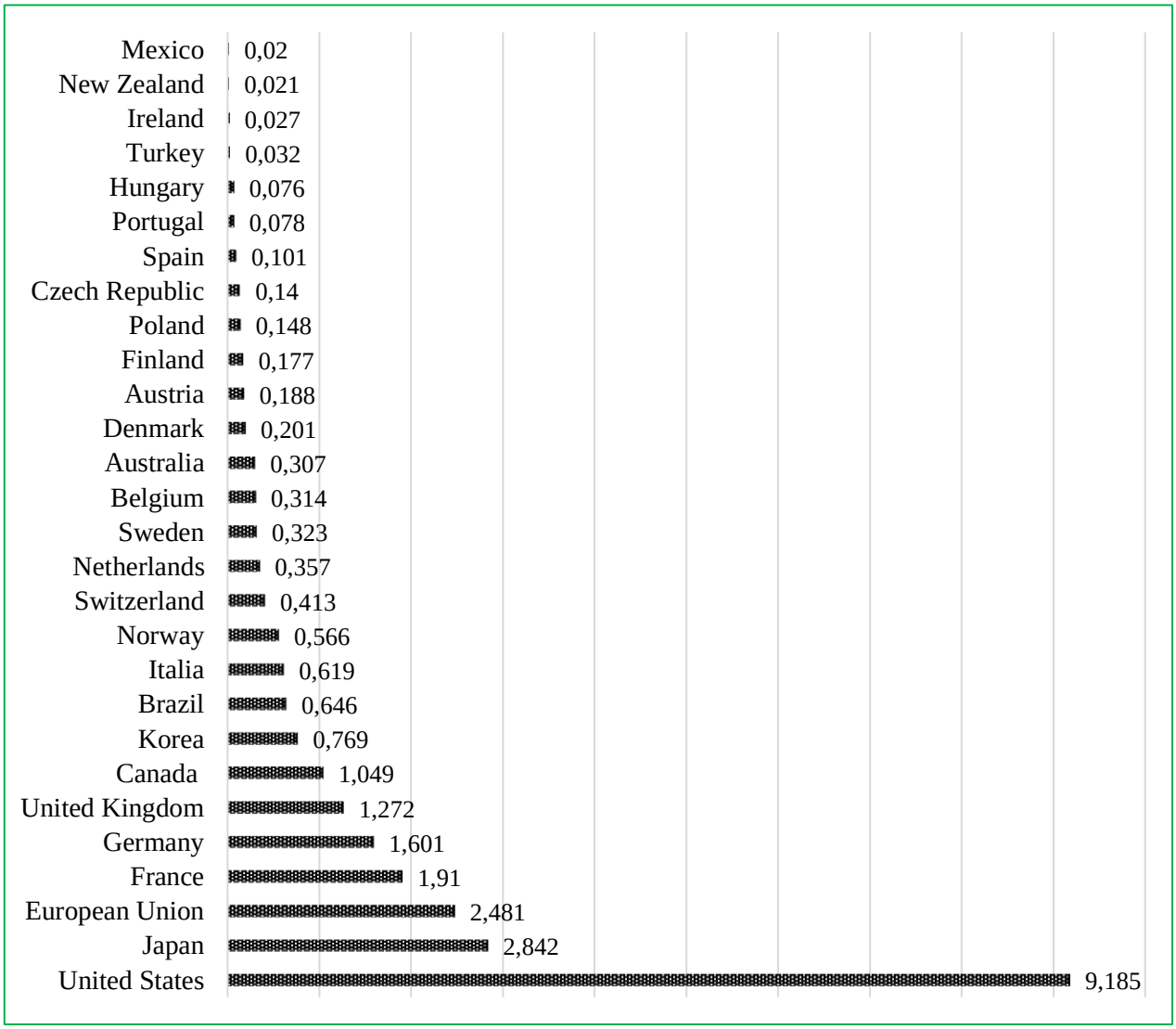
Source: IEA (2022c)

The United States and Japan among IEA member countries spent on renewable energy technologies and high-efficiency fossil fuels a huge amount of money, followed by the EU and the United Kingdom. The US has increased spending on solar technology, hydrogen, and low-emission vehicles significantly. In the EU energy RD&D remains high, in 2021 increased funding in the energy efficiency sector and nuclear ones, spending on cross-sectoral technologies (such as smart grids). In general, the largest share of government spending on energy RD&D – 73% of total spending – accounted for the top five countries:

United States, Japan, France, Germany, and United Kingdom (Fig. 10). Growth was mainly due to investment in low-carbon technologies. Among the IEA countries, also the large amounts of energy RD&D were spent by Canada, Korea, Italy, Brazil, and Norway. In most IEA countries, total R&D spending increased, except in some European countries.

Fig. 10. Total public energy RD&D budgets by the country for 2021, $ billion

Source: IEA (2022c)



Over the last 50 years, IEA member countries have changed their purpose regarding RD&D in the energy sector. Thus, the nuclear sector, which dominated in 1974 and accumulated 76% of total government funding for energy RD&D, generated only 22% in 2021. Financing RD&D in the fossil fuel sector declined to 8% in 2021.

Financing RD&D in both the energy efficiency and renewables increased significantly during the 1990s and 2000s, from 7% in 1990 up to 26% and 14% respectively in 2021. A growing trend was recorded in cross-cutting sectors and storage technologies – up to 24%. While the budgets for hydrogen and fuel cells increased from 3% to 5% in 2021 (Fig. 11).

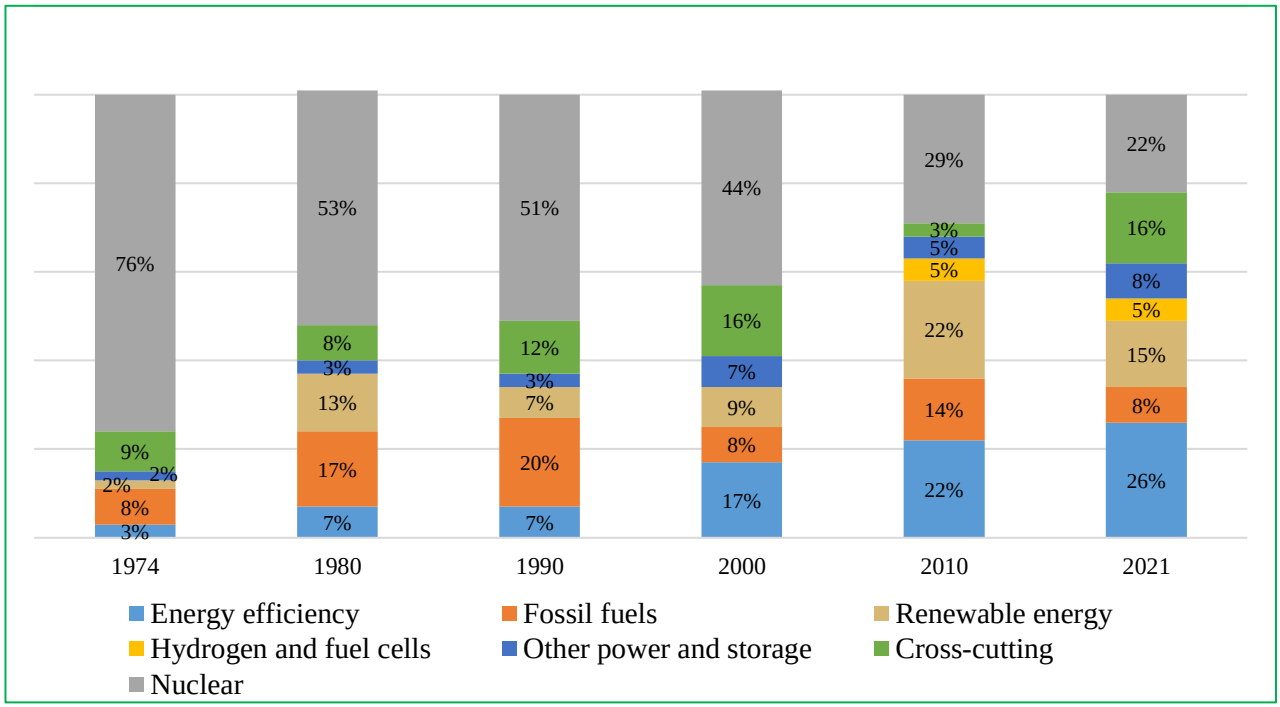


Fig. 11. Evolution of IEA total public energy RD&D by technology, 1974-2021

Source: IEA (2022d)

This distribution of financing may indicate a slow, but growing trend toward increasing low-carbon RD&D costs. Expenditures for the development of environmentally friendly energy technologies, which the member countries of the Innovation Mission committed in 2015 doubled over the last years. Mission Innovation is a global initiative of 24 countries and the EC (on behalf of the EU), which focuses on intensifying and accelerating the development of global innovation in clean energy to make clean energy available. The mission was announced on November 30, 2015[3].

[3] It should be noted that according to the Innovation Mission, 15 IEA and EU member states, as well as leading emerging economies such as Brazil, China, India, and Indonesia, committed in 2015 double government RD&D spending over the next five years.

Public RD&D spending on low-carbon energy technologies in IEA member countries increased significantly in 2021 to reach $ 22 billion (95% of total public energy RD&D spending). For sample, public carbon RD&D spending has increased for the first time since 2013 to reach just over $1 billion. This category includes technologies in the coal, gas, and oil industries, and other RD&D related to fossil fuels. Among the leading countries in investing in low-carbon technologies were Germany, Norway, Australia, and Denmark (Fig. 12).

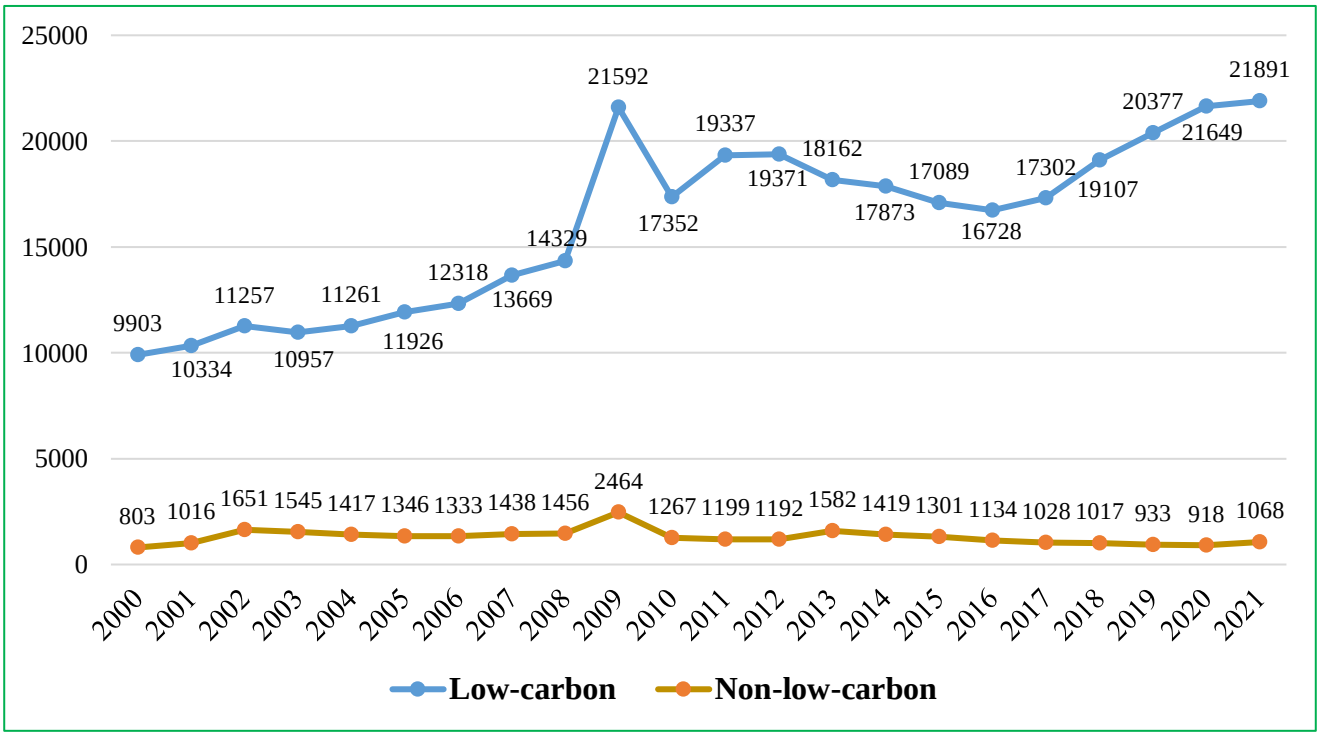


Fig. 12. Evolution of public low-carbon energy RD&D budget in IEA member countries, 2000-2021, $ billion

Source: IEA(2022e)

Governments play an important role in the financial support of low-carbon RD&D. Moreover, they provide incentives, contributing to the development and expansion of "clean" RD&D. In particular, the US, the UK, and the Nordic countries have a clear and systematic framework in the RD&D sector, backed by fiscal incentives (tax credits, grants, *etc.*), market-based instruments or budget allocations. These financial instruments provide the development of institutions and laboratories. For instance, the United States has been able to develop a system of world-class national laboratories with human capital and innovations. The United Kingdom adopted sectoral agreements (nuclear sector agreement, marine wind energy agreement, *etc.*) bringing together government and business with the aim of reducing costs for the low-carbon technologies.

As part of the national climate change strategy, India has adopted a policy based on increasing technological capability and innovations. In particular, the country worked on The National Mission for Enhanced Energy Efficiency (2009), The National Solar Mission (2010), The National Electric Mobility Mission (2012), The National Smart Grid Mission (2015), and The National Mission on Advanced Ultra Super Critical Technology (2017).

Fiscal incentives are an important element in North America, especially in the United States and Canada. In the US since 2018 the financial base has been expanded: tax credits for the development of renewables, loans for energy efficiency, nuclear and fuel elements, as well as increased incentives for companies willing to implement carbon capture technology and reduce emissions under the so-called tax credit "45Q" focusing on long-term storage of CO_2 (underground). This is an example of how incentives can attract investment. Title 45Q of the U.S. Tax Code sets out the terms of tax credit for power plants and industrial facilities that focus on energy efficiency and capturing and storing CO_2 (Waltzer, 2017). In particular, the loan is related to the installation and use of carbon capture equipment in industrial plants, gas- or coal-fired power plants, or facilities directly removing CO_2 from the atmosphere. Captured carbon can be used in the manufacturing of building materials, biofuels, or oil production. In all cases, CO_2 must be geologically stored or used as a raw material to obtain credit.

Governments are also increasingly using market mechanisms to support the commercialization of technologies, including public procurements. In India, for instance, the Unnat Jyoti program has significantly reduced prices for LEDs, increasing the demand for energy-efficient lighting. Public procurement company Energy Efficiency Services Limited replaced more than 350 million LED lamps, helping to save 45.5 TWh per year. Among other things, tenders for building RES capacities reduced the cost of wind and solar energy.

Investment in RD&D differ from other investment in the energy sector. The assets are often intangible, profitability is uncertain, and investment in innovation cannot always be recouped easily and quickly. In this regard, government support becomes an important long-term financial resource. Public finance instruments can provide access to different risky projects. As a result, in the early stages, many private innovations are supported by government-funded programs. Government invests in low-carbon RD&D using a variety of tools and mechanisms (Table 7). These tools are often used by national or subnational governments, but also at a local level or within the framework of international cooperation. Effective public RD&D can "attract" other sources of long-term funding.

Table 7. Innovation policy best practice calls for a broad, need-specific portfolio of support mechanisms

Funding instrument or policy	Description	Purpose
100% grants	Funding awarded to researchers in public or private institutions for projects selected by government agencies	Address private underfunding of research and direct efforts towards government priorities.
Co-funded grants	Funding for private research projects is contingent on the use of own funds by the company, ranging from 5% to over 50% of costs.	Compared with 100% grants, co-funding reduces the risk of "crowding out" and uses public funds more efficiently.
Research by state-owned enterprises	Governments can use their ownership rights to direct the level and type of research undertaken.	Support national champions that are committed to preserving the returns to RD&D within the country. Direct corporate strategy towards national interests.
Public research labs	Government can employ researchers as civil servants and establish long-term research programs.	Provides funding and job stability for researchers working on strategic topics free from commercial pressures.
Venture Capital and seed funding	Capital, usually equity, is provided to new small enterprises in the expectation that a small proportion of the investment can be sold for a substantial profit several years later.	Government VC funds create a market for risky, commercially oriented innovation and can give a social direction to capital market-based technology selection.
Loans and loan guarantees	Public loans can bridge funding gaps for companies on the verge of profitability, enabling them to construct demonstration plants or first-of-a-kind facilities.	Public lenders can be more tolerant of risk in the pursuit of public goods, lending at lower than market rates.
Tax incentives	Lower tax rates or rebates for R&D expenditures; tax allowances; payroll tax deductions; tax refunds for not-yet profitable start-ups.	Encourage firms to undertake more RD&D in all sectors, raising skills and keeping local firms competitive.
Targeted tax incentives	Favourable tax treatment for a specific sector or type of R&D.	Stimulate more activity in a part of the innovation chain or strategically shape a sector.
Prizes	Funding is awarded to winners of competitions to meet a specific technology performance target or outperform rivals	Use the prize money (or other rewards) to stimulate innovation and help policymakers of technology status at reduced public cost.

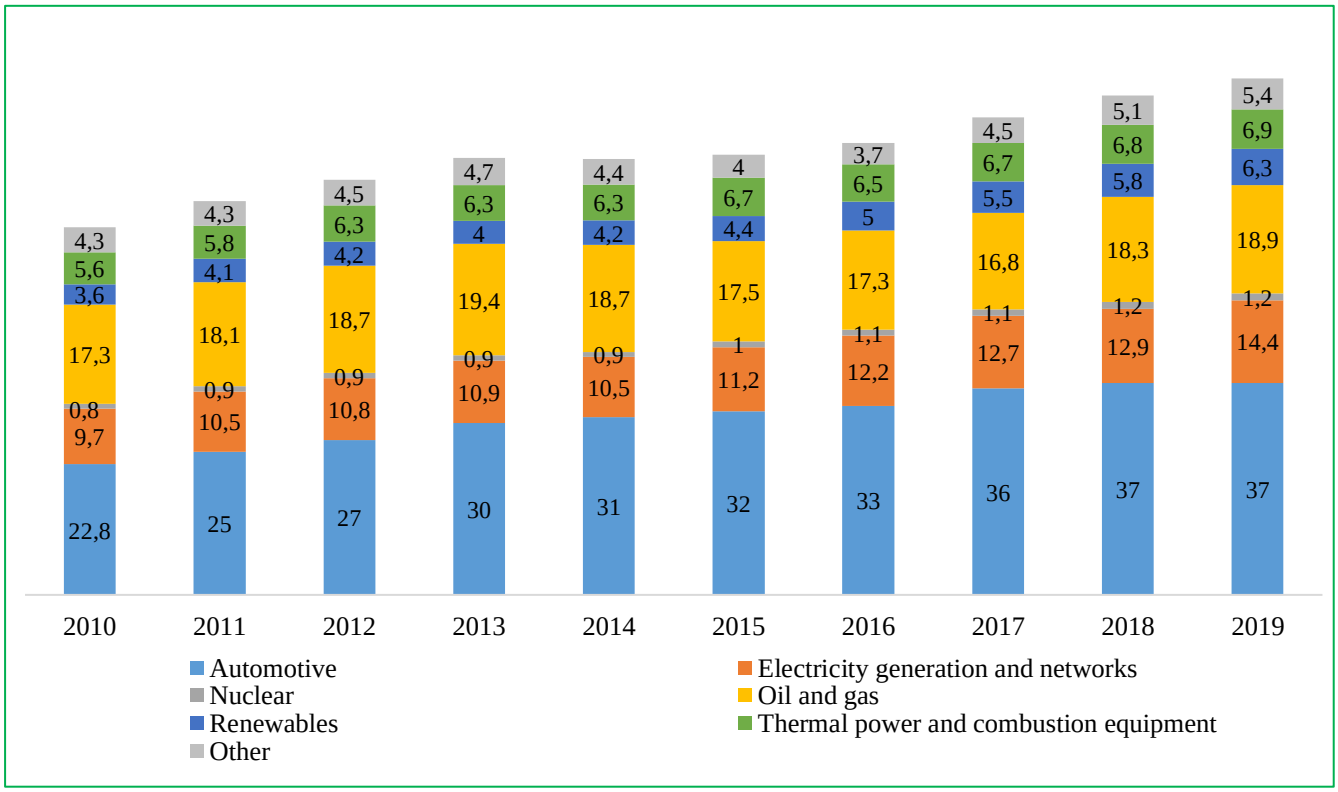
Source: IEA (2019)

Public R&D investment may also include venture capital. As an example, the Finnish Innovation Fund Sitra (a state fund working under the Finnish Parliament with budget of €950 million in 2021) supports start-ups aimed at addressing environmental problems, and social issues and improving the well-being of the population. Its goal is to help bridge the gap between the development of "clean" technologies and their further implementation. The United Kingdom and the United States have programs that provide capital to start-ups and small innovative businesses. In many countries, governments actively work with businesses through public-private partnerships, providing credit guarantees, creating innovative incubators and business networks, and encouraging investment in green business in the early stages. It should be noted that funding instruments depend on technology and partner. Direct government support of RD&D (*e.g*. grants, loans, tax credits) and business innovation (e.g. venture capital and seed funding) should match policies that promote the development of the clean energy market (*e.g*. pricing mechanisms, public procurement, energy efficiency standards, energy efficiency labeling, *etc*.).

Governments have great potential to share best practices and create robust mechanisms for sharing knowledge and intellectual property objects. Through international cooperation, governments can accelerate demonstration, especially in technologically complex areas such as carbon capture, use, and storage (CCUS), thermonuclear fusion, "smart" grids, and a better understanding of using such technologies can pave the way for their faster deployment and scaling.

Along with government support, the role of the private sector in mobilizing innovation capacity is crucial. Traditionally, state-supported research has been a vital source of knowledge and discovery, but the private sector is crucial to bringing new technologies to market. Businesses, entrepreneurs, and investors are serious about identifying, evaluating, and supporting the most prospective ideas and further transforming innovations into products. This is also the case in the energy sector. In 2019 companies attracted to energy storage, energy efficiency, and nuclear and coal-burning technologies have increased their R&D budgets by 3% in comparison 2018. Total R&D expenditures reached almost $90 billion, 74% of them were directed to the low-carbon sectors. Siemens and General Electric took first place in the list of global corporate investors in R&D (Fig. 13).

Fig. 13. Global reported corporate energy R&D spending in selected sectors, 2010-2019, $ billion



Source: IEA (2020b)

Corporate expenditures on R&D engaged in the production of fossil fuels showed languid increased costs – about $19 billion.Automakers, who have much higher R&D budgets than energy companies, continued to spend in 2019 as government policies and competitive pressures drive increased focus on energy efficiency and electric vehicles. The global policy has led to the need to increase spending on energy efficiency measures and the production of electric vehicles. In 2018-2019, automakers made the largest contribution to energy R&D – $36 billion. This was quite noticeable among large European and American auto manufacturers and companies engaged in the production of auto parts for cars, compared with Japanese and Korean automakers. VW Group, for example, increased overall R&D to $16 billion, or 7% of revenue (IEA, 2020b). However, the growing global expansion of Chinese automakers has been reflected in their R&D costs, which have risen by more than 20% on average. It is expected that the expansion of the production capacity of batteries for electric vehicles will turn into a major investment shortly. Production in 2018 was about 70 GWh. However, large manufacturers of electric vehicles are ready to invest $20-30 billion in more than 400 GWh production capacities by the mid-2020s.

Among the technologies, one of the most important today is the CCUS technology. In particular, China`s first large-scale CCUS project was launched in 2018 at China`s National Oil and Gas Corporation's Jilin Oil Field. There were also announcements of new CCUS projects that could work over the next decade. For the first time since 2010 the number of CCUS facilities in operation, under construction, or planned to be built has increased by 43 (in 2018). New CCUS projects have been announced in 2018 in Ireland, the Netherlands, and the United Kingdom. In 2019 venture capital investment remained robust, with more diversification of sectors and countries for energy technology start-ups, estimated at $4 billion. Although these amounts are significantly lower than RD&D investment in the energy sector, mostly invested in low-carbon technologies. Among the countries with the largest share of venture capital in energy technology in the early stages was China. However, excluding large transactions (worth more than $50 million), the United States with a share of 41% is the largest exporter of venture capital. By contrast, India increased its share to 12% in 2019, from an average of 3% over the previous decade. The largest amount of venture capital in technology was invested in energy storage, hydrogen technology, and fuel cells, as well as mining and conversion of fossil fuels. In general, companies in the energy sector are increasingly using corporate venture capital as part of a flexible and more open innovation strategy.

Innovations are the basis of sustainable energy supply and facilitate the deployment of low-carbon technologies, regardless of the volatility in fossil fuel prices and climate policy. Increasing investment in RD&D is important, per se, not bringing the desired results. Framework conditions, including tax regimes, regulations, or standards, as well as supporting measures in the field of environmental security, can be vital determinants of innovation policy.

As pointed out above, effective government measures can significantly accelerate the innovation process and promote its early implementation. Without ongoing research and deployment of R&D, countries are reducing their ability to improve the global energy system. Reducing investment in low-carbon technologies is detrimental to both the world's long-term energy security and environmental sustainability. Evaluating ongoing research gives us hope to address global challenges but requires increased funding both within countries and through enhancing international funding for low-carbon energy RD&D. Better cooperation to support a variety of energy research can help increase investment flows.

Global trends in investing in the "energy of the future"

Along with increasing access to affordable and clean energy and global GHG reduction, issues of energy efficiency as well as economical usage of resources over the past few decades remain extremely topical for the vast majority of countries. In general, the concept of energy efficiency focuses on products, services, technologies, and infrastructure that help companies and households reduce energy consumption, use clean energy sources or implement management systems and tools to improve energy use. Investment in energy efficiency are defined as the additional costs directed to new energy-efficient equipment that reduces energy consumption. In the construction sector, energy-efficient investment is accumulated in new buildings or reconstruction/modernization: for instance, investment in services (design, delivery, and installation) and products (lighting, appliances, equipment, and materials) that increase energy efficiency. In the transport sector, this investment is directed mainly to the production of electric vehicles. In the manufacturing sector, investment in energy efficiency are targeted mainly in the form of technology and "smart" energy management systems. Despite the importance of this sector for socio-economic development (increasing competitiveness of the national industrial sector, as well as ensuring energy and environmental security), the scale of investment in the manufacturing sector is significantly lower than in the energy sector.

According to the IEA report World Energy Investment 2020 (IEA, 2020c), investment in energy efficiency measures during 2017-2019 in the manufacturing, construction, and transport sectors had remained relatively stable at $250 billion per year (Fig. 14).

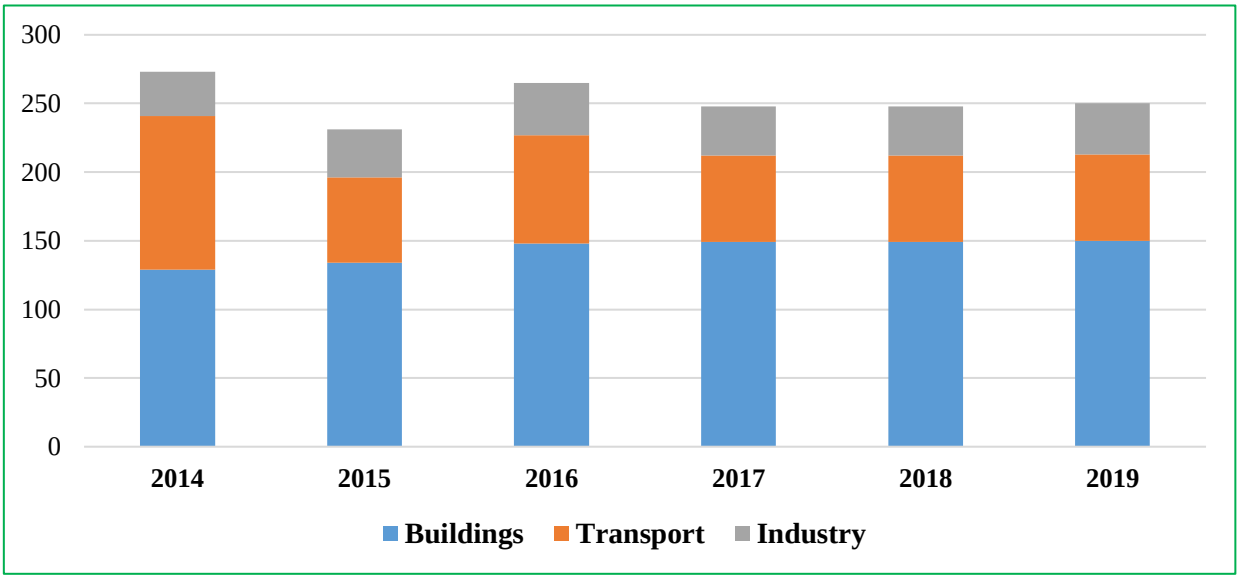


Fig. 14. Global investment in energy efficiency by sector, 2014-2019, $ billion

Source: IEA (2020c)

This proves slow progress in investing in energy efficiency, and 2019 was the third consecutive year when energy efficiency investment slowed. The main factor that led to this situation was inactivity and unsuccessful progress in implementing new energy efficiency policies in some countries. However, it is projected that investment will recover shortly due to the war in Ukraine and the need to achieve the SDGs (building an additional infrastructure).

In 2019, the largest share of investment – 60% – was accumulated in the building sector (insulation of walls, roofs, and windows). Global investment rose 2% to approximately $151 billion in 2019, marking a return to steady growth after stabilizing in 2018. Although the construction sector accounts huge volume of investment, this is still not enough for sustainable development.

In China, investment have remained stable and climbed by an impressive 10% to $30 billion. Due to the efficiency standards, investment in energy efficiency in the real estate sector is huge. As private investment in energy efficiency is around four times the level of public financing, tighter energy performance standards could improve energy efficiency in private buildings.

In Europe, there was a slight increase in investment due to government support for energy efficiency measures. In France and the United Kingdom, two of Europe's major energy efficiency markets, investment has remained stable, while in Germany, they have “shranked”.

In the United States, additional costs for energy efficiency measures in buildings in recent years were stable. However, because of mandatory building performance standards in an increasing number of states, the share of total investment aimed at energy conservation and energy efficiency in construction in the United States is raising.

In this context, it is worth mentioning the Efficient World Scenario (EWS): as of EWS, the average annual investment in energy efficiency should increase to over $ 584 billion by 2025, and in the period between 2026-2040. – up to $ 1.3 trillion (IEA, 2018) (Table 8).

Table 8. Energy efficiency investment needs to meet the EWS, 2017-2040

	Annual average 2017-2025 ($ billion)	Annual average 2026-2040 ($ billion)	Cumulative 2017-2040 ($ billion)
New Policies Scenario*	437	790	15 780
Efficient World Scenario	584	1 284	24 514

** The New Policies Scenario focuses on the world's leading countries pursuing a new state energy policy and implementing energy reforms and takes into account the energy policy measures and implement the intentions related to climate change. The Scenario also takes into account innovations that should arise in the future as a result of technical progress, and regulatory initiatives. Compared to the Efficient World Scenario, this Scenario is the framework and the most likely to be implemented. The total investment in energy efficiency under the EWS Scenario is higher than in the New Policies Scenario: for transport – by 51%, for the construction sector – by 48%, for the manufacturing sector – by 10%.*

Source: IEA (2018)

At a sectoral level, according to the EWS huge amount of investment should be attracted to the transport sector in form of technologies aimed at saving fuel and developing electric vehicles (Fig. 15).

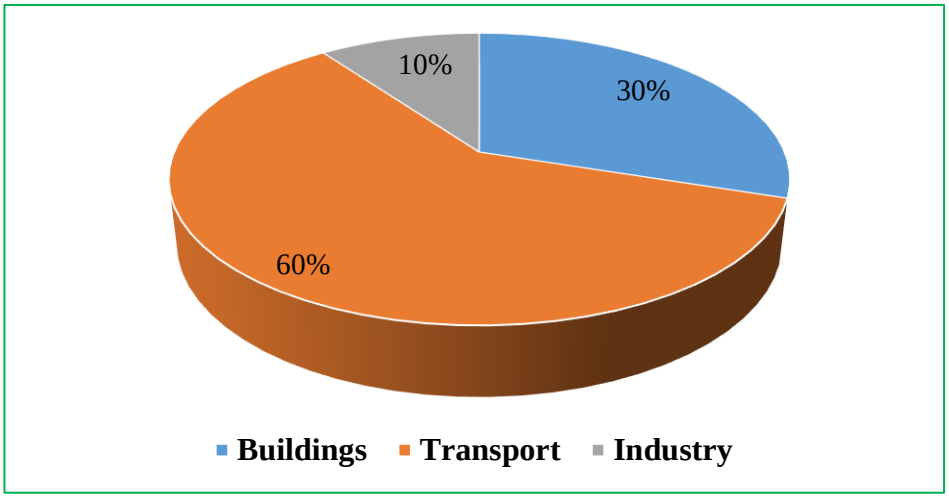


Fig. 15. Cumulative energy efficiency investment in the EWS by sector, 2017-2040

Source: IEA (2018)

The investment contribution of each country and region under the Scenario varies by sector (Fig. 16). It is expected that China, for instance, will accumulate 30% of investment in the industry sector by 2040, most of them will be directed to cost-effective and environmentally efficient heat pumps and motor systems in less energy-intensive industries. Europe, in turn, intends to accumulate 30% of global investment in the construction sector to upgrade old houses and use electric heat pumps.

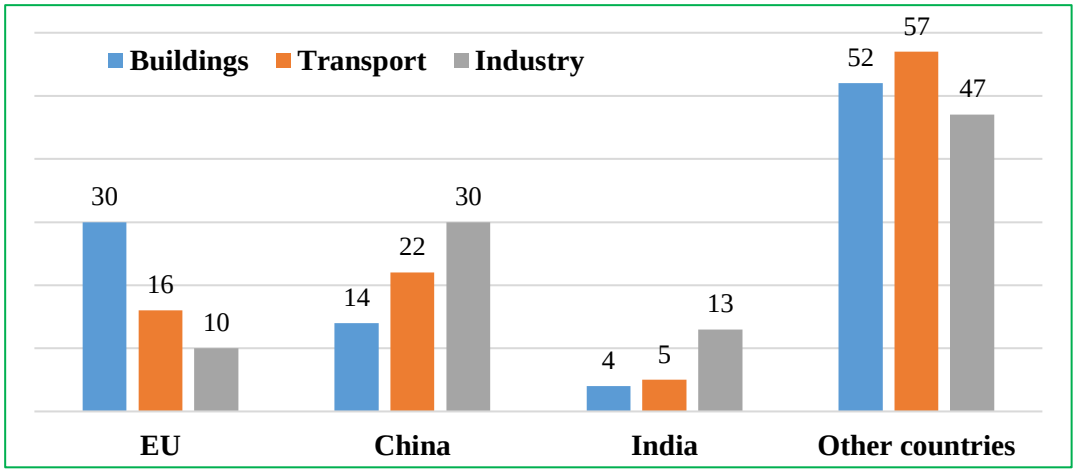


Fig. 16. Cumulative energy efficiency investment in the EWS by sector and region, %

Source: IEA (2018)

Investment in energy efficiency are cost-effective: in all sectors, the recoupment of each dollar invested in energy efficiency pays back on average by 300% over the life of the measure. The recoupment of investment for the transport sector is 200% and for the construction sector – 240%. These calculations are based solely on reducing energy consumption, however, there are many other benefits of energy efficiency, most of which bring additional financial benefits.

Investment in energy efficiency measures in the transport sector, namely in the production of electric vehicles, remain relatively high - global carmakers now target $515 billion for EVs and batteries. Due to rising prices for electric vehicles, total investment in the energy efficiency of transport are increasing (Lienert & Bellon, 2021).

World sales of electric cars reached 6,6 million vehicles in 2021, which is almost 300% more than in 2017, recording the highest growth rate since 2013. The largest market for electric vehicles in the world has China, setting a general trend of growth. In particular, the volume of electric cars sold in China in 2021 reached 3,4 million units, which is equivalent to total sales in Europe, and the United States. Those markets were the second and third largest ones for electric vehicles with sales of 2,4 million and more than 500 000 units, respectively. Norway, Iceland, Germany, the United Kingdom, and France remain among the leading countries in Europe (Fig. 17).

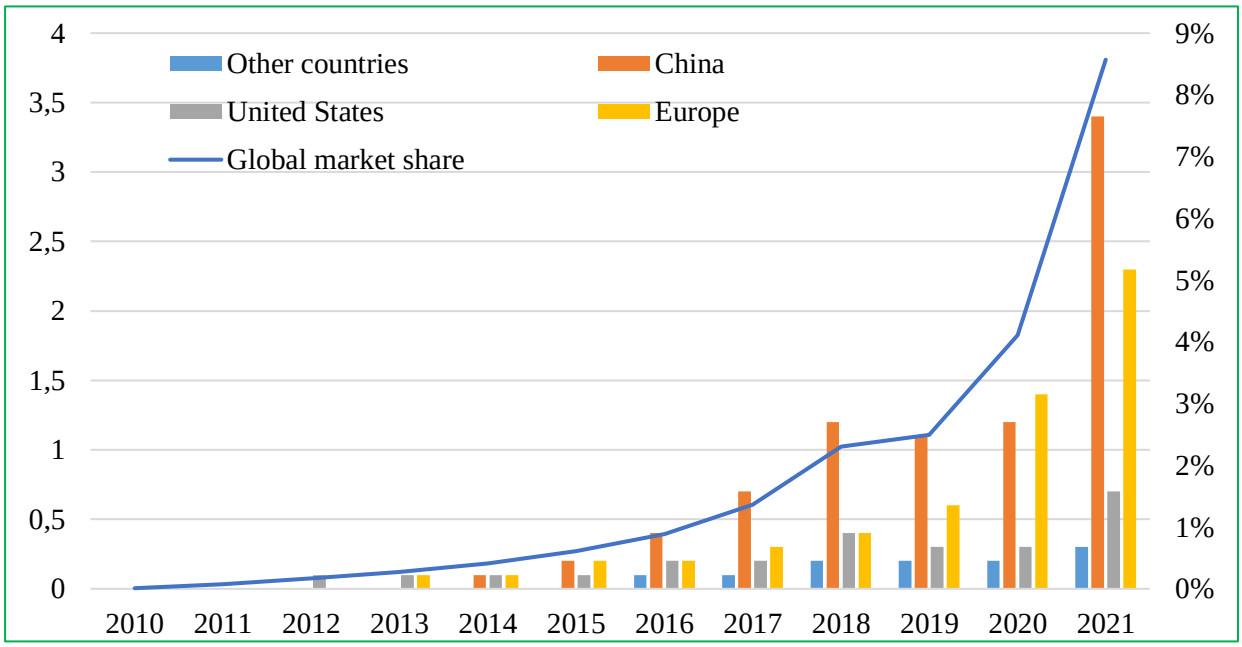


Fig. 17. Global electric car sales, million

Source: Richter (2022)

As for investment in the energy efficiency in the industrial sector, in 2019 their accumulation remained relatively stable compared to previous years, a slightly less than $40 billion. A low level of investment in energy efficiency measures in the industry indicates the advantage of energy efficiency projects that are relatively less capital-intensive and have fast returns. Also, investing decline in energy efficiency measures is due to the constant slowdown in the construction of new energy-intensive industrial facilities, resulting in constant structural changes in China as well as in Europe and North America. However, modernization of industrial facilities in combination with strict requirements set by IEA to implement the scheme "Perform, Achieve, Trade Scheme" is an important factor contributing to investment at the proper level.

Although total investment in energy efficiency in manufacturing remains stable, some changes have taken place in the geographical structure: China accounted for 42% of total investment in 2019, while in 2015 – 25%. This trend reflects China`s ongoing modernization in the manufacturing sector and political efforts driven by large-scale government mandates. North America in 2015 accumulated 17% of all investment in energy efficiency measures, in 2019 – the share was less than 9%.

To attract investment under the EWS Scenario, it is necessary to mobilize various sources of funding. In this context, one of the examples of a mature business model and the driving force behind the development of the energy efficiency market is the ESCO mechanism. ESCO help to develop, implement, and in some cases finance energy efficiency projects due to energy performance contract (EPC). Under EPC company identify and implement all possible energy efficiency measures, and further financial benefits will subsequently be shared between customers. Under EPC, ESCO also provides services for the operation and maintenance of energy efficiency projects.

The world ESCO market in 2020 (the latest open data) was valued at $33 billion. (IEA, 2021e) The Chinese ESCO market continued to grow, increasing by 12.3% to $19.2 billion in 2020, making up 59% of the global ESCO market (Fig. 18). This rapid growth was facilitated by policies: the provision of tax incentives and the introduction of an accounting system that supported ESCO projects (IEA, 2021f). In the US, where ESCOs have been implemented for over 30 years, the market in 2020 marked a small increase – up to $ 8 billion. The European ESCO market accounted for only 10% of global revenues.

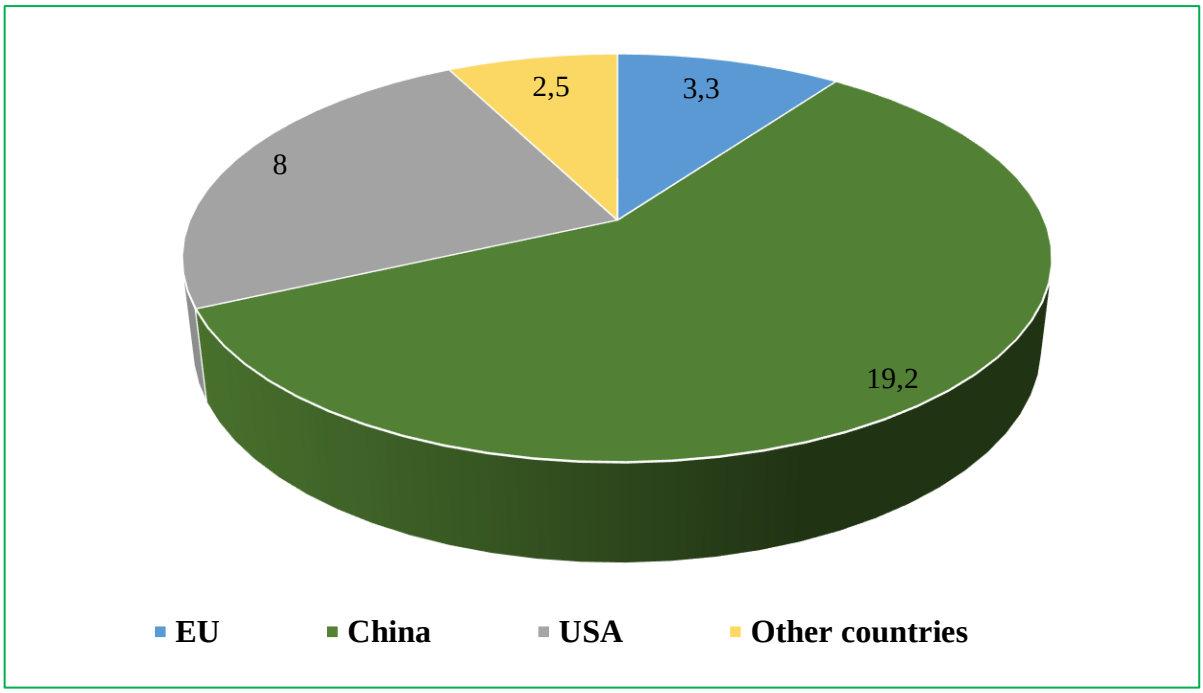


Fig. 18. Revenues of ESCO companies by regions/countries of the world in 2020, $ billion

Source: prepared by the author

On average, ESCO saves about 25% of energy resources. However, there are noticeable differences in ESCO implementation between countries and regions, as well as sectors. Most ESCO projects are implemented in the non-residential, industrial, and transport sectors. Non-residential sector is available for low-risk, easy-to-implement opportunities, such as lighting replacement, building insulation and heating upgrades, ventilation, and air conditioning. Extending the service life of non-residential premises also makes this sector attractive and promising. In the case of housing stock, the situation is the opposite because of less attractive due to its scattered and heterogeneous nature.

ESCOs` activities also vary from the region: in the Asian region due to favorable policies, the industry is the dominant sector for ESCO mechanism. In North America and Europe, the situation is quite opposite: the industry sector is insignificant for ESCOs. In these regions, it is preferable to integrate national specialists to implement energy efficiency measures, where projects have the shortest payback period.

In some countries, ESCOs are implemented in the private sector. In China, for instance, incentives are provided for the ESCO mechanism in the private sector. In North America, such projects are mainly implemented in the public sector.

Along with the ESCO mechanism, from year to year, the financing of energy efficiency measures by "green" banks is growing. In this research, we consider the investment made by member banks of the Green Bank Network. The Network includes Clean Energy Finance Corporation and Malaysia Green Technology Corporation, Connecticut Green Bank and New York Green Bank, as well as Green Finance Organization and Green Investment Group. Since mid-2021, members of the Network invested or committed $50.4 billion in public funds to leverage private financing that supports climate solutions around the world worth a total of $134 billion in different sectors, including the energy efficiency sector (NRDC, 2021).

Other financial institutions that invest in the renewable energy sector and energy-saving measures are KfW, EBRD, EIB, and WB. For instance, EIB lending to EU cohesion regions reached €19.8 billion, helping countries ensure a just transition to a green economy (EIB, 2022). The majority of the funding was directed to SMEs to modernize buildings and build new energy-efficient buildings.

Among other financing instruments, the green bond sector is developing at a fairly rapid pace. The value of global "green" bonds issued for sustainable measures increased in 2021 to $500 billion. Consumers also invest in energy efficiency (through their savings or bank loans). However, such sources are minimal and insufficient for widespread energy modernization. Up to 2050, the biggest contribution to reducing GHG emissions in the world should be made through comprehensive energy savings and efficient use. But investment in energy efficiency is still insufficient.

At the same time, attracting investment in this sector is not easy, as one may face a lack of understanding and perception of how they are implemented into practice and what is the risk of non-return of investment.

The attraction of additional investment under the Global Efficiency Scenario will be possible in a favorable political environment (introduction of new, innovative business models), and market instruments such as "green" bonds and auctions. These measures can ensure an appropriate level of investment in energy efficiency measures and reduce its risk, thereby building investor confidence.

Conclusions

Analysis of green investment indicates that an increasing number of countries and private investors are showing growing concerns about environmental issues and adherence to the principles of sustainable development. However, it is revealed that the transition to sustainable development in investment has not yet happened. Investment progress requires new "transformational" initiatives to mobilize investment flows into the "green" sectors of the economy. Based on the highlighted trends, the next additional opportunities will help to mobilize green investment in low-carbon and climate-resilient infrastructure.

- Governments have to continue moving toward sustainable development, adopting national climate plans, and increasing financial support to implement these plans. Today, governments have a unique opportunity to increase green financing by adjusting the mandates of national institutions and development banks, including the requirements set out in the Paris Agreement and the SDGs. To support green growth, regulators may include climate issues in drafting regulatory frameworks. Public financial institutions should focus on the effectiveness of green investment to maximize return on investment and ensure the efficient use of public finances.
- Governments and private investors should coordinate their efforts to increase funding in the field beyond renewable energy. Transitioning to a green, climate-resilient economy requires investment in other sectors, especially energy efficiency, land use, sustainable agriculture, and reforestation. In addition, the "greening" of the economy requires budgeting for research and the development of new "clean" technologies.
- Further public and private financing should be in line with the Paris Agreement and SDG requirements. For the government institutions, this means deepening cooperation with foreign governments and international organizations, expanding sources of investment, and reassessing risk management. Private investors need to take measures to detect, manage and mitigate climate risks and move the capital from carbon to sustainable sectors. Even modest financing for fossil fuel projects increases the risk of countries lagging behind the goals set by the Paris Agreement. It is necessary to reduce investment in new capacities that run on fossil fuels.

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Environmental Sustainability: The Complex Nature of Managerial Activities

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ABSTRACT

The chapter is devoted to analyzing the nature and specifics of the successful implementation of corporate social responsibility and sustainability principles by businesses. The need for a shift in the way of organizing business processes was formed by international organizations, vital global social and economic issues and by the extensive pressure from stakeholders. Consequently, businesses are interested and motivated to integrate corporate social responsibility (CSR) and sustainability principles into their business strategies to account for the needs of stakeholders and to get some financial and non-financial benefits. At the same time, as the result of the content analysis of the existing scientific literature, the theoretical model on the nature of CSR and sustainability activities were developed to prove the multi-dimensional essence of these modern business practices. Furthermore, the negative influence of an unethical political system and corruption on the efficiency and extent of CSR and sustainability principles implementation was shown. Additionally, CSR and sustainability initiatives were studied as efficient tools for minimizing and overcoming negative outcomes of current social and economic problems worldwide.

Keywords*: corporate social responsibility, sustainability, ethics, social capital, stakeholders.*

Introduction

Nowadays the importance and necessity of corporate social responsibility (CSR) and sustainability as an orientation for the formation of the business strategy are determined by international institutions, national governments and the expressed needs and expectations presented by stakeholders. It should be mentioned, that CSR practices were seen as needed when the global social and economic issues started to negatively affect the well-being of the local population and at the global level. One of the possible solutions to those mentioned issues was theorized in the form of CSR (Bowen 1953). Furthermore, the vital need for implementing sustainability principles was formed by the United Nations General Assembly, which developed The Sustainable Development Goals in 2015, including 17 social, humanitarian and economic global goals as No Poverty, Zero Hunger, Good Health and Well-being, Quality Education, Gender Equality, Clean Water and Sanitation, Affordable and Clean Energy, Decent Work and Economic Growth, Industry, Innovation and Infrastructure, Reduced Inequality, Sustainable Cities and Communities, Responsible Consumption and Production, Climate Action, Life Below Water, Life On Land, Peace, Justice, and Strong Institutions, Partnerships for the Goals (The Sustainable Development Goals 2015).

Accordingly, businesses were advised to adopt practices that can minimize the global social, economic and environmental issues, besides that, stakeholders were also demanding an active role of businesses in social and environmental problem-solving processes, by adopting those activities businesses were able to keep the gained market share, loyal consumers and obtain new competitive advantages, etc.

Previously mentioned keeps the attention of an ever-enlarging number of scientists, policymakers and representatives of businesses focused on the variety of issues associated with the process of implementation of CSR and sustainability principles. Scientists are interested in studying the main factors that determine the efficiency of CSR and sustainability practices, policymakers are trying to find a way how those mutually efficient businesses practices can be motivated and encouraged by the state, and at the same time, business representatives are aiming at analyzing possible financial and non-financial benefits comparing them with the associated investments in sustainability innovations and technologies.

Methods

To reach the main objectives of the chapter, the methodology of a systematic review was used (Danese 2018). Thus, the inductive analysis was performed and, based on it, a theoretical model on CSR and sustainability practices was developed. The systematic analysis was done according to the following stages:

Stage 1. Determining the key concepts of CSR and sustainability principles and applied by businesses practices based on scientific papers published in reputable peer-reviewed journals.

Stage 2. The manual content analysis was performed and as a result of it, the main related social, technological and economic business activities fulfilled by businesses to reach the efficient implementation of CSR and sustainability were determined.

Stage 3. Thus, based on the detailed content analysis of all related concepts and theories that influence the efficiency of implementation of CSR and sustainability principles the theoretical model on the nature of managerial activities towards environmental sustainability was developed.

Stage 4. The discussion of found results was done and further research directions were given.

The chapter aims at a comprehensive systematic analysis of the currently existing literature in order to study the social, economic, environmental and technological nature of the process of an efficient implementation of CSR and sustainability principles. The latest literature highlighted the need to develop a theoretical model on CSR and sustainability practices that can be used as a roadmap by organizations that are trying to follow those practices (Khan 2021, Saha 2021). It should be mentioned, that authors, as a rule, focus on a particular business or a sector of the economy (Pinuer 2022, Wentzel 2022, Yousaf 2021), thus, the design of a general model suitable for organizations in various sectors of the economy or countries was highly demanded.

Results and Discussions

As it is known, environmental sustainability is seen by businesses mostly as a strategy of getting environmental competitive advantages through adopting modern environmental oriented practices and can be determined according to the following policies as a specific entrepreneurial orientation that determines the overall approach of making environmental decisions within an organization, its vision and behavior at the market, the level of proactiveness and involvement of environmental activities; customer orientation towards environmental issues that includes the common beliefs and social norms regarding the acceptance and integration of public environmental needs into the business strategy, corporate social responsibility (CSR) which shows the business readiness and wiliness to take part into the global environmental and social problem-solving processes (Pinuer et al. 2022). Accordingly, the practice of implementing CSR is seen as a key component and in a way as a compulsory precondition of reaching the efficient level of environmental sustainability by businesses nowadays.

Furthermore, another approach should be mentioned, according to which, an effective fulfillment of environmental sustainability can be achieved by introducing the following practices as launching and supporting environmental management initiatives, thus, the environmental oriented projects should be determined and realized according to the decisions of the top management; environmental management system, which should be established and modified to respond to the changes in the social and economic business environment, the system itself is seen as a strategic organizational roadmap on the environmental problem-solving activities; corporate social responsibility, that represents the extension of responsibilities that an organization is ready to take as in CSR social and other issues related to all stakeholders are included rather than just environmental (Yousaf et al. 2021).

It's important to mention, that the personal characteristics of the Chief Executive Officers (CEOs) have a great impact on the efficiency of sustainability activities, thus, the level of education of CEOs can positively or negatively affect the level of involvement and the depth of integrating sustainability activities into business strategy. So, the holders of higher engineering or related science degrees show a higher level of readiness to invest in research and development, sustainability innovations and to adopt a proactive strategy towards environmental sustainability compared to CEOs with other specializations.

Also, the longer the CEOs are taking their responsibilities the higher the level of involvement in the social and environmental problem-solving process and, consequently, the better the overall financial and environmental performance of an organization (Ghardallou 2022).

Besides that, the composition of the CEOs plays a crucial role in the efficiency of implementation of CSR and sustainability activities, thus, having a combination of representatives from different nations leads to a higher level of acceptance of CSR and sustainability principles, stimulates the spreading of these new activities among businesses in general (Tandoh 2022).

Connectedness to Nature

Regarding the personal characteristics of all related stakeholders, the concept of connectedness to nature should be discussed. Connectedness to nature shows stakeholders' values, social norms and patterns of behavior toward nature. Thus, following the inner social and ethical norms, that were formed while interacting with the society, individuals decide how they are going to act, meaning if they are going to pay attention to the possible harmful outcomes of their activities for the nature or they will stay indifferent regarding the environmental consequences of their lifestyle (Jilani 2021). Therefore, the higher share of the population, employees or stakeholders feel a strong connectedness to nature, the higher level of integration of CSR and sustainability activities in business strategy will be seen, in turn, it will lead to higher environmental and corporate performance (Hongxin et al. 2022).

Additionally, based on the published corporate social responsibility and sustainability reports of businesses, the variety of environmental activities was determined and presented in Table 1.

Table 1. Variety of environmental activities.

Managerial	***Technical***	***Social***
Eco certification	Shift to renewable sources of energy, reduction in energy consumption	Education on environmental issues
Eco-oriented volunteering and charity	Reduction of the greenhouse gas emission	Eco-oriented volunteering and charity
	Waste reduction, recycling	
	Reduction of water use	Access to recreation for communities
	Protecting ecosystem	
	Sustainable resources in production	
	Tree planting	
	Reduction of chemicals in production	

Source: developed by the author based on (Grazhevska and Mostepaniuk 2020).

Sustainable Governance

The process of integrating sustainability principles into the business strategy is limited by the main issue regarding ensuring sustainable value creation in the long-term perspective (Hristov et al. 2021).

It should be mentioned that besides stakeholders that put additional pressure on businesses regarding their attitude and the degree of involvement in sustainability-oriented activities, international organizations such as the European Commission (2022), ISO, specifically "ISO 26000 Social Responsibility" (2022) and the Global Reporting Initiative (2022) also recommend integrating sustainability principles into the business strategy. According to their recommendations, further adoption of sustainability principles will have a wide impact on the creation of culture and moral norms oriented towards the social and environmental consequences of business activities, as well as the incorporation of stakeholders' needs with the organization's interests. From the business perspective, the benefits of the integration of sustainability principles into the business strategy are seen as follows (Hristov et al. 2021, Wentzel et al. 2022):

- Financial advantages through cost reduction and revenue growth, can be reached as the result of material substitution, smaller amount of used resources, green packaging, lowering energy consumption in the production processes, waste disposal, usage of renewable resources, reusing and recycling inputs, the use of eco-innovations;
- Corporate image and reputation as the integration of sustainability practices into the business strategy is positively perceived outside an organization, meaning by actual and

potential clients, provides new opportunities regarding future collaborations, stimulates entering new market segments, makes stronger consumer loyalty, provides access to social initiatives in cooperation with universities and public institutions, helps an organization to get a competitive advantage and increase brand value in general;

- Stakeholders' perception of current and potential clients, investors, suppliers, employees and financial institutions influences their business decisions depending on the level of involvement of an organization in sustainability activities. Furthermore, this leads to gaining non-economic benefits, namely improving brand reputation, consumer retention, creating value for the society, getting easier access and more favorable conditions while interacting with financial institutions because of previously built-up trustful relationships between an organization and their stakeholders;
- Cultural change within an organization and community, moreover, it modifies the organizational culture, corporate strategy and develops sustainability goals, which include employees working space, involvement, university and public institutions cooperation.

Ethics

The role of ethics in CSR and sustainability practices should not be underestimated, thus, in business perspective ethics is defined as moral principles that govern a person's behavior or the conducting of an activity (Torelli 2021). In this context, it should be mentioned that the first stage in a shift towards CRS and sustainability activities is to perform business activities according to the generally accepted moral norms and principles. It is impossible to implement sustainability principles without following the ethical standards and commonly shared moral values by businesses.

Meaning, that businesses that violate the universal ethical norms will be seen as "dishonest" and "unethical", thus, will be losing their loyal consumers, partners, etc. So, to be able to get competitive advantages from CSR and sustainability, businesses should first of all be completely ethical and this information should be spread among all their stakeholders. Moreover, an unethical way of doing business will lead to higher risks and lower efficiency of CSR and sustainability activities as a stakeholder will not consider those practices as sincere and serious.

Here the extreme case should be discussed, when businesses use and follow incomplete communication and reporting, meaning hiding/mispresenting undesirable information, performing activities, receiving outcomes, exaggerating positive sides and underestimating

negative ones. Those practices can be called “greenwashing” if they are seen regarding the environmentally oriented activities of businesses (Torelli 2021). As a rule, the practice of “greenwashing” is seen among unethical businesses that are aiming at getting benefits without paying the corresponding costs. Thus, a false-positive perception is created, that has the same consequences as the true-positive perception, meaning that it creates the positive feedback and image of an organization, belief that it is following practices that are socially and environmentally orientated. Therefore, businesses that follow the strategy of “greenwashing” starting with unethical practices, but, despite that, will be seen and recognized as truly ethical, as only organizations that follow the commonly accepted moral norms can be involved in environmental and social problem-solving processes.

It should be stated, that stakeholders can judge the level of ethics only with time, as later the results of this social and environmental responsibility will be obvious, but the benefits will be already received and used by that kind of unethical organizations. In this case, the government should intervene by requesting to provide an access to business performance information for all the stakeholders and to make some independent evaluation of business performance to avoid unfair creation of a positive image of an organization, competitive advantages and to enlarge the number of its loyal consumers, etc.

In this context, the concept of authenticity perceived by stakeholders should be discussed. Perceived authenticity shows the inner attitude of stakeholders towards the level of sincerity and real purposes of integrating social and environmental activities into business strategy. Hence, the positive perception of stakeholders, meaning that they truly believe that an organization is willing to minimize the harmful impact on the environment, etc. leads to the higher environmental performance of an organization through getting access to financial and non-financial benefits from following sustainability and CSR initiatives. In contrast, if stakeholders consider environmental and social activities just as a strategy of getting environmental advantages and do not see the inner motivation of an organization it will lead to the false formation of a green reputation and image of an organization, which will prevent an organization from receiving some of the benefits (Yousaf et al. 2021).

Green HRM

As the pressure from the stakeholders and other external economic, social and political changes force businesses to switch towards CSR and sustainability practices that are aimed at dealing with social and environmental issues, accordingly, businesses are actively

implementing CSR and sustainability principles throughout the whole business activities and integrating the new approaches of doing business in their business strategy. It is a common practice for businesses to implement the principles of green human resource management (GHRM) in their activities. First of all, GHRM is seen as a set of activities associated with the initiation, implementation and continuous maintenance to sustain the green ideas and orientations within employees of an organization (Zhao et al. 2021, Herrera and Heras-Rosas 2020). The result of an efficient implementation of GRHM can be seen as highly motivated and empowered employees that are truly involved in the environmental problem-solving process, specifically, it is important in regard to construction of green projects and other creative and innovative solutions and approaches, etc.

Furthermore, it should be mentioned that a sustainable supply chain can create second-order social capital, which is seen as resources and expertise developed by the organization's stakeholders (Zhao et al. 2021, Bazylevych et al. 2019). Thus, second-order social capital is derived from the connections and relationships of consumers and suppliers. Accordingly, an organization will be able to access the information and resources that are beyond its direct social network including its stakeholders.

Creation of Shared Values

While studying the specifics of CSR and sustainability principles implementation, the creating shared value theory should be mentioned. The authors of the theory defined the creation of shared values as activities that are aiming at rethinking products and markets to identify and meet unmet needs; redefining productivity in the value chain to eliminate risks and improve productivity; and the creation of ancillary industry clusters by enriching the extremal network that supports the company's operations, furthermore, those activities lead to the creation of opportunities for other market actors by enlarging the value and an increase in social and organizational benefits (Porter and Kramer 2011). Besides that, the creation of shared value involves individuals, social groups, organizations and their business environment, meaning that it is an interrelated process with various stakeholders, including companies, value chain partners and society (Yang and Yan 2020). In general understanding, CSR and the creation of shared value theories have some common features, specifically, they are seen as "doing well by doing good" and both are aiming at integrating the social and environmental problem-solving activities into the business strategy. At the same time, CSR is seen as a practice required and needed by the stakeholders, why the creation of shared value

is understood as an inner need targeting balancing between economic and social benefits, that will have continuous return because of identifying new needs and, thus, creating or expanding the existing market including the improvement in services that are needed for that new market, changes in packing, that can have a positive impact on the costs and environmental degradation, improving the skills of suppliers, retailers and other related stakeholders, etc. It should be mentioned that to ensure the efficient implementation of CSR and sustainability principles the fulfillment of ideas of creation of shared value theory should be taken as a compulsory precondition.

Sustainable Supply Chain Management

A supply chain, as a rule, is determined by a variety of organizations that are involved in the forward and backward flows of information, services, finance and products from primary suppliers through a channel to consumers or end-users (Khan et al. 2021). While talking about the level of involvement in the environmental problem-solving, it should be mentioned that it's possible to have a situation when some partners of the supply chain are highly involved in sustainability practices, while others are staying neutral. Today, with the increase in the formed public pressure regarding the role of businesses in the solving of vital global social and environmental issues, businesses are transforming already existing practices according to the expectations of the stakeholders. Thus, sustainable supply chain practices aim at dealing with ecological issues namely reduction in the use of energy, lethal chemicals, air contamination, implementation of sustainable technologies in their activities to increase the efficiency of an organization. In this context, it should be stated, that inbound logistics is associated with activities linked to the internal supply chain and production, while outbound logistics is concentrated on consumer wants recognition, productivity and quality. Therefore, adopting the principles of a sustainable supply chain will improve financial and environmental presentation for the supply chain partners that support the whole range of outcomes, which will ensure the formation of competitive advantages.

Additionally, an efficient adaptation of the sustainable supply chain principles requires constant control and monitoring of the relationships and interactions among participants of the supply chain and stakeholders, based on their image and stakeholders' perception of the overall attitude towards an organization, its business profit and a market share will be determined (Khan et al. 2021). Moreover, active and extensive implementation of the sustainable supply chain principles, constant evaluation of their efficiency and modification

if required allows an organization to reach the highest level of sustainability efficiency, which stresses the essential need for development and maintenance of the sustainable supply chain approaches. Besides that, it should be highlighted that as the principles of sustainable supply chain overlap with the principles of CSR, businesses by adopting a sustainable supply chain are getting involved in CSR practices as well.

Business Groups and Networks

As it is known, small and medium-sized enterprises (SMEs) are lacking resources, the scale of production and benefits-awareness to be able to actively participate in the social and environmental problem-solving processes, that is why, it is a good practice to form a business group, which includes few SMEs (Liakh and Spigarelli 2020). Specifically, it can be seen during the stages of transformation or shifting towards a new business strategy as a response to the constantly changing economic, social and political environment, that put additional pressure on each SME. During the transformation period, the elements of the previous business strategy are not relevant anymore, but the new one is only at its early stages of development, meaning that during this time the risks are getting extremely high, which makes it almost impossible to survive for an individual organization. But in the case of the formation of a business group, mentioned risks will be distributed, so the group itself will be able to survive and efficiently adopt the new business strategy, as the efforts will be consolidated. At the same time, while joining a business group, SMEs form networks, that can be defined as building up stable relationships among participating SMEs, but despite being in contracting relationships with other market actors, participating SMEs legally are remaining independent. Additionally, a business group can be seen as a type of a network, where legally independent participants are operating under the common ownership, administrative and financial control utilizing formal or informal links (Liakh and Spigarelli 2020).

Among key advantages of forming a business group, the following should be mentioned as reduced transaction costs, shared risks and resources, exchange of knowledge of clients, industries, foreign markets, moreover, all participants receive a positive referral from other members of the business group concerning the reputation, image, reliability, etc. In the context of social and environmental problem-solving, it should be stated that a business group stimulates the exchange, discussion and development of the environment-oriented innovations, later, a business group should invest in environmental innovations once, but the benefits of those new technologies will be available for all SMEs of that group. Therefore, forming a business group can be seen as the only way to the involvement of SMEs in the

social and environmental problem-solving process and, consequently, the efficient implementation of CSR and sustainability principles, integrating them into the business strategy of the whole group of SMEs.

Based on the comprehensive analysis of the multi-nature essentials that can ensure the efficient implementation of CSR and sustainability activities by businesses, the theoretical model on the nature of managerial activities towards environmental sustainability was developed (Figure 1).

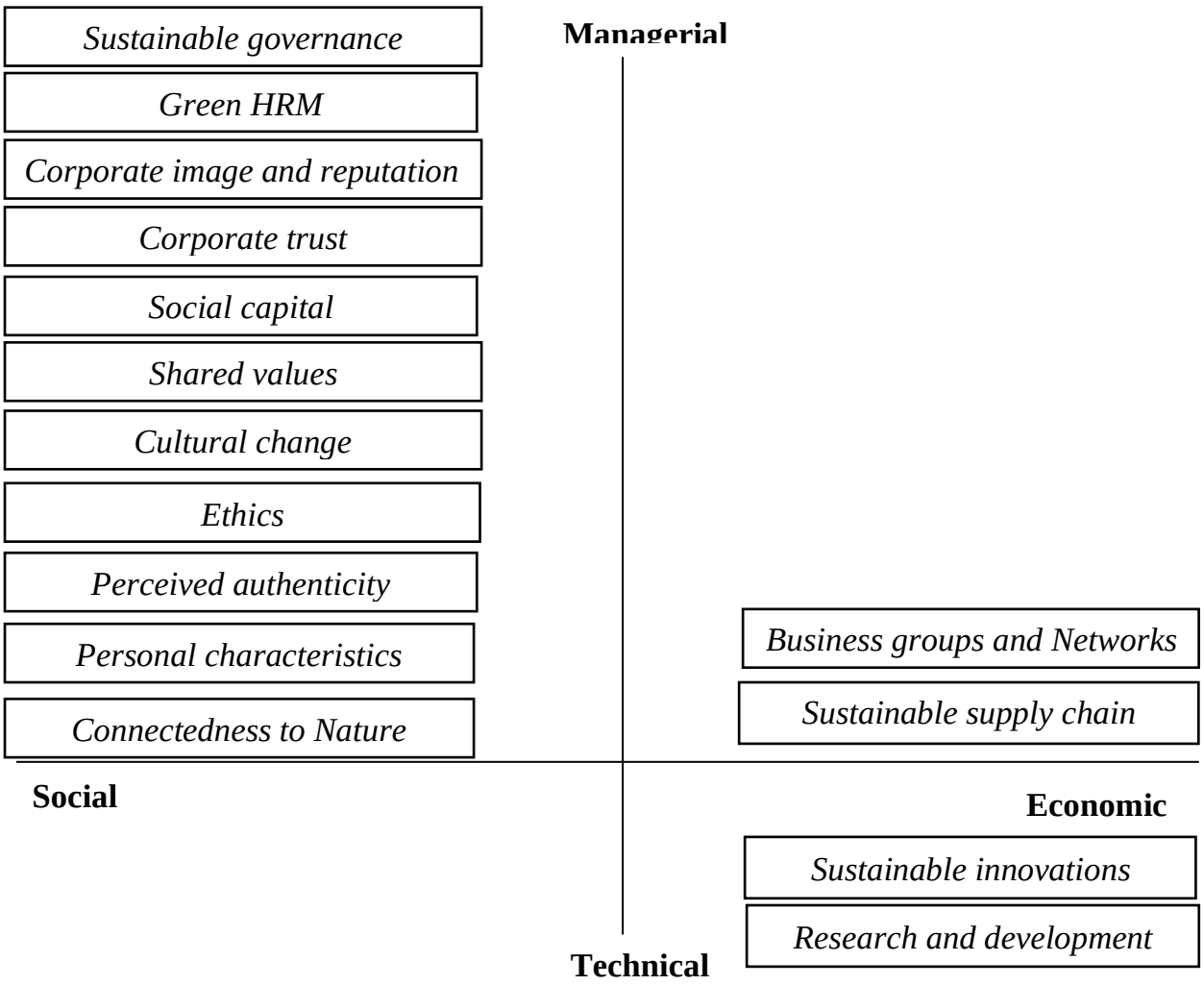

Figure 1. The model on the nature of managerial activities towards environmental sustainability.

According to the model, such activities as launching green HRM, forming trustful relations between employees, suppliers, dealers and other stakeholders, promoting the further accumulation of social capital and shared values, stimulating cultural changes and norms regarding environmental issues, which modifies personal characteristics including personal attitude towards nature, presenting the inner motivation of an organization to participate in

environmental problem-solving have the dual nature as they are used as managerial practices and directly affect the overall creation and gathering of social capital at the national and global level. At the same time, research and development, as well as sustainable innovations first of all are aiming at technical improvements, which, consequently, lead to economic efficiency and other competitive advantages. Lastly, such practices as implementing the principles of a sustainable supply chain, forming business groups and networks are seen as managerial tools that focus on the creation of sustainable and favorable links with other market actors, using of which allows businesses to employ available resources in the most rational and economically efficient manner.

Political System and Corruption

Additionally, it should be said, that exclusively the attempts and activities made by businesses cannot determine and predict the efficiency of CSR and sustainability practices, as many external factors can influence those activities. Among those factors are the political system and the level of corruption that directly depends on the political elites in each particular country (Saha et al. 2021). Thus, the existence of a high level of corruption means that the public officers are involved in the process of making decisions by businesses, including CSR and sustainability initiatives and activities. Under these conditions, businesses are restricted in their activities, which can discourage them from adopting and getting involved in social and environmental problem-solving processes that are highly requested and needed by stakeholders, consequently, businesses will not be able to get an environmental competitive advantage and stay competitive at the global market, in turn, it will prevent the national economy from its potential economic growth. Based on mentioned, the high level of corruption can reduce the efficiency of CSR and sustainability activities and leads to an overall economic recession. Besides that, a high level of corruption allows unethical state intervention in business activities, meaning that businesses themselves will not be acting according to the commonly accepted moral norms and ethics, which is also seen as a factor that predicts the dishonest implementation of principles of CSR and sustainability, which can be determined as greenwashing.

As a rule, the high level of corruption is formed by unfair and dishonest politicians, which aim at getting financial and non-financial personal benefits rather than providing favorable financial and legal conditions to businesses, stimulating the development of competitive entrepreneurs, investing in research and developments, supporting the adoption of CSR and sustainability principles at the national level. The possible influence of the level

of corruption and the political system on the efficiency of environmental and social business practices is shown in Figure 2.

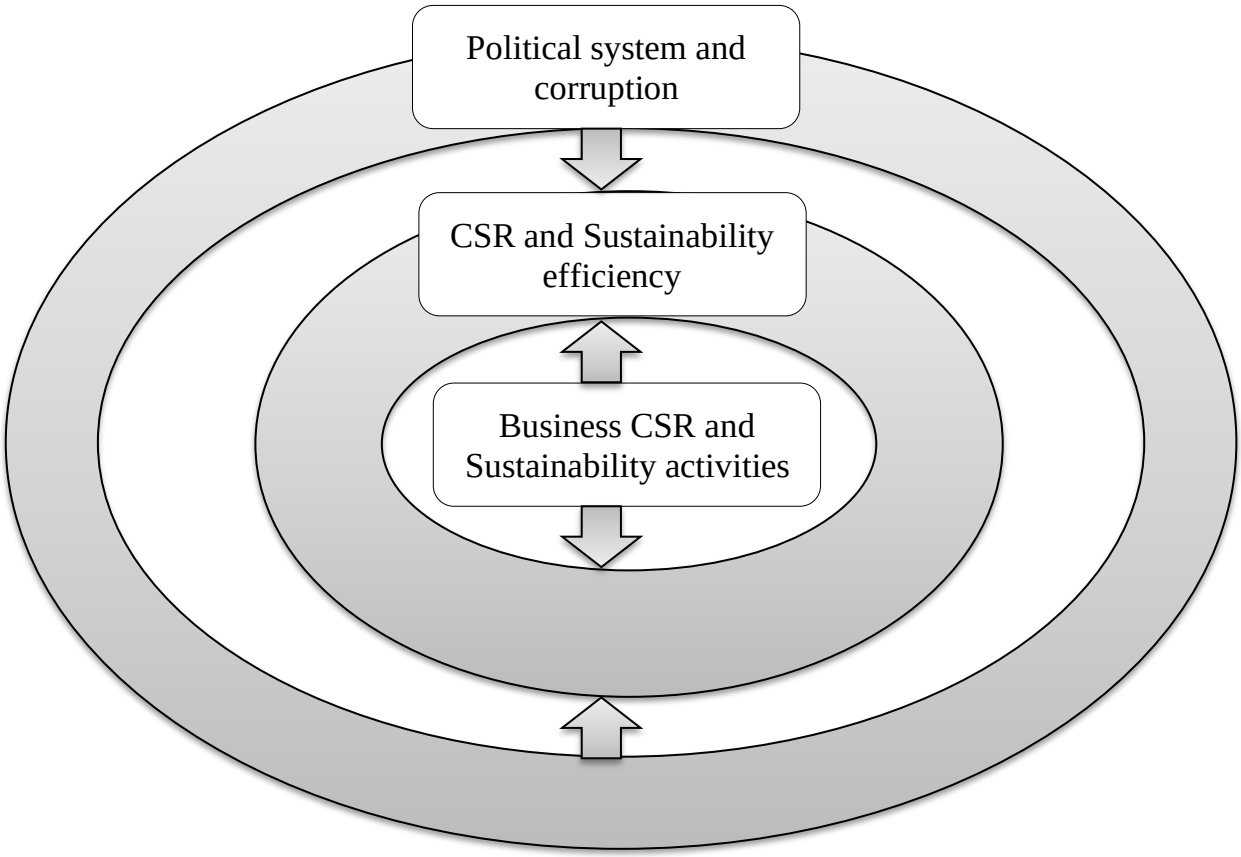

Figure 2. The model on the external and internal influences on the efficiency of CSR and Sustainability activities.
Source: developed by the author.

In this context, it should be highlighted that an unfair and dishonest external social and economic environment will negatively affect the efficiency of CSR and sustainability activities regardless of the inner and sincere attitude of an organization and its employees towards those practices. Besides mentioning the countries with weak and corrupted political systems, there are several social, economic and environmental issues seen all around the globe, namely disbalances in national budgets, the extensive financial pressure on the state because of the aging population, massive outflow of the labor force, the existence of grey economy, continuous resource deprivation and environmental degradation, etc., solving of which requires the joint efforts of all economic actors as the state, businesses and other stakeholders. Consequently, the implementation of CSR and sustainability principles by businesses can be determined as a way of eliminating vital global issues as those practices are seen as a mutually beneficial interaction and cooperation between three groups of economic actors, where all individual, corporate and state interests are consolidated.

Thus, integrating CSR and sustainability principles into business strategy will make the following favorable changes concerning the global social, economic and environmental issues (Grazhevska and Mostepaniuk 2021):

- When businesses provide additional social services to their employees or local community it reduces the financial pressure on the local budget and can spare some funds to be used on other needed directions or investments;
- While providing sustainable working conditions businesses can prevent the outflow of the labor force, which, in turn, will stimulate the overall economic growth of the country;
- By following the ethical and moral norms businesses will limit the expansion of the grey economy, where employers are trying to avoid obeying the formed governmental system of rules and obligations, which as well will positively influence economic growth;
- At the same time, integration of CSR and sustainability principles into the business strategy stimulates the formation of trustful relationships among employees, suppliers, dealers and consumers, networks and business groups, shared values, meaning that those practices ensure the building up and accumulation of social capital, which nowadays is seen as one of the most important preconditions for further economic growth and obtaining competitive advantages in general.

Conclusions and Further Researches Directions

Implementation of the methodology of a systematic review on the specifics of the adoption of CSR and sustainability principles allowed to show the multi-nature of this process, meaning that using some managerial practices leads to multi-dimensional results, which were divided into three groups as social, economic, and technological. Such practices as "green HRM" aim at forming a pro-environmental attitude in employees and setting up an environmentally oriented corporate atmosphere, which, in turn, changes the commonly accepted moral norms and beliefs, stimulates the creation and accumulation of social capital and shared value, and encourages ethical behavior of employees and other stakeholders.

At the same time, technical initiatives such as investments in research and development and sustainability innovations ensure future economic and financial benefits, while the formation of business groups and networks and the adoption of sustainable supply chain principles provide economic competitive advantages for such CSR and sustainability-oriented businesses. Additionally, it was proved that unfavorable external factors such as the unethical

political system and corruption can prevent businesses from shifting towards CSR and sustainability practices or reduce the efficiency of implementation of those practices. Thus, a high level of corruption will restrict the freedom of business activities, meaning that businesses will not be able to get environmental competitive advantages and because of that lose the market share of the global market. The unethical political system can be determined based on its main goal to meet the personal interests of the public offices rather than to support and stimulate the development of the free market and innovative business practices.

Corporate social responsibility and sustainability activities can eliminate the negative outcomes of the global social, economic and environmental issues such as a massive outflow of the labor force, extreme financial pressure on local budgets and population aging. So, it is necessary for businesses to actively follow those innovative business strategies that can provide financial and non-financial benefits for an organization and the whole society as well. Based on the above-mentioned, future studies should focus on providing practical recommendations for organizations regarding an efficient implantation of CSR and sustainability practices, analyzing possible economic, social and technical challenges that can arise for businesses while shifting from a traditional way of organizing business toward the sustainability-oriented and the methods of overcoming those challenges.

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Sustainable Development of Ukrainian Steel Production and Trade with Middle East Countries

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ABSTRACT

This study researches the problem of sustainability of steel and iron making in Ukraine and researches the possible ways to upgrade and improve the technology used in the country in order to comply with ecological policies. In order to research the topic statistical information was used as well as technical information regarding steelmaking factories. Also, this article underlines the situation of the sustainable steel production and the possibilities this material provides in reaching long-term goals of reaching net-zero emissions. This study shows the practical possibilities of growth for Ukrainian steelmakers in the market of Middle East countries on the example of Saudi Arabia and compliance with its own long-term strategy and government programs until 2030. The results of the study highlight the areas which need to be improved by the Ukrainian steelmakers in order to achieve reduction in emissions and show the methods for that goal.

Keywords*: Ukraine, sustainable development, trade, iron and steel industry, CO_2 emissions, carbon dioxide emissions.*

Introduction

At the Paris conference of 2015, the majority of countries' representatives have discussed the ecological situation in the world and have agreed to 2 scenarios: the best-case scenario is too keep the temperatures rise below 1.5 degrees Celsius and in the worst-case scenario below 2 Celsius degrees. The Earth's resources are finite and the world has always played an active role in promoting environmental sustainability, with the conclusion that effective resource management and recycling and green products will have a positive impact on the global economy. Environmental sustainability is no longer just a narrow concept, which is worked only in ecologically friendly or eco-related areas of economy - it is now an essential issue of our existence.

Products such as crude steel are critical in the evolution and development of finished products on which we depend for existence. We need all types of building projects, road construction, vehicles and equipment. They contribute to our comfort, security and a strong, developed economy. But their production also causes a lot of pollution and environmental damage. Manufacturing is a major energy consumer and emitter of carbon-based greenhouse gases.

The steel industry - one of the largest sectors in the world economy - has recently come under intense pressure to reduce emissions and its reliant on coal and coke. The entire industry is grappling with this problem, finding new and better ways to reduce emissions, one idea at a time.

Steel is one of the most recycled materials in the world, and circular economy practices are integrated into all stages of the production cycle. Still, the high-temperature heat, which is critical to the production process, still requires a lot of energy. As a result, the steel industry remains one of the largest energy consumers and CO_2 emitters. This is approximately 7 percent of the emissions of all greenhouse gas on the planet.

The global trend to keep the climate change controlled has led financial regulators, countries' officials and business customers to openly push the producers of steel and iron to find a way of improving the sustainability of the industry in order to decrease CO2 emissions. Incremental and disruptive technologies are needed to accelerate this process (World Bank, 2020).

The steel industry is incredibly important to the various components of Ukraine's sustainable development: it provides employment for more than 500,000 people, generates nearly 25% of GDP, 40% of export earnings and 25% of industrial production. The industry is also responsible for over 25% of harmful atmospheric emissions and over 30% of CO2 emissions from industrial sources due to outdated equipment, and is the largest consumer of electricity (15.6%) and fossil fuels (14.2%).

Ukrainian steel production peaked in 1985 at 56.5 million tons per year, and then experienced several sharp declines—after the collapse of the Soviet Union in the mid-1990s and the global recession in 2008. Steel production fell by 17.1 million tones % in 2014 due to the war breaking out in one of the most economically prominent for the industry region, in Donbass, Donetsk coal basin (Shatokha, 2015).

Results

Sustainability of Ukraine's steelmaking industry

At present, the iron and steel industry of the world is stagnating, even though its market remains highly competitive. If demand increases, the market will quickly meet demand because of the large amount of supply, but all this leads to a negative consequence, namely the folding of products. Because of such a problem, businesses will soon exhaust their own assets and close down. In December 2021, global steel production was 1,951 million tons, an increase of 3.8% over December 2020 (World Steel Association, 2022).

With such figures, there is a possibility of further growth in production and a way out of stagnation. Thus, there is a significant reserve of unused steelmaking capacity in the world. Compared to last year, the reserve of production capacity was growing. This situation reflects intensified competition in the global sustainable smelting market and, on the other hand, shows the ability to quickly meet the growing demand for steel in the world. In the case of increasing demand, it is possible to use the capacity reserve, allowing not to change the price of goods. tactics for the short and medium term It is also necessary to consider that a significant influx of demand is possible only from abroad, so it is necessary to establish political and economic relations with exporting countries.

In 2021, the Ukrainian steel industry produced 21.3 million tons of crude steel, which is 103.64% compared to the same period in 2020, whereas in 2020 there were produced 20.4 million tons of pig iron (101.49% compared to 2019), 18.36 million tons of rolled steel (100, 2% compared to 2019) (World Steel Association, 2021). Thus, the "metallurgical" share in GDP is over 15%, which is quite significant. Ukraine has the status of a metallurgical net exporter. The share of such products in 2020 – approximately 40% of the total exports of metalware. That is, the stability of the industry in Ukraine is related to the situation on the world steel market, and also depends on the quality and competitiveness of products.

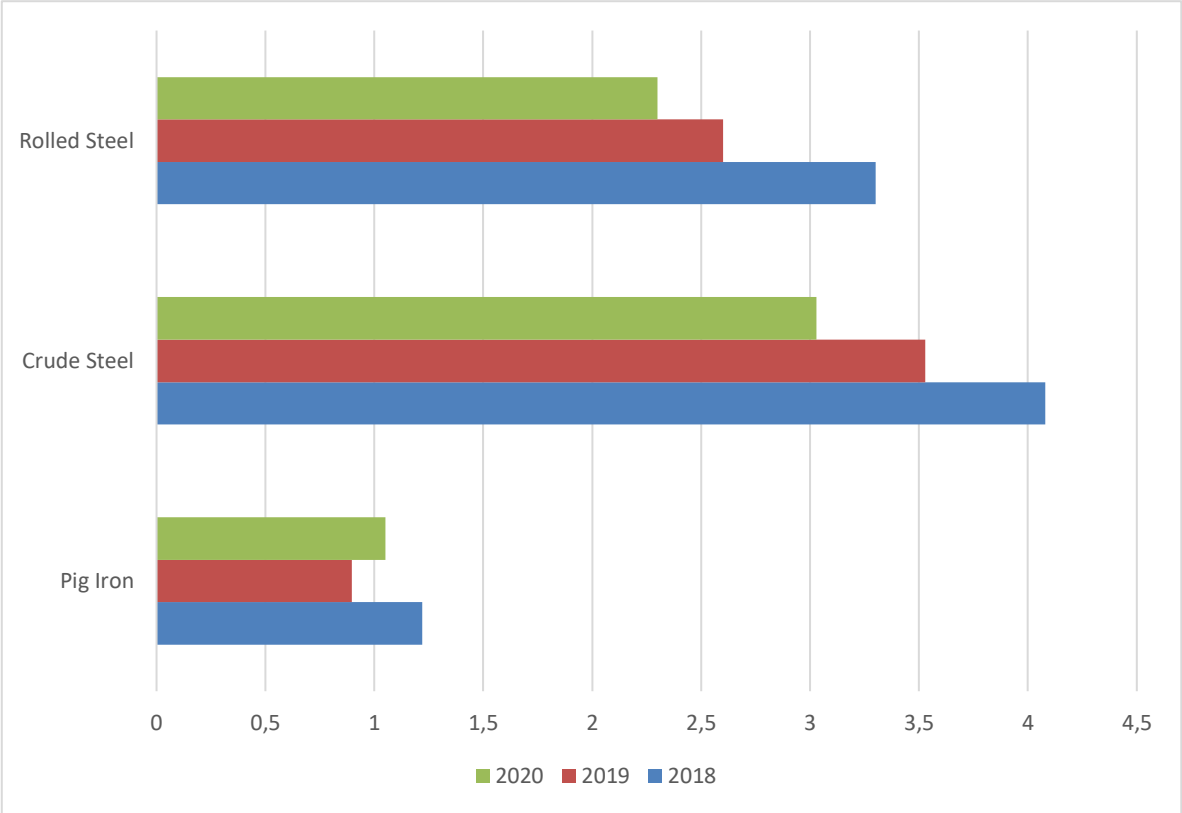

Fig. 1. Exports of steel and iron products of Ukraine in 2018-2020, bln. USD
Source: OEC (2022).

As we can see in Figure 1, exports of Ukraine, despite the progress in producing substantial amounts of steel and iron products, Ukrainian export is suffering a downfall, which is amounting in total to approximately 2 billion US dollars over 2 years. There are multiple possible root causes of this event, one of the most probable would be Covid-19 crisis, which caused some economies to halt their economic activity, although the crisis was, and still is, a global process, inevitably met by all actors on the market, moreover some countries were able to maintain pre-covid level of production, such as European Union countries which implanted a strong set of policies to evade the possibility of negative growth during crisis, nevertheless, countries like China, that increased their production in Covid-19 crisis from 929 000 thousand tons in 2018 to 1 064 732 thousand tons in 2020 (World Steel Association, 2022), therefore we can draw conclusion from this separated situation, that Covid-19 crisis wasn't a reason for such substantial drop in exports and maintained level of production. In that case we must try to comprehend the quality of Ukrainian product and the pricing process

The problem of energy consumption is one of the most important in all developed countries and becomes especially urgent in Ukraine, where energy resources are used extremely inefficiently and their cost is constantly growing.

Per unit of output product in Ukraine consumes 3 times more energy resources than in the industrially developed countries of the world, which makes products of the metallurgy sector only marginally competitive in the global market and their sales are limited mainly by the home market demand (Markevych et al., 2022).

It is known that energy saving is a complex problem associated with solution of not only financial, but also technical, social, economic, scientific, organizational, technological and environmental issues. Energy-saving in ferrous metallurgy, one of the most energy-intensive industries, is a national problem. Its solution includes technological, energy, organizational and technical, financial and economic measures, which are the only chain The electric arc and induction furnaces are widely used in foundry as well as in Ukrainian metallurgy. Therefore, the issue of rational energy management of their use is very important for solving the problems of energy saving. For example, a list of energy saving measures in induction furnaces is as follows:

- correct operation of induction furnaces, maintenance of lining and electrical equipment in operating condition, compliance with schedules of scheduled works;

- maintenance of high values of power factor;

- compliance with the optimal level of residue when draining the furnace metal; round-the-clock operation of furnaces with full load instead of their one-or two-shift operation;

- reduction to the minimum required furnace downtime values;

- replacement of inefficient, morally and physically, deteriorated furnaces with updated technological systems (Vakulenko, Sysak, Shelever, 2021).

There are 2 possible ways for the latter option: industry may adopt electronic arc furnaces, which are more efficient but may be expensive to transition to, or they can maintain and upgrade blast furnaces, which is a short-term solution if companies are looking forward to produce so-called “green” steel. At this time in Ukraine we have the majority of blast furnaces, therefore there were conducted researches and installed updates to functional parts of furnaces, in order to increase energy efficiency (Bublyk, Koval, Redkva, 2017).

The metal receiver is the most important zone of the blast furnace, the lining of which is exposed to chemical, mechanical effects due to the reduction of iron and formation of the final slag, high temperatures and the movement of melts. It is the condition of the hearth and that largely determines the duration of the blast furnace campaign. Increasing the stability and operational reliability of the hearth and hearth of modern blast furnaces is an urgent task. The

issues of increasing the operational reliability of the hearth and the continuation of the blast furnace campaign are solved by:

- improvement of designs of the hearth and hearth of blast furnaces, application of new refractory materials that ensure reliability of blast furnace operation;

- selection of reliable system or improvement of existing cooling system of metal collector;

- use of modern automatic process control system, which includes a subsystem for control of ignition of hearth and hearth lining (Noort et al., 1994).

The modern direction in design of metal receiving area of blast furnaces is mainly based on the following:

- increase in the horn's height;

- increasing the height of dead layer (depth of sump);

- reduction of the thickness of the hearth;

- reduction of the thickness of the walls of the furnace;

- use of new generations of refractory materials for hearth and ladle lining. In the modern methodology of blast furnace hearth design, two main directions are being developed:

- "thermal" approach - an attempt to link the combination of refractory materials with the cooling system, the use of materials with high thermal conductivity based on graphite, semigraphite and carbon;

- "refractory" approach - using a combination of wear-resistant materials based on carbon and ceramics ("ceramic glass"). In Ukraine, the preference was given to the design of metal receivers with the use of "ceramic glass" during the reconstruction of blast furnaces (Stewart, Titterington, James, 1996).

To assess the influence of design solutions on the condition of the lining (its wear rate and thermal loads) the analysis of thermal performance of five blast furnaces in Ukraine of different design of the metal receiver according to SAC "Gorn" was performed:

1) SE No.8 of PJSC "Arcelor Mittal Kryvyi Rih", volume 2700 m3 - ceramic glass Saint-Gobain, cooling system - process water (BF-8 AMKR);

2) SE № 3 PJSC "AZOVSTAL" with the volume of 1800 m3 - ceramic glass Gongyi Anzheng, cooling system - chemically treated water (BF-3 AZS);

3) SE №3 of PJSC "Zaporizhstal" with the volume of 1513 m3 - ceramic glass Gongyi Anzheng, cooling system - technical water (BF-3 ZpSt);

4) GP №4 of PJSC "Zaporozhstal" with the volume of 1513 m3 - without ceramic cup; cooling system - technical water (BF-4 AzSt);

5) SE №2 of PJSC "Zaporizhstal" with the volume of 1513 m3 - without ceramic cup, cooling system - technical water (BF-2 ZpSt) (Kornilov et al., 2021).

It was found that high thermal loads are observed at BF №8 of PJSC "Arcelor Mittal Kryvyi Rih", which is probably due to the large volume of the furnace, and as a consequence, a large production and perimeter cooling of the metal receiver. At the same time, BF No. 8 had the least wear of the lining in all areas of the metal receiver, except for the upper horn. Since the heat loss is an integral parameter that allows to qualitatively and quantitatively assess the thermal performance of monitored zones and furnaces as a whole, a comparison of heat losses of the metal receiver in the cooling system of blast furnaces under consideration was performed. It was found that the large heat losses were ~1.4-1.8 MW at the SE № 8 of AMKR, SE № 2 and SE № 4 of Zaporizhstal, the smaller ones - ~0.9-1.3 MW - at the SE № 3 of Zaporizhstal and SE № 3 of AZOVSTAL. The usual comparison of heat losses does not make it possible to estimate the influence of furnace design on the thermal performance of the hearth and hearth through different volume of blast furnaces and, as a consequence, different volume of cast iron produced. Therefore, an assessment of the specific value of heat losses of the metal receiver per unit volume of the blast furnace is performed. The value of specific heat loss per unit volume of blast furnace in blast furnaces with a ceramic cup (~0.4-0.7 kW/m3) is much lower than in blast furnaces without it (~0.9-1.1 kW/m3). This difference between the specific heat losses is equivalent to a lower coke consumption for compensation of heat losses of the hearth and the bottom by 0.5-1.1 kg/t in blast furnaces with a ceramic tumbler. Thus, it is established that the generalizing parameter for comparing the thermal performance of metal receivers in blast furnaces is the specific heat loss per unit of useful volume of the furnace.

Implementation of continuous control over the hearth lining unwinding on blast furnaces allowed to estimate the effect of using a ceramic cup in terms of the value of heat losses of the hearth. The value of specific heat loss per unit volume of furnace in blast furnaces with ceramic cup (~0,4-0,7 kW/m3) is much lower than in blast furnaces without it (~0,9-1,1 kW/m3). This difference between the specific heat losses is equivalent to a lower coke consumption for compensation of heat losses of the bottom plate by 0,5-1,1 kg/t at blast furnaces with ceramic cup (Kornilov et al., 2021).

Thus, we see the positive side from the implementation of the up-to-date equipment details in the blast furnaces, nevertheless, we should try to compare it with other available technologies at this point in time – with electronic arc furnaces (EAF), with this we will use the experience and projects of EU.

One of the most important concepts is "industrial symbiosis". Every material stream (residue) that is produced with steel must find its correct destination for reuse, recycling or recovery. The recycling of industrial waste residue is an important step in the comprehensive circular economy of the steel industry (Pakholchuk, 2019). Although steel itself is a circular material, this is not the case for the steel industry, as further research work is required to adjust the properties of the residue, identify further suitable end uses and reduce the risk of overly harsh legislation. Industrial residues from EAF steel production have been used successfully by other sectors in the past, but new EU legislation or stricter EU member state laws could jeopardize best practice and thus the level of recycling achieved by the steel industry. Therefore, research efforts should focus on how to identify other applications of EAF wakes (slag, dust, sludge), with the aim of lowering the role of new policies with the maximum decrease of negative influence on human health in the process (CEPS 2019).

Moreover, the numbers are showing that EAF is much more efficient than blast furnaces or blast oxygen furnaces (BF or BOF). Electric arc furnaces consume on average about 12 kg of coal per ton of steel. The global EAF route produced around 520 million tones of steel in 2018, equivalent to consuming more than 6 million tones of fossil coal. This use of coal results in specific CO2 emissions of around 43 kg/t of steel, which is around 22 million tones of CO2 relative to the entire EAF steel production in 2018. Direct CO2 emissions from EAF steel production in Europe are taken into account, the benchmark is 59 kg CO2/t steel, while the average is 102 kg CO2/t steel. According to these values, in addition to the use of natural gas and graphite electrodes, the use of fossil coal in electric arc furnaces also leads to consumption (International Iron and Steel Institute, 2000).

The carbon footprint of BF-BOF integrated steelmaking and specific CO2 emissions per ton of feedstock at 16% scrap, including the integration of gas and heat recovered from flue gas and blast furnace slag (GBFS). Scope 1 emissions from iron production, especially from blast furnaces, dominate the entire process chain. Using BOF, the scope 1 emissions of the decarburization process are significantly lower, approximately 160 kg of carbon dioxide per ton of molten steel; the total Scope 2 emissions of electricity, oxygen production and dry primary dedusting systems are 35 kg CO_2 per ton of molten steel.

In suppressed combustion dust collector systems, BOF tail gas has a good heating value and is usually collected in a gas receiver for further use. Depending on the BOF operation, CO2 emissions of 30-40 kg per ton of molten steel can be achieved through this gas recovery. Additional credits are also available for 10-30 kg of heat per ton of molten steel to recover heat from BOF tail gas to generate steam and replace other fossil fuels such as natural gas. Newly developed BOF bottom ash and dust by-product recovery solution capable of recovering and reusing metal and mineral fractions with the potential to earn additional points (Voraberger, 2022).

To sum up, we can conclude that there still is a room for improvement of Ukrainian steel industry, moreover, in order to remain competitive and return the previous revenues from steel and iron exports, Ukraine has to start implementing policies, which would lower the base-cost of the steel and also will help industry to push in a sustainable direction.

The reason of steel sustainability in modern economy

The possibility of economically profitable functioning of ferrous metallurgy and the entire industry, subject to restrictions on greenhouse gas emissions (some literature uses the term carbon-constrained economy) is not obvious. Further international "rules of the game" and, in particular, the measure of Ukraine's obligations regarding restrictions on greenhouse gas emissions have not yet been defined. in the U.S. - voluntary industrial efficiency targets, and in China - established by the state. Projections of the future cost of permits for CO2 emissions in Europe range from 25-50 euros per ton of CO2. Assuming that the production of each ton of steel emits about 2 tons of CO2, this constitutes a major challenge to the competitiveness of the European steel industry. For example, the well-known plans of the German government to limit the allowance of CO2 free emissions for the iron and steel industry to a level close to current production. According to this, the competitiveness of the German steel industry and its growth opportunities will be threatened. The challenges to the future competitiveness of European steel industry are detailed in the ActionPlan for a competitive and sustainable steel industry in Europe, which identifies the following relevant areas of work (with significant cuts).

1. Establish a regulatory environment for sustainable development:

- introduce directives for member states' renewable energy support schemes to ensure that the short-term targets for the share of renewables are met;

- develop an EU policy framework for 2030 to address the potential cost impact on the competitiveness of European industry, including through international negotiations on preventing global climate change;

- advocate for the best achievements on energy efficiency based on energy audit data, European and international studies;

- advocate investments for energy efficiency (new boilers for power generation, use of converter gas, CCGT, waste heat recovery);

- to consider the eco-design requirements, namely the recyclability and dismantling for easy separation of the steel part for recycling.

2. Support innovation:

- integrate iron and steel into research and innovation and market commercialization activities for energy-efficient products, technologies, and solutions;

- explore the possibility of "tagging" revenues generated through an emissions trading scheme to fund mitigation measures, including the introduction of innovative technologies. responsibility and opportunity with transparent accounting, introducing a clear mechanism for fulfilling commitments;

- ensure early standardization of greenhouse gas emissions;

- continue activities to develop a life cycle methodology to ensure the degree of recycling of materials;

- conduct a life cycle assessment along the supply chain supply chain and include a recycling rate indicator in policy and strategy documents

Diversification of supply: create conditions for the future use of our own resources of fossil gas, traditional and unconventional sources to reduce import dependence and reduce the cost of energy (Shatokha, 2015).

Today there is a fairly large number of innovative technological solutions at different stages of development or testing that have a very significant potential to reduce greenhouse gas emissions by enterprises of ferrous metallurgy.

The Japanese initiative COURSE50 is an acronym for CO2Ultimate Reduction in Steelmaking Process by Innovative Technologiesfor Cool Earth 50. The project is part of the government's Cool Earth 50 program, which began in 2008. The scientific and

technological research envisioned by the project is funded by the government and major steel companies in Japan with a total budget of 10 billion yen (about $860 million).

The peculiarity of this project is that the blast furnace and two-stage steel production is preserved.

The project includes several components, including:

1) reducing CO_2 emissions from iron production, which involves:

a. using hydrogen as a reducing agent;

b. reforming of coke gas in order to increase hydrogen content in it using waste heat;

c. production of coke with high strength and increased reactivity, which is suitable for use in a blast furnace that uses hydrogen as a reducing agent;

2) capture of CO_2 from the bell furnace gas for further use of the gas as a fuel or reducing agent;

3) reduction of energy consumption by recycling waste heat.

The specifics of technologies based on the reduction of iron ores with hydrogen, as well as the method of economically viable production of hydrogen on a commercial scale, are not currently disclosed in detail in the publications on this project. One option being treated is the preliminary reduction of iron ore materials in a shaft furnace followed by loading the partially metallized product into the blast furnace. Regarding the improvement of existing technologies, the following is reported to increase the hydrogen content in coke oven gas from the current 50-55% to 63-67%.

It is supposed to blow such gas both to the usual tuyere of the blast furnace and to the tuyere located in the lower part of the shaft. Secondly, it is planned to use certain admixtures to the coal charge to improve the quality of coke. Since blowing in reformed coke gas will provide reduction of coke consumption, requirements to coke strength to ensure gas permeability of materials in the blast furnace increase. In addition, the endothermic effect associated with reduction of iron oxides by hydrogen will somewhat reduce the temperature at certain horizons of the blast furnace, which - according to the authors of the project - will require the use of coke with a high reactivity. For this purpose, special additives for the coal charge (HPC, High performance caking additives) are being developed, the use of which will make it possible to increase the content of coal grades in the charge, giving the coke a high reactivity, while increasing its strength (IEA, 2014).

Ukraine's trade in steel and iron with Arab countries and its effect on sustainable economy

The world steel production and consumption increase constantly during last years. According to information of International Iron and Steel Institute (IISI), in 2021, the world steel production increased by 3,8%, compared to the same index in 2020, and composed 1,951 billion tons. It is the highest level of the world steel production that have ever been and the world steel production has been closing on onto 2 billion tons of steel in the next 2 years. Moreover, over the last 15 years, world steel production has increased almost by 2 times, when the production was just hitting 1 billion tons per year. Over the last 5 years, Ukraine has steadily increased the production tempo, nevertheless, Ukrainian production in the scale of the whole-world level is falling sharply.

Table 1. Steel and iron production in the world by country, thousand tons

Country	2017	2018	2019	2020	2021	Percentage of the world production in 2021, %	Rank among world producers
World	1735087,0	1826643,9	1875330,1	1880410,4	1951924,0	100	-
China	870 740,9	929 038,4	995 418,9	1064732,0	1032790,0	52,91	1
United States	81 612,2	86 607,4	87 761,2	72 732,1	85 791,4	4,40	4
Vietnam	11 473,0	15 471,0	17 469,0	19 900,0	23 019,2	1,18	13
Ukraine	21 417,3	21 100,5	20 848,2	20 616,4	21 365,6	1,09	14

Source: based on OEC (2022).

The situation of the world steel market in recent years is determined by the "China factor". China's steel product consumption growth has stagnated. At the same time, the growth rate of steel production is much higher than that of domestic consumption. This is highlighted on the fig. 2. Moreover, as we can see from the fig. 3, we can see that China makes up almost all of the Asia's demand of ores and slags from Ukraine, approximately third of Ukrainian ores and slags go to Europe, where technologically advanced steelworks of Italy and Germany produce steel products, which can't be produced on the Ukrainian factories due to the reasons mentioned in first chapter.

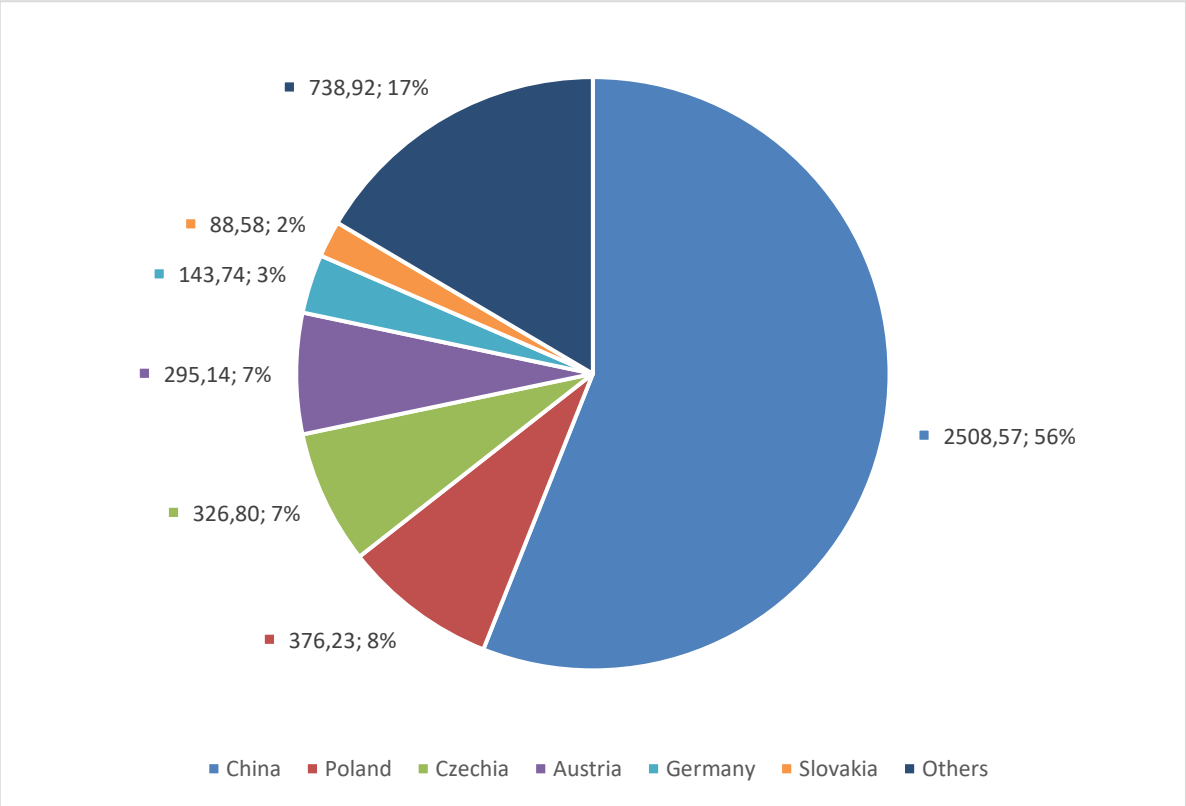

Fig. 2. Ukraine's export of ores and slags in 2020 by country, mln USD [5]
Source: OEC (2022).

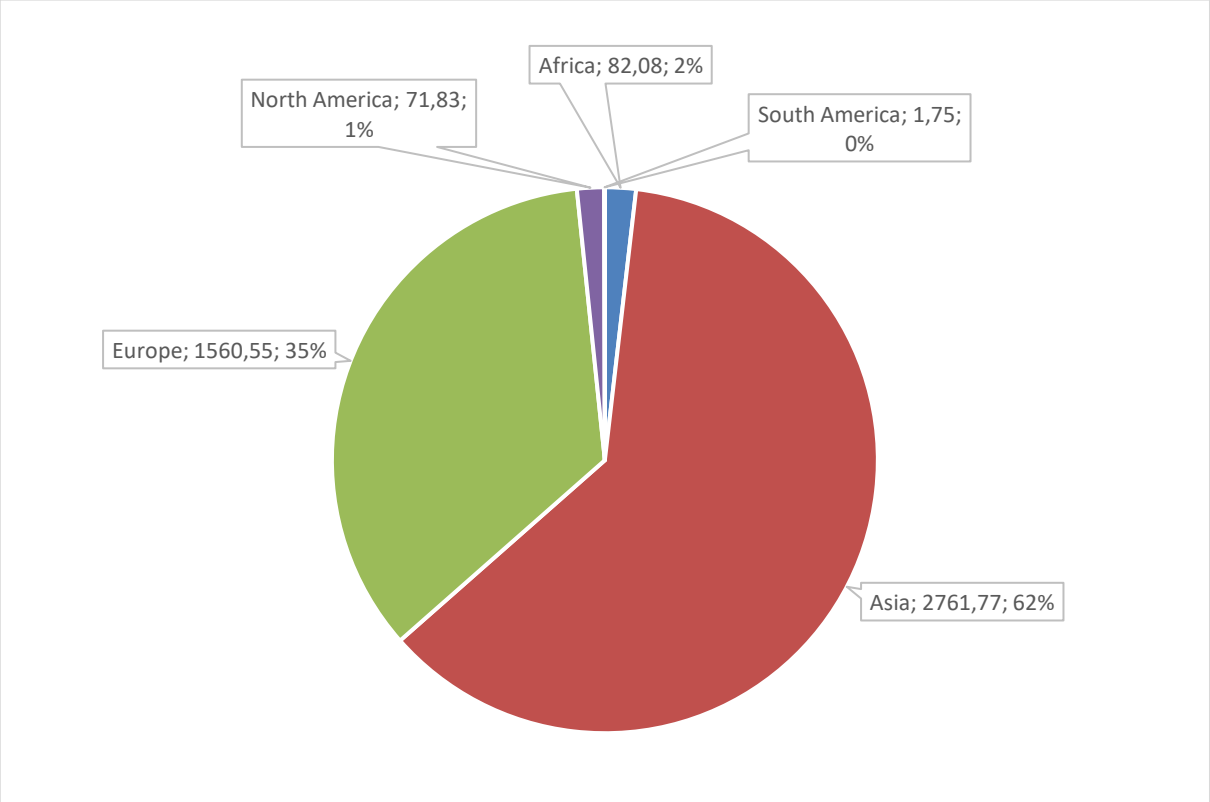

Fig. 3. Ukraine's export of ores and slags in 2020 by continent, mln USD.
Source: OEC (2022).

One of the most prominent actors in Asia and in Middle East is Saudi Arabia, the country is importing 4.44% of Ukrainian iron and steel export, which equals to $377 million dollars, out of those numbers, the majority of export is semi-finished iron, which is up to $208 million dollars in 2020, and $119 million dollars of pig iron exports. In that case we can see, that Kingdom of Saudi Arabia imports products, which can be further reprocess the semi-raw materials Ukraine is exporting. Moreover, Saudi Arabia has committed to sustainable development in all fields, including steelmaking.

Sustainability has been the core of Vision 2030 since the adoption of the strategy. Saudi Arabia now plans to enter a new level of commitment to sustainability as the kingdom aims to achieve net-zero emissions by 2060. The announcement is in line with Vision 2030's broader ambition to accelerate the energy transition, achieve the Sustainable Development Goals (Vision 2030, 2022).

In order to fully realize the potential of the Saudi programs, they would need the building material which corresponds with their declared goals, and steel fits the description, due to plans to start producing energy through the solar panels installed on the buildings, because of the climate it would prove more efficient than in most places on the planer, moreover The use of photovoltaic cells can greatly reduce the overall energy consumption of a building. One square meter of Arsolar roof cladding (6 kg) supports photovoltaic cells that generate 120 kWh of electricity per year. Therefore, every kilogram of steel produces 70 MJ of solar energy per year (Vassart, Cajot, Labory, 2009).

Ukraine is fully fit to satisfy the demands of new projects in Arabia, which is proved by the export statistics of the country in the field of iron and steel, as it is shown in fig. 4 and fig. 5, as we can see Ukraine has been exporting steel and iron very sporadically, without dominating contracts like with ore and slags shipments to China, therefore Ukraine can take advantage of the Saudi vision and development strategy, thus moving itself to cover the needed amounts while optimizing the trade routes, which would be much shorter and easier than shipping steel to United States, China or Russia, logistically it would improve the costs even more for Ukrainian producers

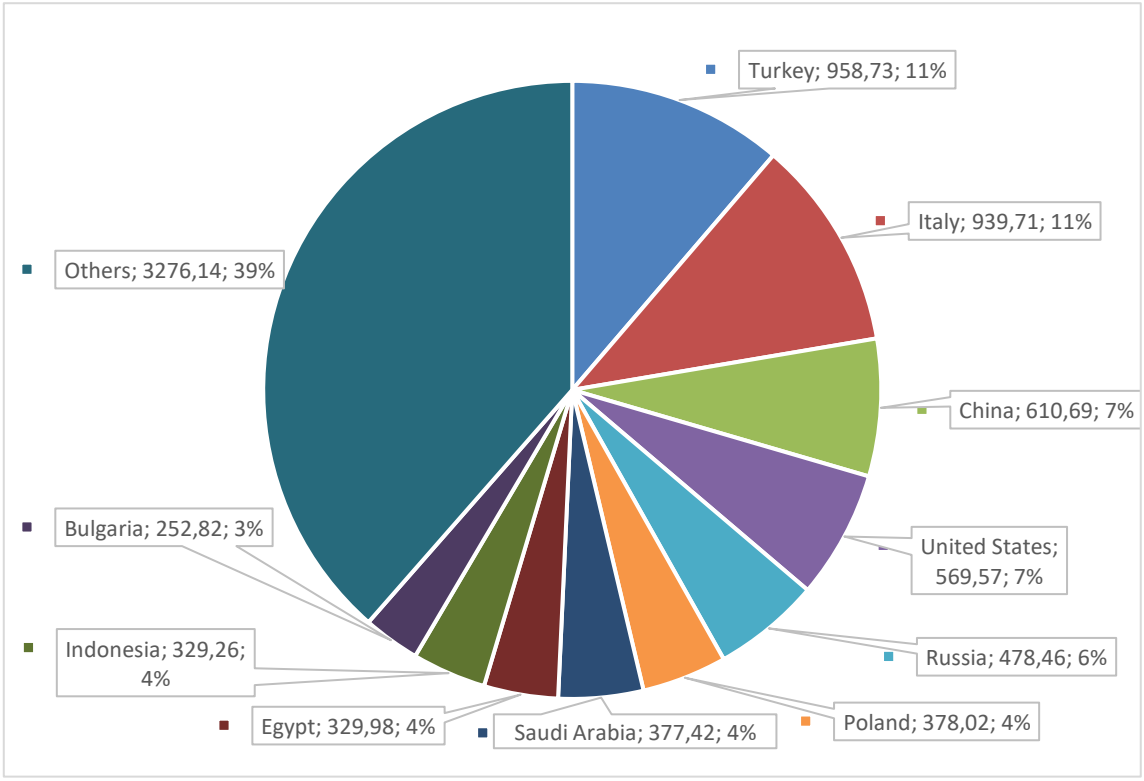

Fig. 4. Ukraine's export of steel and iron in 2020 by country, mln USD.
Source: OEC (2022).

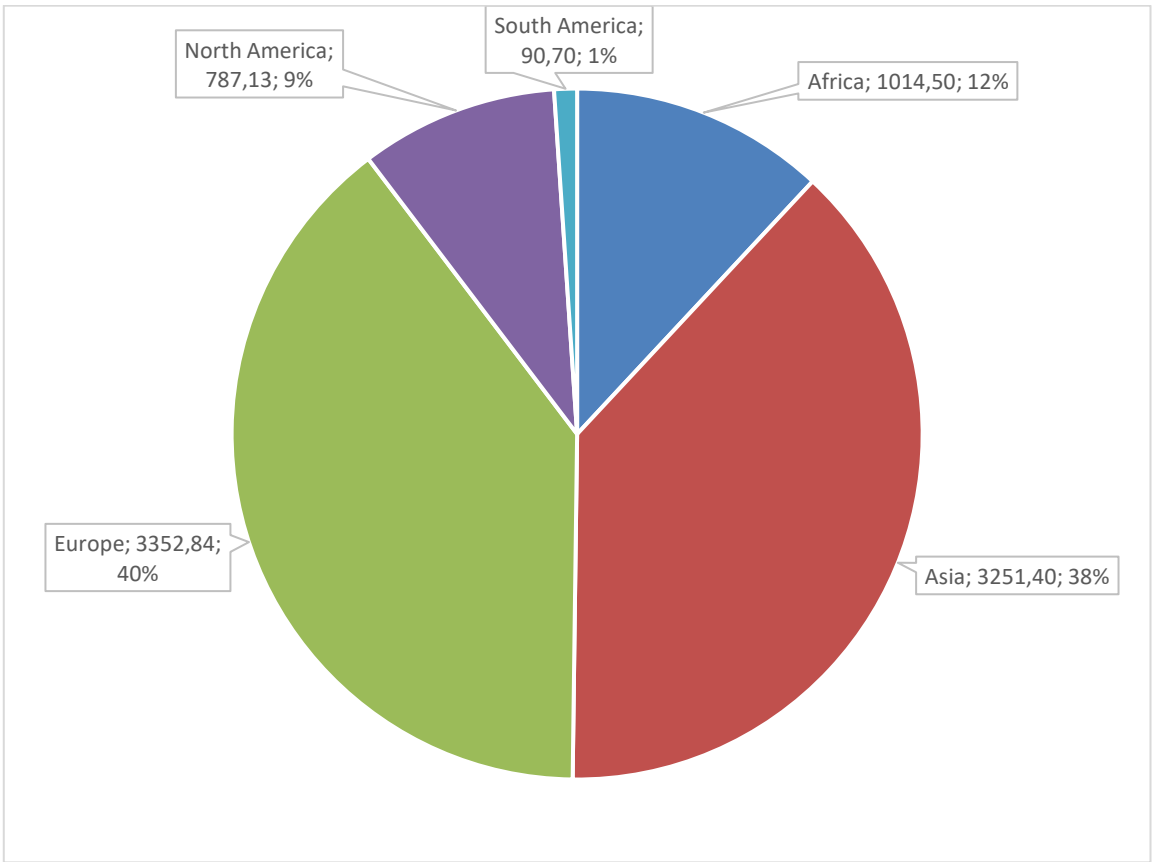

Fig. 5. Ukraine's export of steel and iron in 2020 by continent, mln USD.
Source: OEC (2022).

Apart from this statistical information, we can also see, that Ukraine has one of the highest net export statistics, which supports the thesis about being able to produce enough material to cover sustainable projects in the Middle East, the net exports chart shows that Ukraine has 4th place in the world following Japan, Russia and South Korea. Although we need to understand the reasons for the high production in Korea and Japan, who do not possess the same level of ore and coal production, as does Ukraine and Russia. Asian countries are generally importing raw materials and reprocess them, after which they are exporting finished products or construction details, generating the high net export numbers.

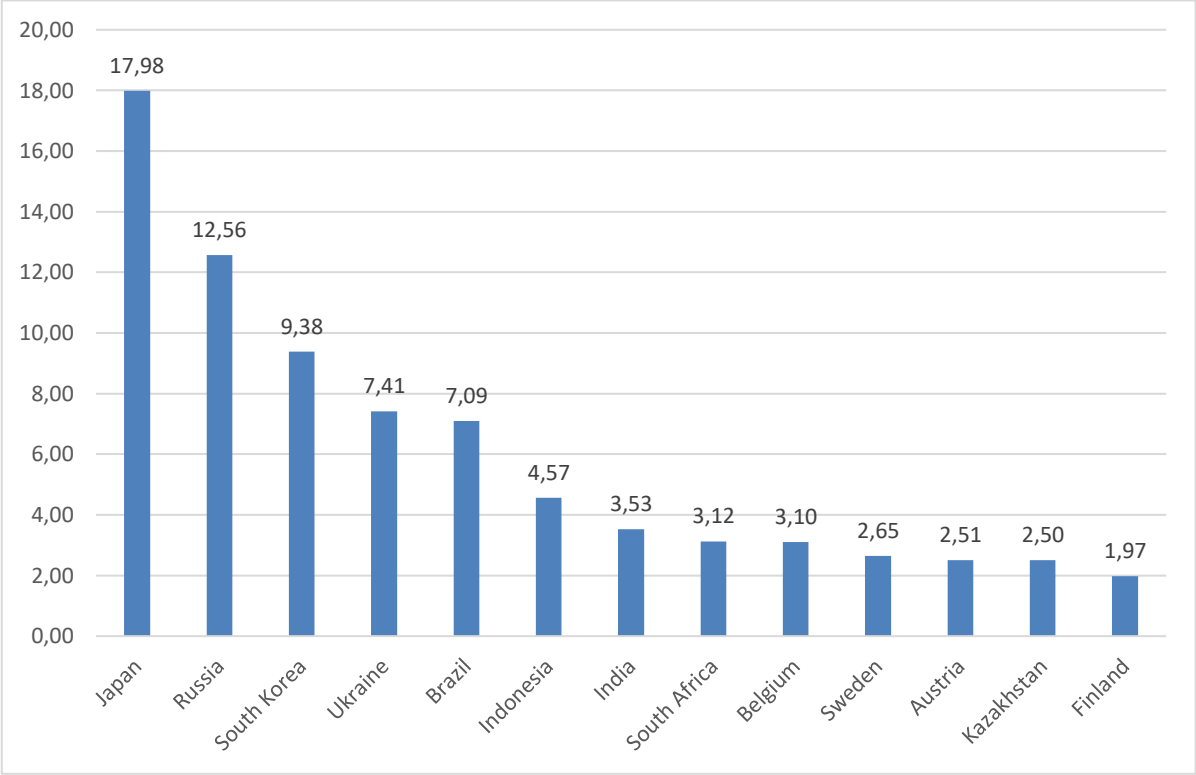

Fig. 6. Net exports of steel and iron in 2020, bln USD.
Source: OEC (2022).

Conclusions

As we can see, the Ukrainian steel-making industry has the capacity to grow and produce enough iron and steel in order to supply the necessary sustainability projects throughout the world, although Ukraine needs to modernize its own equipment in order to reach the lowering of the CO2 emissions in Ukraine itself. The study shows that the modernization is needed in order to reduce both the emissions and energy consumption, which is one of the highest in Europe, if calculated mWh/ton of steel. Therefore, the suggestion is that government stimulates the update with one of 2 ways:

- By installing tax on CO2 emissions, thereby forcing industry to look for a way to decrease taxation and updating the equipment
- By focusing subsidies for equipment upgrades

Moreover, we have learned that Ukraine can increase the output of the steel production and with required updates it will help the industry to export the products to countries which share the sustainability goals, example given is Saudi Arabia, which has the capacity to increase the steel consumption, due to sustainability goals and programs adopted in Vision 2030 and in plans to reach net-zero emissions by 2060.

Concluding, we can see that steel is "Backbone of sustainability" as it was called in European commission report, and we can see the positives it can bring to ecology and energy problems, while at the same time remaining its high output and growth rate, as shown in statistics over past years

In order to improve situation in Ukrainian steelworks, the enterprises have to change the outdated blast-furnaces with electrometallurgy methods, such as EAF – electronic arc furnaces, which would reduce the energy input and reduce the CO2 emissions, also companies may want to invest in newest projects aimed at even further decrease in the emissions.

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Spatial Formations for Sustainable Development in the Conditions of Decentralization in Ukraine

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ABSTRACT

Changes in the administrative-territorial system reformatted the system of local government in Ukraine. Consequences of the reform: communities were created at the basic level, nominally capable of exercising all decentralized powers, small districts with a population of 7-180 thousand were eliminated, a fundamentally new subregional level was created - districts (counties) with a population of 150 thousand - for state power. The subregional level of new districts for Ukraine is structurally necessary, even in the conditions of their, perhaps, intermediate existence. The institutional issues of the new spatial division are considered at the level of the new enlarged district – as a new player in the administrative-territorial division of the state. An urgent problem was stated - the extreme lack of funds, even for the exercise of their powers. To achieve a positive effect on the organization of public authorities at all levels of territorial organization of power, it is proposed to use the possibility of applying the positive effect of external externalities.he analysis of the experience of countries with similar potential helps to determine their prospects, without copying other people's mistakes. The experience of European countries, in particular, Poland, proves that the three-level structure of territorial organization of power in the continental system of local self-government (which is implemented, including in Ukraine), is effective.

Keywords*: decentralization, budget, local government, SMART specialization*

Introduction

Given the socio-economic significance, as well as the scale of these issues for the spatial development of the country, it is a permanent focus of economic and financial science, as well as research in public administration. Thus, modern trends in the decentralization of state power were studied by Boldyrev (2019) and Zhalilo (2019), and the implementation of the above trends became the focus of research Zagurska-Antonyuk (2019). The combination of regional and decentralization aspects is illustrated in the works of Ramenska (2020) and Savenko (2020). Unconditional and effective example of basic research in the field of decentralization and regional policy are the theoretical achievements of scientists of the Institute of Industrial Economics of the National Academy of Sciences of Ukraine in particular: Amosha et al. (2018), Koval, V. et al.. (2022), Mikhno et al. (2022).

Despite significant achievements, in the context of constant changes in the domestic regulatory and institutional environment, the problem of budget decentralization and standardization of spatial development needs further consideration.

Along with the implementation of administrative-territorial reform, fiscal decentralization reform should take place in parallel, and the transfer of powers from the center to the subregional entity should take place simultaneously with the provision of appropriate sources of funding. to provide public services.

Currently, a number of urgent issues remain unresolved: the complexity of macroeconomic policy, especially fiscal coordination, the exacerbation of inherited territorial disparities, the problem of institutional perfection of decentralized units that receive delegated powers.

These arguments determined the purpose of the article - to analyze the global process of decentralization, highlight sectoral successes and structural mistakes of foreign countries, provide recommendations for territorial development in Ukraine given new approaches to regulatory, institutional and financial regulation.

Methods

The theoretical and methodological basis of the study is the provisions of institutional theory, including the paradigm of evolutionary development, territorial organization of power, regional economy, administrative and budgetary decentralization, the concept of strategic management, public administration.

The following general scientific methods were used in the research process: analysis and synthesis (for analysis of scientific schools of cluster theories development, generalization of existing theoretical approaches and provisions, scientific developments on public administration, regional strategy, cluster development management and terminological apparatus clarification); classification and system approach (to identify the sectoral specifics of the development of cluster structures in different countries; determining the features of budget decentralization based on the analysis of regional development strategies); comparison and structural and logical generalization (to determine the peculiarities of international practice of regional development according to the NUTS nomenclature and the possibilities of its use in Ukraine; development of a number of measures to form a regional infrastructure of institutions to promote regional development on the basis of smart-specialization).

Results

Systematic strategizing of economic development of spatial formations

Qualitative strategy of economic development of the state should be aimed at a balanced step by step in terms of resources and deadlines to achieve a large-scale goal based on classical theoretical achievements. Thus, the facts of socio-political life during the long historical development show that on the rising wave of the Kondratiev cycle there are socio-political cataclysms (wars and revolutions), and on the lowering wave - "explosion" and flourishing of culture. The serious influence of the fleeting political situation in our country leads to the fact that theoretical strategizing, unfortunately, does not always have practical implementation. At the same time, given the time limits of the technical and economic cycles of Kondratiev, namely - 25-30 years of the rising wave and 25-30 years of the rising, it should be noted the following: during the rising wave of each major cycle, when there are profound changes in the economic life of society, significant technological inventions, but also the greatest number of social upheavals, it is necessary to use those driving forces that are formed just in the period of descending activity of the previous economic wave (Fig.1).

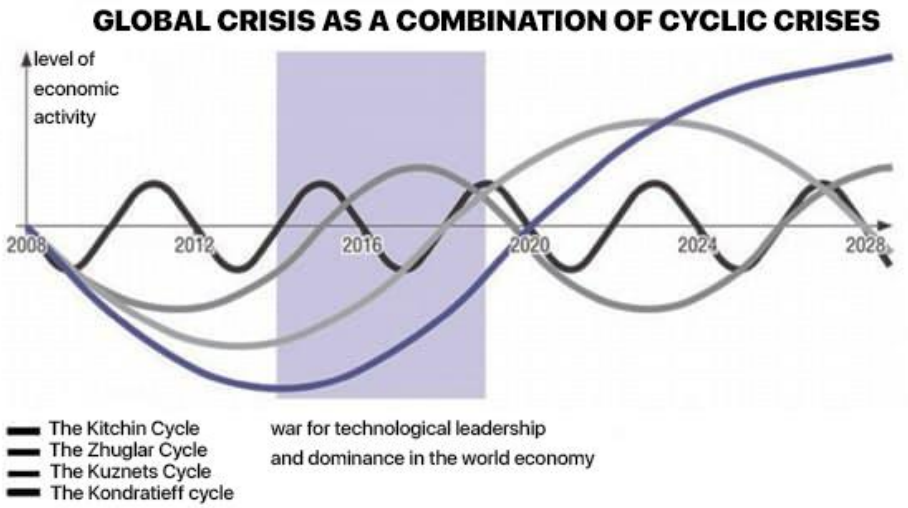

Fig.1. The global crisis as a set of cyclical crises in the early 21st century

Source: Amosha et al. (2018).

The concept of regional economic strategy envisages that during the period of 25-30 years of the semi-cycle of the upward wave at the basic level of local self-government in Ukraine, namely at the community level, the territorial community should develop for its own strategic development such scenarios would be implemented in the next half-cycle (between 25-30 years of the next rising wave).

This is the course of events that will prevent the rapid change of the political situation, and given that the philosophy of decentralization reform has given the maximum level of self-development and funding to the grassroots community in Ukraine, it is possible to implement it. Moreover, it is in those countries where democratic mechanisms for the formation and implementation of policies, both domestic and foreign, that govern the state and regions is effective. Examples are Poland, Hungary, Slovakia, Lithuania, etc. Developed countries, for the most part, are characterized by a lack of mechanisms for citizen participation in policy-making and implementation, as well as a commitment to rapid change of political elites.

At the same time, communities should be given real independence of local self-government in matters of strategizing the development of their own territories for a period of 25-30 years. As for the strategy of technological breakthrough, the task of long-term strategies at all levels of government is to clearly define technological areas (industries), where competitive leadership is possible in maintaining existing and opening and filling new markets. In modern conditions, it is called smart (smart) - specialization.

Ukrainian scientists from the Institute of Industrial Economics of the National Academy of Sciences of Ukraine have repeatedly stressed the need to take into account the European approach to territorial division and the Nomenclature of Territorial Units in Ukraine for the purposes of NUTS statistics. Correspondence of NUTS levels in the European Union and required in Ukraine is given in Table 1.

Table 1. Administrative correspondence of levels

Level according to NUTS nomenclature	***Population***	***Administrative division of Poland***	***Analogue of Ukraine***
NUTS-1	3-7 million people	Macroregions	Economic district
NUTS-2	800 thousand-3 million people	Voivodeships (wojewodztwo)	region
NUTS-3	150 thousand-800 thousand persons	Counties (powiat), including cities that have the status of urban counties	Subregional level (rural and urban areas)
LAU (NUTS 4-5)	up to 150 thousand people	Communes (gmina)	communities

Source: compiled by the authors

Thus, the correlation identity with the Polish territorial administrative system gives Ukraine the opportunity to take into account the positive consequences based on foreign experience. Given that the starting positions of Poland and Ukraine are almost the same, and the territorial division is similar, it is necessary to take into account the experience of fiscal reform.

The reform of fiscal decentralization should be a synchronous and necessary process for reformatting the administrative-territorial structure, but at the same time, it should be accompanied by the provision of financial support from appropriate sources to provide a social package to citizens. Ukraine's own tax revenues in the new system of territorial organization of power can be the basis for building a model of effective budget decentralization (Verkhovna Rada of Ukraine, 2021). Thus, based on the relationship between income categories (Table 2) in the administrative division of Poland, it is possible to offer your own vision of building a national system of fiscal distribution with the introduction of fundamentally new institutions and mechanisms.

Table 2. The ratio between income categories administrative units in Poland

Unit	Commune (gmina)	Counties (powiat)	Voivodeships (wojewodztwo)
Own income	33,7	15,4	8
PIT and PAP	22,2	18,2	33,9
General grants	24,8	42,4	11,6
Targeted subventions	19,3	24	46,5
EU funds	5,6	3,4	30,3

Source: Association of Ukrainian Cities (2020).

In general, when studying the systematic strategy of economic development of spatial formations, one should undoubtedly take into account the paradigm of cyclical technical and economic fluctuations. Thus, high-quality strategy of economic development of the state should be aimed at a balanced step by step in terms of resources and deadlines to achieve a large-scale goal based on classical theoretical achievements.

For example, the facts of socio-political life during the long historical development show that on the rising wave of the Kondratiev cycle there are socio-political cataclysms (wars and revolutions), and on the falling wave - "explosion" and flourishing culture.

The large-scale influence of the fleeting political situation in our country leads to the fact that theoretical strategizing, unfortunately, does not always have practical implementation. At the same time, given the timing of Kondratiev's technical and economic cycles, the following should be noted: it is necessary to use those driving forces that are formed just in the period of descending activity of the previous declining economic wave.

The concept of regional economic strategy envisages that during the 25-30 years of the semi-cycle of the upward wave at the basic level of local self-government in Ukraine, namely at the community level, the territorial community should develop for its own strategic development such scenarios would be implemented in the next half-cycle (between 25-30 years of the next rising wave).

This will be a safeguard against the changing political situation, and given that the philosophy of decentralization reform has given the maximum level of self-development and funding to the grassroots community in Ukraine, it is possible to implement it. It is in countries where well-developed democratic mechanisms for policy formation and implementation work that state and regional governance is effective (Poland, Hungary, Slovakia, Lithuania). Economically strong countries are characterized by a lack of mechanisms for citizen participation in policy formulation and implementation, as well as a commitment to rapid change of political elites. At the same time, communities should be given real independence of local self-government in matters of strategizing the development of their own territories for a period of 25-30 years.

As for the strategy of technological leap, the task of long-term strategies at all levels of government is to clearly define technological areas (industries), where competitive leadership is possible in maintaining existing and opening and filling new markets, ie smart (smart) - specialization. Budget decentralization in the new model of communication between the center and the regions of Ukraine is one of the key factors in the rational distribution and use of the budget, as well as high efficiency of public services.

The subregional level, as new to the territorial separation of powers in Ukraine, will deserve special attention, moreover, in the context of the formation of a multilevel economy, it itself becomes a multilevel structure. At the same time, there are questions of optimal distribution of budget funds between the subjects of the budget process within the district, and it should be balanced and comply with the legal framework, in other words, current and effective financial support of local government in budget decentralization.

However, apart from the objective positive aspects of decentralization, the implementation of fiscal decentralization is impossible without potential risks and shortcomings. For example, limited taxes at the grassroots level, the creation of other local revenues - only through self-taxation, in Poland - is a referendum. Therefore, it is crucial to understand them in order to identify the necessary safeguards and, if necessary, to develop preventive measures.

According to European scientists, the effective database is determined by the following triad of factors (Fig. 2):

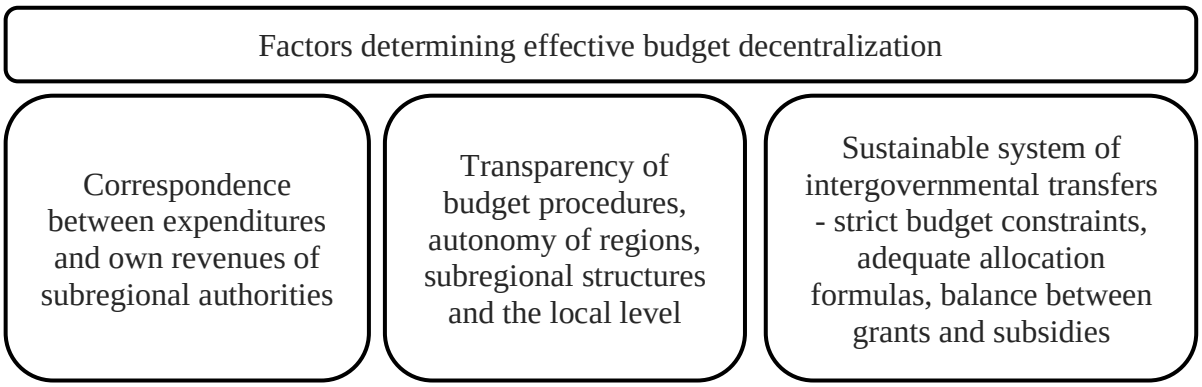

Fig.2. The main determinants of budget decentralization

Source: compiled by the authors

Strengthening the capacity of the community to effectively influence the essential characteristics of their quality of life is the basis of sustainable community development on the basis of inclusiveness. At the same time, in Ukraine, unfortunately, unofficially, the reform of the administrative-territorial system was reduced to the objectives of consolidation of districts and settlements, reduction of administrative-territorial units, to transfer to the balance of local authorities all social spheres, such as medicine and education . But with the formation of large areas, you can get rid of inter-district and supra-district formations.

The importance of local self-government in the political system of any society is determined by the fact that it is the closest branch of government to the population. At the same time, an effective system of inter-budgetary relations should be based on a clear delineation of revenue and expenditure powers, ensure that all levels of government are endowed with sufficient sources of revenue, or have the power to find them to perform their functions.

Thus, there are a number of issues that need to be addressed in order for the reform to be finalized. After all, the unresolved spectrum of urgent issues makes reform steps incomplete and significantly reduces motivation on the ground.

Political issues. The lack of effective tools of public administration provokes permanent crises. In the process of reforming the government in Ukraine, the issue of efficiency of the administrative sphere has been raised for many years, one of the components of which is the reform of decentralization. However, at present, decentralization reform is taking place without a constitutional design. The clash of administrative-territorial reform has resulted in less than a third of administrative-territorial entities uniting in communities. The reason for this is a number of administrative and communicative risks.

In fact, the unification of territorial communities took place administratively. At the same time, the regional state administration, their heads, were given the right to formulate and submit to the Cabinet of Ministers appropriate long-term, regional plans, or regional development plans, having previously taken away this right from regional councils. And thus administratively unite almost 90% of territorial communities, contrary to Article 140 of the Constitution. In addition, instead of adopting a change in the number of districts in the administrative-territorial structure of the country by law, the parliament approved this decision by Resolution (Verkhovna Rada of Ukraine 2020).

The concept of local self-government development and decentralization of power provided for democratic principles, but for objective reasons, the process of unification of territorial communities took place in the absence of laws on local referendums and other opportunities for democracy on the ground. Thus, the administrative nature of the association of territorial communities leads to precedents of constitutional and general democratic legitimacy, primarily on the principles of voluntary local self-government.

Another fundamental aspect is the existence of valid grounds for changes to the ATU. Yes, it is illogical, but there is a situation when residents have to pass the center of another to receive services for their community. However, in accordance with the principle of capacity, local self-government bodies perform exclusively the powers established by law. Other conditions of capacity must be worked out by the Government. Availability and efficiency indicators are also important. Finally, the basis for changes in the ATU are the requirements of state security.

Financial and budgetary issues of the new spatial division.

European experience shows that effective solutions to the problems of local communities can only be at the local level. A developed civil society and democracy incompatible with a totalitarian regime are the basis of strong local self-government.

Fundamentally new mechanism of budget regulation with horizontal equalization of tax capacity of territories depending on the level of income per capita has changed the system of total balancing of all local budgets. And the powers delegated to the local level must be provided with adequate resources for their quality implementation. United communities have gained these powers and resources. At the same time, the issue of financial and budgetary instruments of the decentralization process for the modernization of the economy and sustainable development of Ukraine in the conditions of decentralization needs further solution. In particular, at the subregional level. After all, enlarged districts are certain intermediate subregional structures with no direct links to the state budget and extreme lack of funds, even for their own powers (Fig. 3).

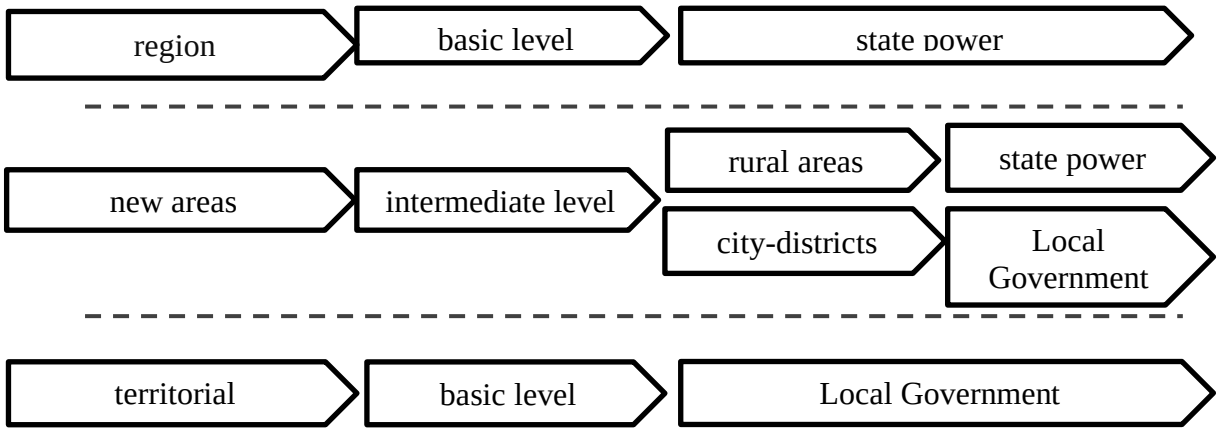

Fig.3. Block diagram of the territorial organization of power in Ukraine

Source: compiled by the authors

The need for the district is unconditional, as there are a number of functions that the community is unable to perform, so social justice is potentially violated.

In the new districts, the previous district councils have been abolished, and regional state administrations will be reorganized to represent prefects. The implications of the reform at the community and district levels are set out below (Fig. 4).

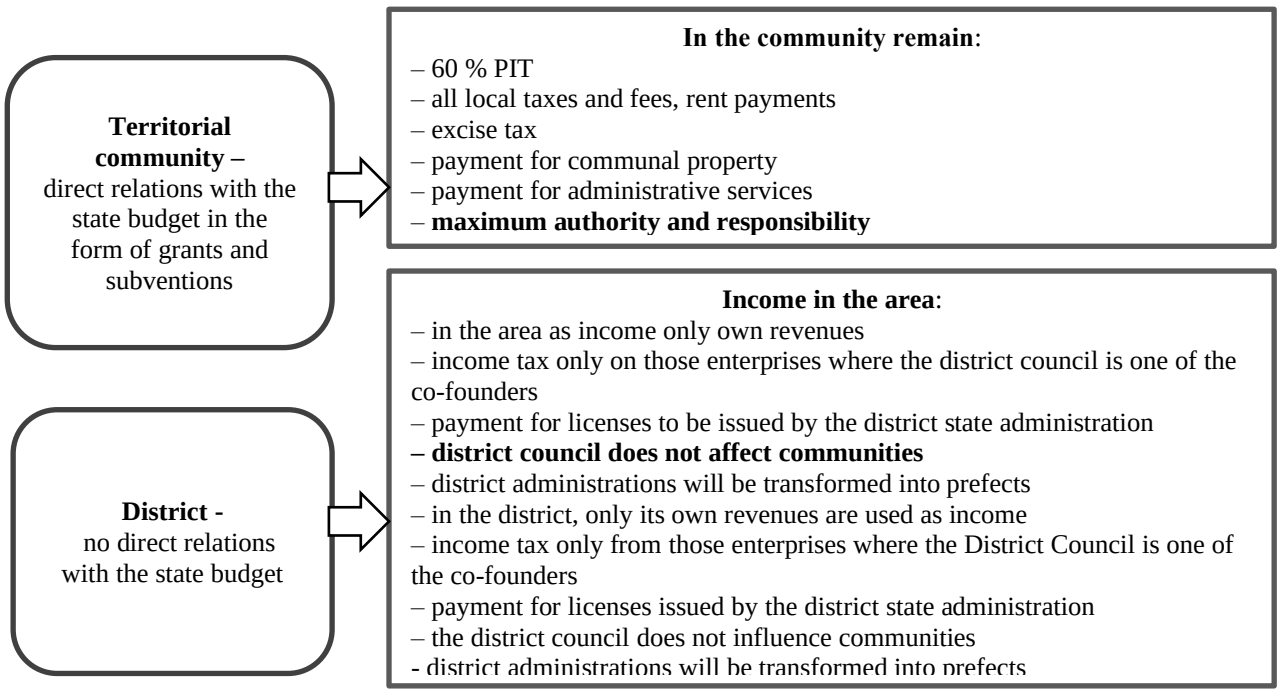

Fig.4. Consequences of transformation of the subregional and community level

Source: compiled by the authors

The first results of this transformation were local budget revenues, which show a positive trend: from UAH 80.2 billion received in 2015, own revenues to the general fund of local budgets increased by UAH 209.9 billion. and amounted to UAH 290.1 in 2021. In total, revenues from general and special funds increased by UAH 210.2 billion during this period, which is a tool for influencing the outcome and gaining the trust of citizens. (Fig. 5).

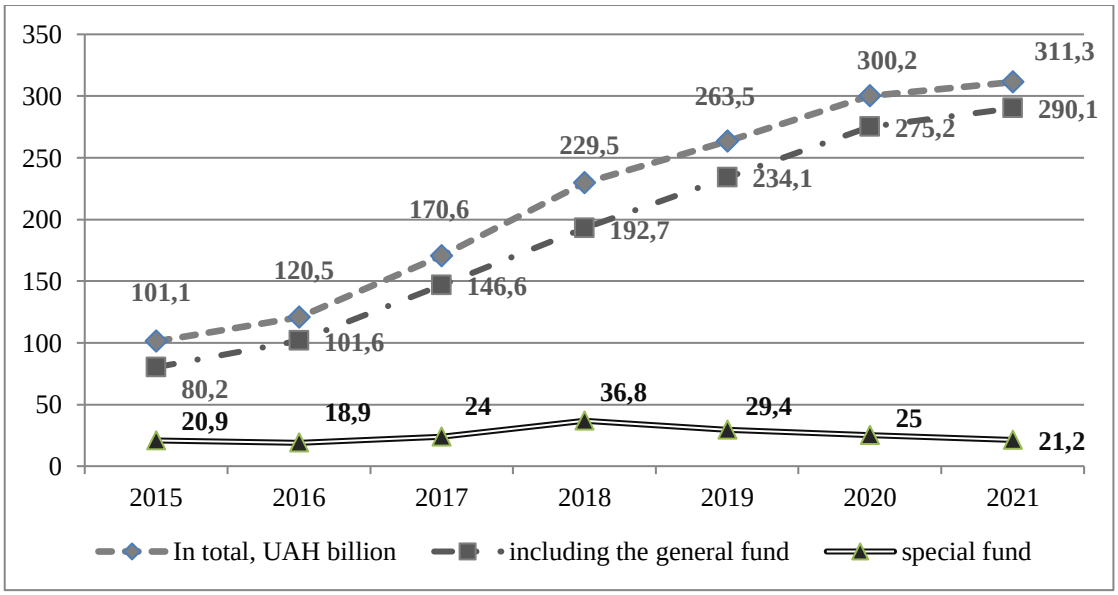

Fig. 5. Analysis of the dynamics and structure of revenues to local budgets

Source: Minfin (2021)

The share of the dynamics of the general and special fund in the structure of the state budget is shown in Fig. 6:

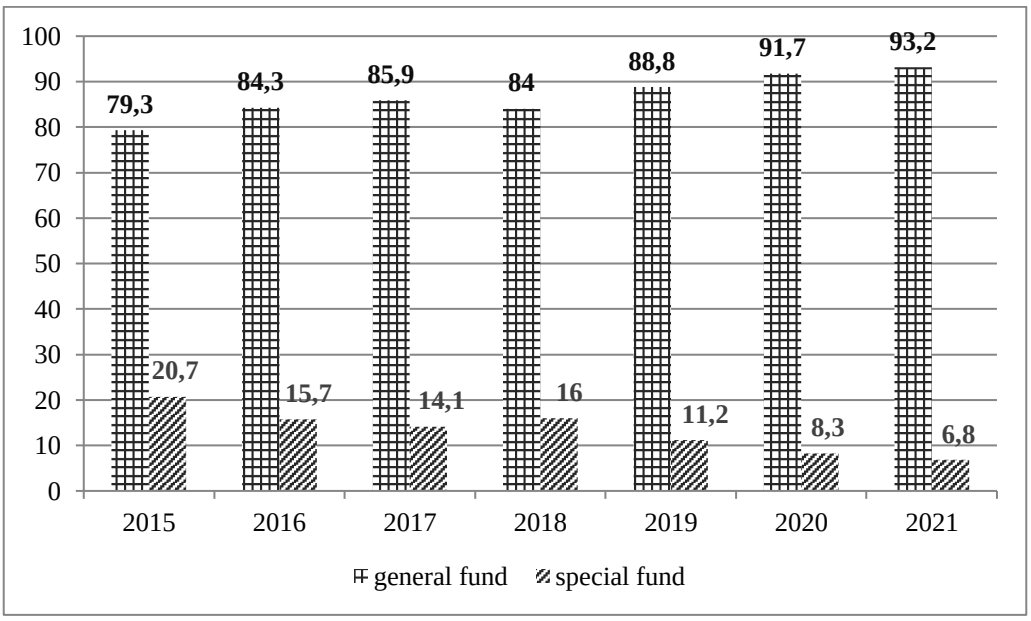

Fig. 6. The share of general and special fund in the total local budgets

Source: Minfin (2021)

The highlights of the transformational transformations are: expanding the rights of public authorities, giving them full budgetary independence and authority to spend. Local authorities have received incentives and real leverage in the local fight against illegal production and circulation of excisable goods to fill their own budgets.

The share of transfers from the state budget is decreasing with increasing revenues to the general fund of local budgets. It is important in terms of budget decentralization to analyze the amount of revenues to local budgets by type:

Table 3. Dynamics of local budget revenues by types of revenues, 2014-2020, UAH billion

Indicator	***2015***	***2015***	***2017***	***2018***	***2019***	***2020***	***2021***
Tax revenues	75,3	98,2	146,9	201	231,8	270,5	285,6
Non-tax revenues	12,3	20,2	21,7	26	29,2	26,8	22,5
Income from capital transactions	1,1	1,7	1,5	1,9	1,8	2,9	3,2
Trust funds	0,4	0,4	0,5	0,6	0,7	0,6	0,6
Official transfers	130,6	174	195,4	272,6	298,9	260,3	160,2
Total	231,7	294,5	366	502,1	562,4	560,5	471,5

Source: Minfin (2021)

Thus, during 2015–2021, local budget revenues doubled. Structurally, official transfers traditionally had the largest share in local budget revenues, accounting for 52.9% on average over the years.

Institutional issues of the new spatial division.

The real state of financial support of local self-government bodies for the performance of functions and tasks within their competence and the implementation of the entrusted powers is extremely difficult. An urgent problem at the district level is the extreme lack of funds, even for the exercise of their powers (payment of utility bills, salaries, administrative services, etc.).

Ways to solve - one-time subventions from the state budget, or transfers to the district council from the regional council. At the same time, we consider it expedient to propose to achieve a positive effect of the organization of public authorities at all levels of territorial organization, the use of the possibility of applying the positive effect of external externalities. When the effective work of a public authority is achieved from the synergy of the two actors, with the characteristic functions and range of rights and powers.

An illustrative effect of this aspect of the spatial organization of government is demonstrated by a number of foreign countries in which local governments have the authority to create extra-budgetary financial funds that are targeted and created to address specific economic and social problems. Local communities can form insurance, reserve, guarantee and depreciation funds.

By its status, a regional non-budgetary fund is usually a trust, which also includes an investment corporation. The trust nature of the funds allows to increase the capital concentrated in them.

In addition, municipal depreciation funds are being set up to achieve the goal of financing investments. Such funds are formed at the expense of depreciation deductions of municipal enterprises and are an organizational form of concentration of financial resources for equipment upgrades in the municipal sector of the economy (Table 4).

Table 4. Examples of functioning of budgetary and extra-budgetary funds for territorial development in foreign countries

Country	*The essence of the reform*
Poland	The legislation on territorial self-government of the Republic of Poland does not provide for the right of communes to establish extra-budgetary funds. But at the voivodship level, extra-budgetary environmental funds operate.
France	With their own subsidies, communes in France can participate in the creation of guarantee funds, which are created by credit institutions of credit institutions and provide loan guarantees to newly created enterprises.
Norway, Canada, USA, Middle East countries	Funds of regional trust funds are formed at the expense of part of the income from the sale of mineral resources, rental income. The funds accumulated in this way allow to compensate for the losses of the regions due to the depletion of resources. These funds are a source of financial resources to diversify the economy of extractive regions; creation of new jobs; development of the social sphere.

Source: Charles Stewart Mott Foundation (2022).

Taking into account foreign experience, as well as for the implementation of effective economic development strategy, real implementation of strategic level measures, it is proposed to create a network of Regional Development Funds (funds for production development, scientific and technological development and innovation, social and environmental development). development, while making changes to the relevant regulatory framework.

The mechanism of filling the Funds, including at the district level, is the interest income from the budgets of the respective territorial units at a comprehensive and progressive rate. That is, there should be incentives in the region / district / community to increase economic development indicators and prevent the shadowing of the economy in order to ensure higher indicators of revenues to Development Funds, and, accordingly, project financing.

Currently, local budgets have two real sources of financial development: the vast majority are the budget (including the mechanism of horizontal alignment) and the State Fund for Regional Development (SFRD). However, the financing of projects with the State Fund for Rural Development is in accordance with certain selection criteria, which do not always meet the interests of the community. At the same time, the proposed Funds as tools to ensure the activities of Corporations, at each spatial level will allow the community to solve urgent problems in this area in accordance with their own resources.

It should be noted that attempts to use interest on tax revenues for such purposes have already taken place, but have not been enshrined in the Budget and Tax Codes.

Taking into account foreign, in particular, Polish experience, as well as the ratio of the administrative-territorial structure of Ukraine with the model of Poland, we can note the possibility of forecasting:

• amendments to the Law of Ukraine "On Principles of State Regional Policy", where legal regulation of relevant budget funds would be part of budgets of relevant levels, and transitional provisions to the law contained amendments to the Budget Code of Ukraine, in particular on these funds. fund of budgets of the relevant levels and has a permanent multi-year budget purpose,

• taking into account the ratio between the categories of revenues of administrative units, it is obvious that the maximum for financing extra-budgetary funds may be the share of community budgets, the average - local and subregional, and finally - the regional level, according to own revenues and tax receipts.

It should be noted that

1) The proposed Regional Development Funds combine two trends - national to obtain funds for development through the relevant state institution, and European - to obtain funding through the relevant Fund;

2) The Corporation for Advanced Development is an institution of financial assistance to regional development on the basis of smart specialization and the Corporation can play the role of a management company, manage the development of the territory in which a special regime of entrepreneurial activity.

The planned effect of the Corporation's activities clearly demonstrates the econometric effect of the example of E. Malinvo, when managing changes in the level of investment depending on profits, and the Keynesian result - a stable equilibrium in economic turmoil.

In order to normalize the systemic strategy of economic development of spatial entities, as well as issues of legislative settlement of topical issues in the field of administrative-territorial structure, it is proposed to carry out the following reforms:

- initiate the establishment of an interdepartmental advisory body in the format of the Regional Development Council, renew the position of Deputy Prime Minister for Decentralization, whose powers will include influencing the decisions of other ministries on decentralization;

- to establish a clear regulation of the concept of boundaries of administrative-territorial units and the procedure for their establishment,

- to initiate the organization of the process of establishing territorial boundaries of communities as basic administrative-territorial units by the Verkhovna Rada, at the proposal of the Cabinet of Ministers. A representative of the state, represented by the district state administration, shall coordinate such agreements,

-initiate the creation of an information platform that will coordinate the actions of relevant ministries on regional development and relevant institutional structures with the leading role of the Ministry of Community and Territorial Development,

-consider the possibility of amending the current regulatory framework regarding the recognition of the Corporation for Advanced Development as an external and internal investor with the rights and competencies of an investment corporation.

- bringing the activities of all local executive bodies in line with the new zoning (spatial division),

- support for institutionally and methodically newly created communities,

- creation of community development strategies, assistance to communities in the preparation of infrastructure development projects, first of all - centers for the provision of administrative services,

- in case of adoption of amendments to the Constitution, reformatting of local state administrations into prefectural bodies, changes at the level of district and regional councils, creation of a new system of supervision over the legality of local self-government decisions.

Thus, decentralization reform must be synchronized with the new regional policy and the transformation of the entire regional structure, as well as guarantee social justice and self-legitimacy. Potentially possible at the new regional level gap between these processes may provoke spontaneous expression of will. In fact, the transfer of resources to the community level has taken place, and new districts can already lobby their interests until the state's decisions are reviewed, thus fully organizing for their own effective development.

Conclusions

Summarizing the results of the study, we note the following. Modern processes of reforming the administrative-territorial structure of Ukraine with accompanying processes of budget decentralization result in a number of unresolved but urgent issues: complicating macroeconomic policy, especially fiscal coordination, exacerbation of inherited territorial disparities, problems of institutional perfection of decentralized decentralization.

At the same time, the analysis of the experience of countries with similar potential helps to determine their prospects without repeating the mistakes of others. The experience of European countries, in particular Poland, proves that the three-level structure of territorial organization of power in the continental system of local self-government is effective, and the correlation with the Polish territorial administrative-territorial structure allows Ukraine to consider positive consequences and minimize risks.

There is substantiated evidence of the need to take into account in Ukraine the European approach to territorial division and the Nomenclature of territorial units for the purposes of NUTS statistics. Based on the relationship between the categories of income of administrative units in Poland, proposed his own vision of building a national system of budget and tax distribution with the introduction of fundamentally new institutions and mechanisms.

The conceptual vision of systemic strategy of economic development of spatial formations clearly demonstrates that during the 25-30 years of the Kondratiev half-cycle of the descending wave at the community level, the territorial community should develop for its own strategic development such scenarios of advanced development that could be implemented in the next cycles (25-30 years of the next rising wave).

The advantages and threats of budget decentralization, its main determinants in European countries are presented. Given the experience of the relevant fiscal processes in our country since 2019, an analytical study of budget decentralization in its political, regulatory and organizational and institutional areas. The institutional issues of the new spatial division are considered at the level of the new enlarged district - as a new player in the administrative-territorial division of the state. An urgent problem was stated - the extreme lack of funds, even for the exercise of their powers. To achieve a positive effect on the organization of public authorities at all levels of territorial organization of power, it is proposed to use the possibility of applying the positive effect of external externalities. When the effective work of a public authority is achieved from the synergy of the two actors, with the characteristic functions and range of rights and powers.

It was stressed that the decentralization process should be closely linked to the new regional policy and the transformation of the entire regional structure, as well as to ensure social legitimacy and justice.

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Territorial Conditions of Population as a Factor of Influence on the Formation of Consumer Behavior of Ukrainian Households: Theoretical and Methodological Principles

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ABSTRACT

It is substantiated that the main factor influencing the consumer behavior of the population and the formation of collective models of consumer behavior of households in Ukraine are the territorial living conditions of the population at the local level and their assessment. Their importance for assessing the achievement of socially important Sustainable Development Goals (SDGs) is indicated. The principles of formation and use of the system of indicators of living conditions of the population at the local level are determined. The developed methodology for assessing the territorial living conditions of the population at the level of amalgamated territorial communities (ATC) of villages, towns, cities of Ukraine is presented and the stages of implementation are determined: assessment of social, economic and ecological development of ATC and determination of the level of provision and maintenance of territorial living conditions of the population; diagnosis of ATC development concerning the state of territorial living conditions of the population; determination of preconditions of social and economic and ecological development of ATC with use of SWOT-analysis; building a model for assessing the territorial living conditions of the population at the level of ATC and developing strategic directions for improving the territorial living conditions; monitoring of results and control over the implementation of strategic goals of ensuring and improving the territorial living conditions of the population. The existing approaches to the formation of the list of indicators for assessing the living conditions of the population as a factor influencing the consumer behavior of households are systematized.

Keywords*: household, consumer behavior of households, territorial living conditions of the population, Sustainable Development Goals (SDGs).*

Introduction

The household is the most important component that shapes the economy of the countries. Household consumption is the driving force of structural changes in the economy, increasing its competitiveness, implementing an innovative model of economic growth. The study of household activities, in particular consumer behavior, allows more complete assessment of the social and economic systems' current development. Currently, the formation of European model of consumer household behavior, which is socially oriented to the level and quality of life improvement.

Socially oriented model of households' consumer behavior is to ensure the access to qualitative social service, in particular, education, health, culture, recreation and tourism,

achieving high level of social protection, providing mobility to the population, both as professional as territorial, satisfying the needs in competitive and highly- qualified personnel in the economy.

Today, consumer behavior in Ukrainian households is influenced by negative factors, primarily political and economic instability, including the Russian war against Ukraine, imperfect governance, deteriorating socio-economic living conditions, the COVID-19 pandemic, increasing inaccessibility for significant part of the population of social services as a result of deteriorating living standards and declining incomes, significant depreciation and destruction of fixed assets of social enterprises, lack of resources in order to improve the quality of social services and investment, etc. Moreover, the study of theoretical and methodological principles of assessing the territorial living conditions of the population as a factor influencing the formation of consumer behavior of households in Ukraine is urgently relevant.

Methods for assessing the territorial living conditions of the population at the level of amalgamated territorial communities (ATC) of villages, towns, cities of Ukraine, the system of living condition indicators at local level, information support relevant to the study of households' consumer behavior of in social disasters or armed conflicts will help to assess the achievement of the socially important Sustainable Development Goals (SDGs), in particular the following goals (SDGs 1–4, 8–11, 17): overcoming poverty and hunger, good health and well-being, quality education, decent work and economic growth, reducing inequality, industry, innovation and infrastructure, sustainable development of cities and communities, partnership for sustainable development (Open SDG, 2022a).

For example, local development is aimed at ensuring housing affordability, ensuring timely public awareness of emergencies using innovative technologies, reducing the negative impact of pollutants, including on the urban environment, in particular through the use of innovative technologies, economic growth, job creation, development tourism, recreation, local culture and local production (Tasks and indicators 11.1–11.6 SDGs 11 "Sustainable development of cities and communities") (Open SDG, 2022b).

Results

Methods of assessing the territorial living conditions of the population at the level of ATC of villages, settlements, cities of Ukraine: stages of implementation

The main methodological principles, methods of research and principles of formation and the usage of living condition indicators of at the local level in order to assess the territorial living conditions of the population at the level of communities (villages, towns, cities) of Ukraine, which conducted the study are:

• scientific one is the use of modern general and special research techniques and assessment methods to identify factors, conditions, principles, features and trends of territorial living conditions of the population, which must be reliable, verified and verified;

• complexity means that the method of assessing the territorial living conditions of the population at the level of amalgamated hromada/amalgamated territorial communities (ATC) of villages, towns, cities of Ukraine was based on the study of many aspects of the problem, characterized by diversity of indicators aspects of this issue, in particular, quantitative and qualitative, current and future, economic, social and environmental;

• systematic one determines the need to study the basic elements of the development of territorial living conditions of the population at the local level in their unity and on the basis of identifying stable relationships to achieve the strategic goal;

• priority means the importance of assessing the territorial living conditions of the population at the local level and focusing on its main points that have a decisive impact on others, in particular, the availability of natural, resource, production, scientific and technical potential, small and medium enterprises, employment, satisfaction of the population with goods and services, ecological situation of the amalgamated territorial community, etc.;

• sustainability means assessment of the development of territorial living conditions of the population at the community level should be carried out on an ongoing basis, which will analyze, identify changes in trends and trends in the development of local communities and develop measures to improve the situation;

• target orientation means the study of the development of territorial living conditions of the population should have a specific purpose, according to which the methodological

tools, research objectives are selected and the range of problems and measures to solve them is determined;

• objectivity means the development of indicator system on the basis of data from state statistics bodies, other central and local executive bodies and real goals and indicators (induces), which can be achieved and be assessed;

• validity and expediency mean the development of indicator system of community development on the basis of clearly defined development goals and economically justified measures and projects that contribute to their achievement, using the best world experience in the field of economic and social development programming;

• accessibility and transparency determine providing public access, which includes information on goals, priorities and expected results and performance indicators of development plans;

• non-discrimination and equal access define the observance of the rights and consideration of the interests of all subjects of the amalgamated territorial community during the development and implementation of the community development plan;

• efficiency determines the defining and ensuring the functioning of the mechanism for achieving goals, tasks, activities and projects of the community development plan in the timeframe;

• historical continuity - taking into account and preserving the positive achievements of the previous development of the community (s);

• ethnic and cultural development - the revival of ethnic identity and the preservation of spiritual and material culture of ethnic groups, promoting their development;

• sustainable development provides ensuring community development to meet the needs of the current generation, taking into account the interests of future generations (Ministry for Communities and Territories Development of Ukraine, 2016; Khomiuk, & Pavlikha, 2019).

In our opinion, the methodology for assessing the territorial living conditions of the population at the level of amalgamated territorial communities (ATC) of villages, settlements, cities of Ukraine should include five stages (Fig. 1):

- the first stage is the assessment of social, economic and environmental development of amalgamated hromada/amalgamated territorial community (ATC) villages, settlements, cities, identification of major trends and problems, assessment of their natural, resource,

production, human, labor, scientific, financial and innovation potential, determining the level of provision and support territorial living conditions of the population;

- the second stage defines diagnosis of ATC development of villages, settlements, cities on the basis of the definition and systematization of indicators characterizing the state of territorial living conditions, calculation of relative indicators of territorial living conditions, induces of level of territorial living conditions and integrated index of assessment of the development of territorial living conditions of the population;

- the third stage means determining the prerequisites for social, economic and environmental development of ATC villages, towns, cities using SWOT-analysis (analysis of strengths and weaknesses of ATC development, opportunities and threats; identification of benefits, challenges and risks of ATC development and external factors of ATC development, identification of relationships between internal and external factors, justification of their impact on the formulation of strategic and operational goals of ATC development in the short and long- term perspectives);

- the fourth stage detects building a model for assessing the territorial living conditions of the population at the level of ATC villages, towns, cities and developing strategic directions for improving the territorial living conditions of the population at the local level;

- the fifth stage concludes the monitoring of results and control over the implementation of strategic goals of ensuring and improving the territorial living conditions of the population at the level of ATC of villages, settlements, cities.

The Methodology for assessing the territorial living conditions of the population at the level of amalgamated territorial communities (ATC) of villages, settlements, cities of Ukraine and the System of indicators of indicators for assessing the territorial living conditions of the population at the level of amalgamated territorial communities (ATC) of villages, cities of Ukraine are extremely relevant and important, in particular, for the formation of information base (collection, availability and processing of analytical information on the state and features of territorial living conditions), for development, decision-making and justification of measures by local authorities (local self-government ATC) needs of the population of ATC villages, settlements, cities, which will increase the competitiveness of ATC and improve the quality of life, the formation of socially oriented model of consumer behavior of households and the transformation of personal consumption into the driving force of economic growth.

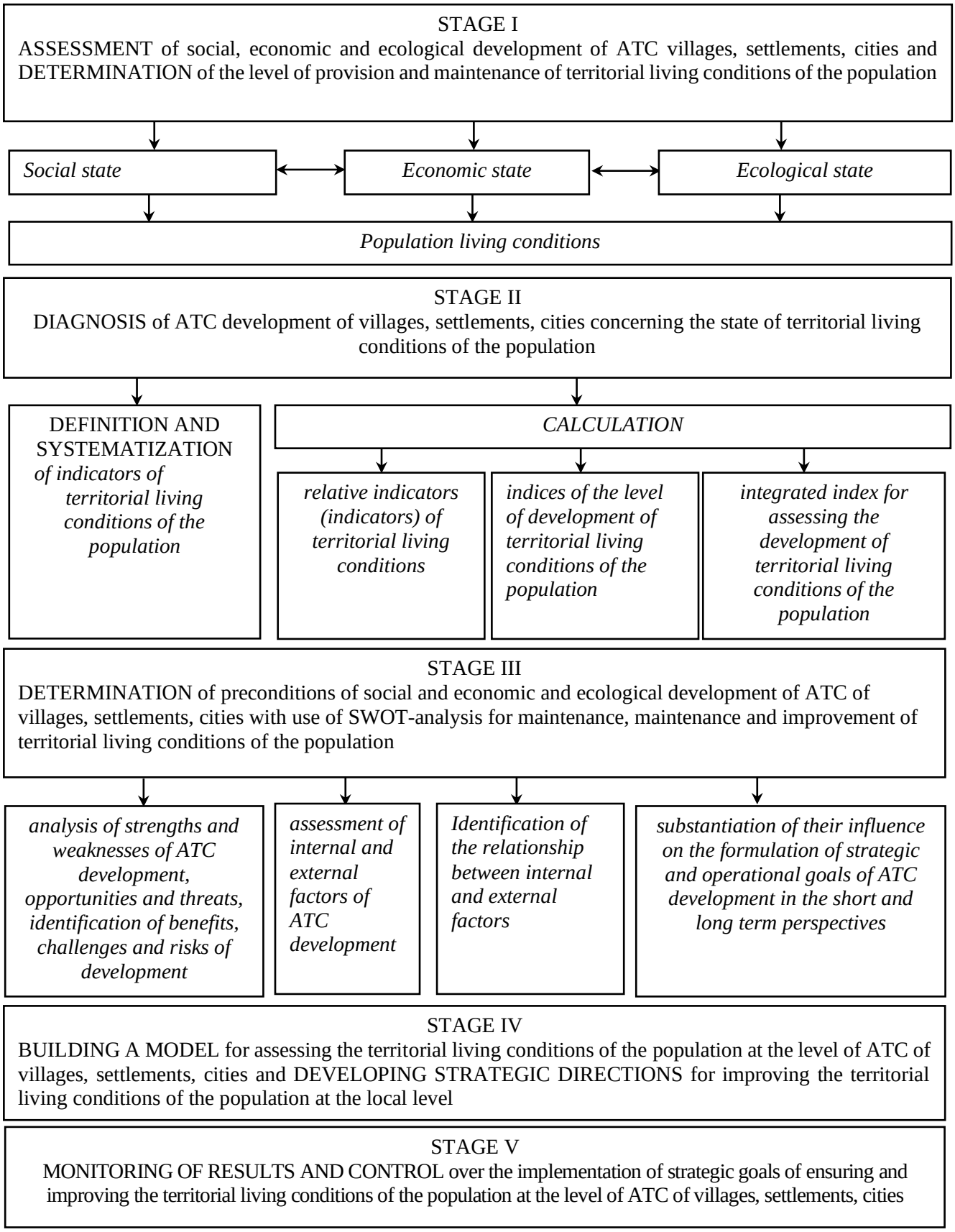

Fig. 1. Methods for assessing the territorial living conditions of the population of Ukraine at the level of AT) of villages, towns, cities of Ukraine

List of indicators for assessing the living conditions of the population: systematization of existing approaches

Assessment of territorial living conditions of the population at the level of amalgamated territorial communities (ATC) of villages, settlements, cities of Ukraine includes the following components:

- development of methodological approaches to the assessment of territorial living conditions of the population at the local level, in particular, indices of the level of development of territorial living conditions and the integrated index of assessment of the development of territorial living conditions;

- definition and systematization of ,both, quantitative and qualitative indicators of territorial living conditions, calculation of relative indicators (indicators), the use of which will identify features and identify trends in territorial living conditions at the level of ATC villages, towns, cities;

- construction of a model for assessing the territorial living conditions of the population and development of strategic measures to improve the territorial living conditions of the population at the local level;

- monitoring the achievement of strategic goals of ensuring and improving the territorial living conditions of the population at the level of ATC villages, settlements, cities.

Today there is no universal algorithm for forming indicators of assessing the territorial living conditions of the population at the level of communities (villages, settlements, cities) of Ukraine, but there are recommendations how to help in forming a set of indicators for projects, plans, programs or development strategies.

In particular, they were developed by the Ministry of Regional Development, Construction and Housing of Ukraine (now the Ministry of Communities and Territories of Ukraine) Procedure and Methodology for monitoring and evaluating the effectiveness of state regional policy and approved by the Cabinet of Ministers of Ukraine № 856 of October 21, 2015 (Verkhovna Rada of Ukraine, 2015), Methodology for developing, monitoring and evaluating the effectiveness of regional development strategies and action plans for their implementation, approved by the order of the Ministry of Regional Development, Construction and Housing of Ukraine № 79 of March 31, 2016 (Ministry for Communities and Territories Development of Ukraine, 2016).

According to the resolution, the annual monitoring and evaluation of the effectiveness of state regional policy are based on 64 indicators, which are divided into twelve groups: economic and social cohesion, economic efficiency, investment and innovation development and foreign economic cooperation, financial self-sufficiency, small and medium development, medium-sized enterprises, labor market efficiency, infrastructure development, renewable energy and energy efficiency, availability and quality of education services, availability and quality of health services, social protection and security, environmental management and environmental quality. Rating assessment of social and economic development of regions involves the use of quarterly and annual indicators and is conducted by comparing the deviation of the values of each region from their best values by region for the relevant (reporting) period and the corresponding ranking of regions (27 positions) (Verkhovna Rada of Ukraine, 2015; Ministry for Communities and Territories Development of Ukraine, 2020a).

Monitoring of the reform of local self-government and territorial organization of power is carried out by the Ministry of Community and Territorial Development of Ukraine in the following areas: territorial organization of Ukraine (New administrative-territorial structure of the basic level, approved by the Cabinet of Ministers of Ukraine on June 12, 2020), territorial communities, cooperation of territorial communities, results of financial decentralization, state financial support, development of the CNAP network in territorial communities, decentralization in the field of land relations. According to the new system of administrative-territorial organization of the basic level (communities) in Ukraine, 1470 territorial communities were formed. There are 410 urban, 433 urban, 627 rural (settlements: 443 cities, 1960 settlements, 26261 villages) among them (Decentralization, 2021). This is the basis for continuing local government reform and accelerating changes in the social sphere, including health, education, culture, tourism, social services, energy efficiency, etc., which will help improve the territorial living conditions and consumer behavior of households. From the indicative list of indicators of social and economic development of the amalgamated territorial community, according to the Guidelines for the formation and implementation of forecast and program documents of socio-economic development of the amalgamated territorial community, presented in Table 1, to form a system of indicators of evaluation can be used indicators of the demographic situation (indicators 1-7), economic efficiency (indicators 8, 9, 11), quality and accessibility of public services (indicators 23-32), creating comfortable conditions for life (indicators 33-37) (Ministry for Communities and Territories Development of Ukraine, 2016).

Table 1. Approximate list of indicators of socio-economic development of the amalgamated territorial community

№	Indicator characteristic	Unit of measurement	Value of the indicator in the previous year	Value of the indicator in the reporting year	Reporting year as a percentage of the previous year
I	***Demographic situation***				
1	Permanent population	person			
2	The number of permanent residents aged 16 - 59 years	person			
3	Number of children under 16 years	person			
4	Demographic load per 1,000 people of working age	%			
5	Natural increase (decrease) in population	person			
6	Total coefficient of disposal of the rural population (per 1000 persons of the existing rural population)	ppm			
7	Internal migration of the population within the settlements of the amalgamated territorial community	person			
II	***Economic efficiency***				
8	Volume of capital investments per 1 person	UAH			
	including at the expense of the state budget	UAH			
	including at the expense of the regional budget	UAH			
	including at the expense of the budget of the amalgamated territorial community				
9	Number of small and medium enterprises per 1,000 population	units			
10	Number of small and medium enterprises per 1,000 population	units			
	including:				
	serving agricultural				
	agricultural production				
	consumer				
11	The length of paved roads of local significance built in the reporting year	km			
12	Number of regional development projects implemented on the territory of the amalgamated community, including at the expense of:	units			
	funds of the state fund of regional development				
	funds of subventions from the state budget to local budgets for the formation of the infrastructure of amalgamated territorial communities				
	other sources				
13	The amount of funding for regional development projects implemented in the amalgamated community	UAH			
	at the expense of the state budget				
	at the expense of the local budget				
	at the expense of other sources	%			

III	***Financial self-sufficiency***				
14	Revenues of the general fund of the budget of the amalgamated territorial community (excluding transfers) per 1 person	UAH			
15	Capital expenditures of the budget of the amalgamated territorial community (excluding transfers) per 1 person	UAH			
16	The share of the basic subsidy in the revenues of the general fund of the budget of the amalgamated territorial community (excluding subventions)	%			
17	Share of development budget expenditures in the total expenditures of the amalgamated territorial community (excluding own revenues of budgetary institutions)	%			
18	The amount of revenues to the budget of the amalgamated territorial community from the payment of personal income tax per 1 person	UAH			
19	The amount of revenues to the budget of the amalgamated territorial community from the payment for land per 1 person	UAH			
20	The amount of revenues to the budget of the amalgamated territorial community from the payment of a single tax per 1 person	UAH			
21	The amount of revenues to the budget of the amalgamated territorial community from the payment of excise tax per 1 person	UAH			
22	The amount of revenues to the budget of the amalgamated territorial community from the payment of real estate tax per 1 person	UAH			
IV	***Quality and availability of public services***				
23	Share of households with fixed broadband Internet in the total number of households of the amalgamated territorial community	%			
24	Provision of the population with general practitioners - family doctors per 1,000 population at the end of the year	person			
25	Average occupancy of the group of preschool educational institution of the amalgamated territorial community	person			
26	The share of preschool children is covered by preschool educational institutions, in the total number of preschool children	%			
27	The average class size of the secondary school of the amalgamated territorial community	person			
28	Proportion of children for whom transportation to school and home is organized in the total number of student, who need it	%			
29	Proportion of children covered by out-of-school education in the total number of school-aged children	%			
30	Proportion of graduates of secondary schools who received 160 points and higher according to the results of external independent assessment in a foreign language, in the total number of students, who passed tests in foreign language	%			
31	Proportion of graduates of secondary schools who received 160 points and higher according to the results of external independent evaluation of the Ukrainian language, in the total number of students, who passed tests in Ukrainian language	%			

32	Proportion of graduates of secondary schools who received 160 points and above according to the results of external independent assessment in mathematics, in the total number of students, who passed tests in Mathematics	%			
V	***Creating comfortable living conditions***				
33	Share of households with centralized water supply in the total number of households of the amalgamated territorial community	%			
34	Share of households provided with centralized drainage in the total number of households of the amalgamated territorial community	%			
35	Share of households that have concluded credit agreements within the framework of mechanisms to support energy efficiency measures in the housing sector at the expense of the state budget (including co-financing from local budgets), in the total number of households of the amalgamated territorial community	%			
36	Proportion of settlements in which separate collection of solid household waste has been introduced in the total number of settlements of the amalgamated territorial community	%			
37	The share of settlements that have concluded agreements with service organizations for the removal of solid waste in the total number of settlements of the amalgamated territorial community	%			

Source: author's calculations based on ***(****Ministry for Communities and Territories Development of Ukraine, 2021).*

Therefore, we propose to apply the legal provisions of the documents mentioned above in the process of assessing the territorial living conditions of the population at the community level (villages, settlements, cities) of Ukraine, forming a system of indicators and developing a community development strategy. When developing a system of indicators for assessing the territorial living conditions of the population at the level of communities (villages, settlements, cities) of Ukraine, it is advisable to use official data from state statistics, other central and local executive bodies, information materials of opinion polls and etc.

In our opinion, the system of indicators can include the following components: population, labor market, health care, education, culture, tourism, information and communication services, social protection, housing and energy saving, environment (Table 2).

Table 2. System of indicators of territorial living conditions of the population at the level of communities: Ukrainian villages, settlements, cities namely

Components, Indicators, Units
I. Population
1.The number of available population and the average annual number 2. Average life expectancy at birth, years 3. The average age of the population 4. Total mortality rate per 1 thousand people of the current population 5. Number of live births per 1 thousand people of the current population, ppm
II. Labor market
1. Number of registered unemployed, total persons 2. Number of registered unemployed by occupational groups, persons 3. Number of vacancies, total, units 4. Number of vacancies by professional groups, units 5. The average number of full-time employees, persons 6. Accepted employees, persons / to the average number of full-time employees, interest 7. Workers and persons left; to the average number of full-time employees, percent 8. Average monthly salary of employees, persons / to the average level, interest
III. Healthcare
1. Number of hospitals, at the end of the year, units 2. Number of hospital beds, at the end of the year, units 3. Provision of the population with hospital beds per 10 thousand population, beds 4. Number of outpatient clinics, at the end of the year, units 5. Planned capacity of outpatient clinics, visits per shift 6. Provision of the population with outpatient care per 10 thousand population, visits per shift 7. Number of obstetric points, at the end of the year, units 8. Number of doctors of all specialties, at the end of the year, persons 9. Provision of the population with doctors per 10 thousand population, persons 10. Number of paramedics, at the end of the year, persons 11. Provision of the population with average medical staff per 10 thousand population, persons 12. Number of patients diagnosed with active tuberculosis for the first time in their lives per 100 thousand population, persons
IV. Education
Preschool educational institutions 1. Number of institutions, units 2. Number of places in institutions, places 3. Number of children in institutions, persons 4. Number of children in institutions per 100 places, persons 5. Coverage of children by institutions, interest **Secondary schools** 1. Number of institutions, units 2. Number of students in institutions, persons 3. Number of teachers in institutions, persons 4. Graduation of students from secondary schools, persons 5. Proportion of full-time general education institutions in rural areas that use computer equipment connected to the Internet in the educational process, percentage of the total number of such institutions

6. Proportion of school graduates of the reporting year with a certificate of complete general secondary education, percentage of the total number of persons admitted to the initial cycle of higher education institutions of III-IV level of accreditation
7. Proportion of children in rural areas for whom transportation to school and home is organized, percentage of the total number of students in need
8. Proportion of graduates of secondary schools who received 160 points and above according to the results of external independent assessment in Ukrainian language and literature, percent of the total number of students who took tests in Ukrainian language and literature
9. Proportion of graduates of secondary schools who received 160 points and above according to the results of external independent assessment in a foreign language, percent of the total number of students who took tests in a foreign language
10. Proportion of children covered by out-of-school education, percentage to the total number of school-aged children

Professional (vocational) educational institutions

1. Number of institutions, units
2. Number of students, persons
3. Students and individuals are accepted
4. Qualified employees, persons have been trained (released)

Universities

1. Number of institutions, units
2. Number of students, persons
3. Admitted students to higher education institutions, individuals
4. Trained specialists in higher education institutions, individuals

V. Culture, tourism, information and communication services

1. Number of club-type cultural institutions, units
2. Number of places in cultural institutions of club type, places
3. Number of public and universal libraries, units
4. Library fund of mass and universal libraries, copies, thousand / per 100 people
5. Number of collective accommodation establishments, units
6. Number of persons who were in collective accommodation establishments, persons
7. Number of places in hotels and similar establishments, places
8. Number of persons staying in hotels and similar accommodation establishments, persons
9. Number of beds (places) in specialized accommodation facilities, units
10. Number of persons who were in specialized accommodation establishments, persons
11. Number of children's health and recreation facilities, units
12. Number of children who were in children's health and recreation facilities, persons
13. Proportion of children who were in children's health and recreation facilities in the total number of children aged 7-16, percent
14. Number of tourists served by tour operators and travel agents of Ukraine, thousand people
15. Number of professional theaters, at the end of the year, units
16. Number of theater visits per year, thousand / per 100 people
17. Number of concert organizations, at the end of the year, units
18. Number of concert visits per year, thousand / per 100 people
19. Number of museums, at the end of the year, units
20. Number of visits to museums per year, thousand / per 100 people
21. Proportion of urban households that have Internet access at home, percentage of total number of such households
22. Proportion of rural households with Internet access, percentage of total such households

VI. Social protection

1. Number of pensioners by types of pensions, persons
2. Number of pensioners per 1,000 population, persons
3. The average amount of the assigned monthly pension, UAH / to the average level, interest

4. Number of persons with disabilities, in total, as of January 1, persons / including by disability groups (groups I, groups II, groups III, children under 18) 5. Number of persons with disabilities per 1,000 population, persons 6.Provision of subsidies to the population to reimburse the costs of housing and communal services - the number of households to which subsidies are allocated, units / total amount of assigned subsidies, thousand UAH 7. The level of coverage by social services of persons in difficult life circumstances, territorial centers of social services, the percentage of the total number of such persons 8. Number of orphans and children deprived of parental care, according to the primary registration per 10 thousand children, persons 9.The share of orphans and children deprived of parental care who are brought up in family forms of education in the total number of children in this category, the percentage 10.Number of criminal offenses committed against the life and health of a person per 10 thousand population, units
VII. Housing and energy saving
1. Growth rate (decrease) of the volume of commissioned housing, interest to the corresponding period of the previous year 2. The total area of the housing stock per capita, sq. meters 3. The level of implementation of energy-saving light sources in outdoor lighting of settlements, the percentage of the total number of light points 4. The share of equipping multi-apartment residential buildings with building heat meters, the percentage of the total number of apartment buildings to be equipped
VIII. Environment
1. Used fresh water, including for domestic and drinking needs, million m3 2. Discharged into surface water bodies, including polluted return waters, million m3 3. Capacity of treatment facilities, million m3 4. Emissions of pollutants into the atmosphere by stationary sources of pollution, t 5. Emissions of harmful substances per km2 of territory, t / per person, kg 6. The presence of waste in specially designated places or facilities, t 7. Proportion of waste disposed of in specially designated places or facilities or incinerated (without energy production), in the total amount of generated waste, percentage 8. Generation of waste of I-IV hazard classes, vol 9. Waste disposal, t 10.Share of settlements in which separate collection of solid household waste is introduced, in the total number of settlements, percent

Substantiation of the components of the system of indicators of assessment of territorial living conditions of the population at the level of communities (villages, settlements, cities) of Ukraine is based on the characteristics of their content and analysis of the achieved levels. The possibilities of the demographic component of the "Population" in providing potential living conditions for the population are primarily related to the total population, the dynamics of its change, gender and age structure, the parameters of population reproduction. The main indicators of this component determine the quantitative characteristics.

The component "Labor Market" includes indicators of employment and economic activity, unemployment and term of it, especially among young people, which limits the conditions for the realization of labor potential, accompanied by professional disqualification and devaluation of human capital, providing reliable and safe working conditions for all workers, persons with disabilities and temporary incapacity, by reducing the levels of occupational risks, creating decent working conditions and safe jobs. The main indicators of measuring the level of these risks are the number of victims of accidents at work, the share of workers employed in hazardous conditions, the level of severity of occupational injuries.

The level of providing the population with potential territorial living conditions is determined by the quality of the labor force, its educational and professional potential, and the possibility of access to quality educational services creates the conditions for its growth. The educational component in the system of determining and developing a system of indicators for assessing the territorial living conditions of the population at the community level is determined by indicators of labor force quality indicators; in particular, the share of people aged 14-35 with vocational education qualifications or trained in new professions. An important aspect is wages (average monthly wages in dollar terms at the NBU market rate; the level of social protection expenditures and the ratio of average monthly pensions with a living wage and average wages), the level of material well-being creates conditions for development and reproduction of social and social potential of communities, in turn, the formation of motivation to increase the solvency of the population is a factor in socio-economic growth.

Provision of the community with social infrastructure, access to medical, educational, cultural, tourist services are crucial for improving the quality of labor potential, maintaining efficiency, life expectancy, improving quality of life and territorial living conditions. Indicators of the component "Health care" include the capacity of outpatient clinics, the level of provision of doctors, paramedics and hospital beds, the incidence of socially related (tuberculosis, HIV, sexually transmitted diseases), disability, average the level of children's disabilities, which limit the opportunities for the formation of labor potential, which affects the level and opportunities to improve living conditions.

The components of "Education", "Culture, tourism and information and communication services" include indicators that assess the provision of children's preschools, secondary and higher education institutions of all levels, in particular, the percentage of children in preschools, the share of children enrolled in the population aged 7-22 years),

employment of children in extracurricular education; total expenditures on education (% of GDP), expenditures of households on education in the structure of their total expenditures, total expenditures per 1 pupil or student and the level of dissatisfaction with their education; total expenditures on education (% of GDP), expenditures of households on education in the structure of their total expenditures, total expenditures per 1 pupil or student and the level of dissatisfaction with their education; the level of education in universities of all levels of accreditation, vocational and general education institutions; the number of Internet users, the level of provision of printed publications, public and universal libraries, the number of visitors to cultural institutions, the level of sports, including among children under 17, the provision of tourism and recreation, etc.

The Social Protection component contains indicators that characterize the number of socially vulnerable groups, in particular, pensioners, the disabled, including children; the level of coverage of social services for people in difficult life circumstances, including orphans and children deprived of parental care, territorial centers of social services, etc.

Housing is characterized by indicators of the component "Housing and energy saving". The main indicators that determine the state of the environment of the component "Environment" include indicators of water supply and sewerage, air protection, generation and management of waste, which will improve the territorial living conditions of communities.

Assessment of territorial living conditions of the population at the level of communities (villages, settlements, cities) of Ukraine using a system of indicators will continue to improve methodological approaches to data collection, processing and analysis for quarterly and annual monitoring of socio-economic development of regions and communities, developing proposals on ways to address issues that hinder community development, ensuring effective cooperation between central and local executive bodies and local governments to overcome negative trends and address the most pressing socio-economic problems of communities, in particular, addressing issues related to further increasing employment of the population aged 15-70.

It is necessary to create conditions at the community level for a favorable economic environment for business development and job creation with decent wages; take measures to reduce the outflow of migrant workers abroad.

It is worth also mentioning that increasing the level of introduction of energy-saving light sources in outdoor lighting of settlements: expansion of inter-municipal cooperation in

the field of outdoor lighting of settlements; creating conditions for attracting investments, cheap international loans and / or grants for infrastructure development, introduction of modern methods and technologies in the field of outdoor lighting; conducting an information campaign to reduce electricity consumption, etc. (Ministry for Communities and Territories Development of Ukraine, 2020a; 2020b).

Conclusions

The study gives grounds to conclude that the method of assessing the territorial living conditions of the population at the level of amalgamated territorial communities (ATC) of villages, towns, cities of Ukraine, the system of indicators of living conditions at the local level, information support on consumer behavior of households implementation of social catastrophes and / or armed conflicts in countries will help assess the achievement of socially important Sustainable Development Goals (SDGs). The application of these methods of research and principles for assessing the territorial living conditions of the population at the level of communities (villages, towns, cities) of Ukraine as a factor influencing consumer behavior of households will help substantiate the theoretical and methodological foundations of socially oriented consumer behavior and development of territorial conditions population living, as well as the development of practical recommendations for improving both the territorial living conditions of the population and, in general, the standard of living of the population in Ukraine.

Further research should be focused on generalizing internal and external factors influencing and regulating consumer behavior of modern households as an important subject of economic relations, developing theoretical and methodological foundations for studying the impact of demographic factors on consumer behavior and its dynamics, justification of public policy measures to achieve Ukraine of European standards in the field of household consumption.

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Management of Innovative Energy Efficient Technologies in the Conditions of Sustainable Development

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ABSTRACT

Irreversible depletion of the world's hydrocarbon reserves, rising energy prices, environmental pollution problems – all this is forcing most developed countries to set their own energy strategies aimed at developing alternative energy. Thus, there is need to develop theoretical principles and practical recommendations for the formation of the concept of energy saving technology management in view of compliance with the conceptual principles of sustainable development, namely focusing on carbon-free energy technologies. The analysis and prospects of development of the state's energy platform on the basis of postulates of sustainable development are carried out. It is proved that the introduction of models for the development of energy efficient technologies "Energy Efficiency +" and "New Paradigm - Power Market" will allow Ukraine to make a technological breakthrough. The scientific and methodological approach to improving the management system of energy resources distribution in accordance with the requirements of alpha stakeholders, especially industrial enterprises, according to certain parameters at the stage of Industry 4.0 in the conditions of communication environment constraints energy saving.

Keywords*: sustainable development, energy efficient technologies, alternative energy, stakeholders.*

Introduction

It is proved that innovations in the energy field are priority for sustainable development at all levels of the economy. It is determined that the European Union is the initiator of the formation and implementation of innovative strategies for sustainable development, especially environmental responsibility. Environmental responsibility of companies and countries is aimed at sustainable management of natural resources, development of safe technologies in the energy sector, increasing the use of renewable energy sources and clean energy, nuclear and energy security.

Implementation of new engineering and design solutions in energy supply systems, which provide for the integrated use of energy from renewable sources, will solve an important economic and scientific-technical problem of reducing the consumption of traditional fuel and energy resources for Ukraine.

Optimization of existing energy systems will lead to a gradual increase in efficiency without significant investments in innovative technologies for energy production, transmission and distribution. Modernization of existing energy systems to the intellectual level involves the creation of a fully integrated system – from production, transmission to distribution and consumption of electricity and the introduction of new metering systems by individual consumers (Dileep 2020).

However, a set of issues related to determining the domestic specifics of the introduction of a modern model of energy-saving technologies, including the use of renewable energy sources, among economic agents needs in-depth analysis and methodological clarification. It is becoming increasingly difficult for energy companies to determine which set of communication tools is effective to build lasting relationships in the marketplace and achieve optimal impact on the consumer (Kappagantu and Daniel 2018).

The aim of the article is systematic study, critical assessment of theoretical principles and current practices of managing the implementation of energy-saving technologies, given the use of renewable energy conversion technologies to ensure sustainable development.

Methods

Theoretical and methodological basis of the article are modern theories, concepts, hypotheses. The following general and specific methods are used to ensure the reliability of the results and conclusions: dialectical, epistemological and logical, including terminological analysis – to study the conceptual and categorical apparatus and clarify the basics of management decisions; induction, deduction, scientific abstraction and generalization – to substantiate economic categories and definitions; monographic and comparative – to systematize scientific approaches to the specification of the theoretical foundations of expanding the methodological basis of management; methods of abstract-logical method – for the development of theoretical and methodological generalizations and formulation of conclusions based on research results.

Results

The results of the introduction of renewable energy technologies (i.e. solar energy, environmental heat, groundwater heat, etc.) are improving the environment, ensuring sustainable development of Ukraine, reducing risks from external energy supply, increasing the autonomy of energy supply to consumers. The prospects of this area are due to the fact that its results are relevant for several related fields of science: construction, industrial heating, agriculture, ecology. Only by taking into account the technical, technological, environmental and other aspects can the economic and scientific-technical problem of reducing the consumption of traditional fuel and energy resources be solved.

In modern conditions, the problem of rational use of energy resources is becoming increasingly important at all hierarchical levels: consumer (nanolevel); enterprises (microlevel); countries (macrolevel); world (megalevel). There is no doubt that the sustainable socio-economic development of any country largely depends on the growth of energy efficiency of the national economy.

Energy saving is a key factor in improving energy efficiency, economic efficiency and economic security of business, which is a necessary factor in sustainable development of society.

New 4th investment cycle is being launched today in the global energy sector, in which the following global trends will operate according to the International Energy Agency (IEA).

Components of the driver activation of the development model "Energy efficiency +" in the medium term: the dominance of centralized energy; development of threegeneration; development of dispersed generation; economically justified innovations; development of intelligent energy models in individual clusters (Smart Grid 1.0) (Gunduz and Das 2020).

Today, a new energy civilization has been formed and continues to develop in the leading countries, the main features of which are: energy efficiency; intelligent energy systems built according to the Smart Grid concept; decentralization of energy; new energy sources, etc.

The development of energy of the 4th investment cycle is implemented within the framework of such models (Fig. 1).

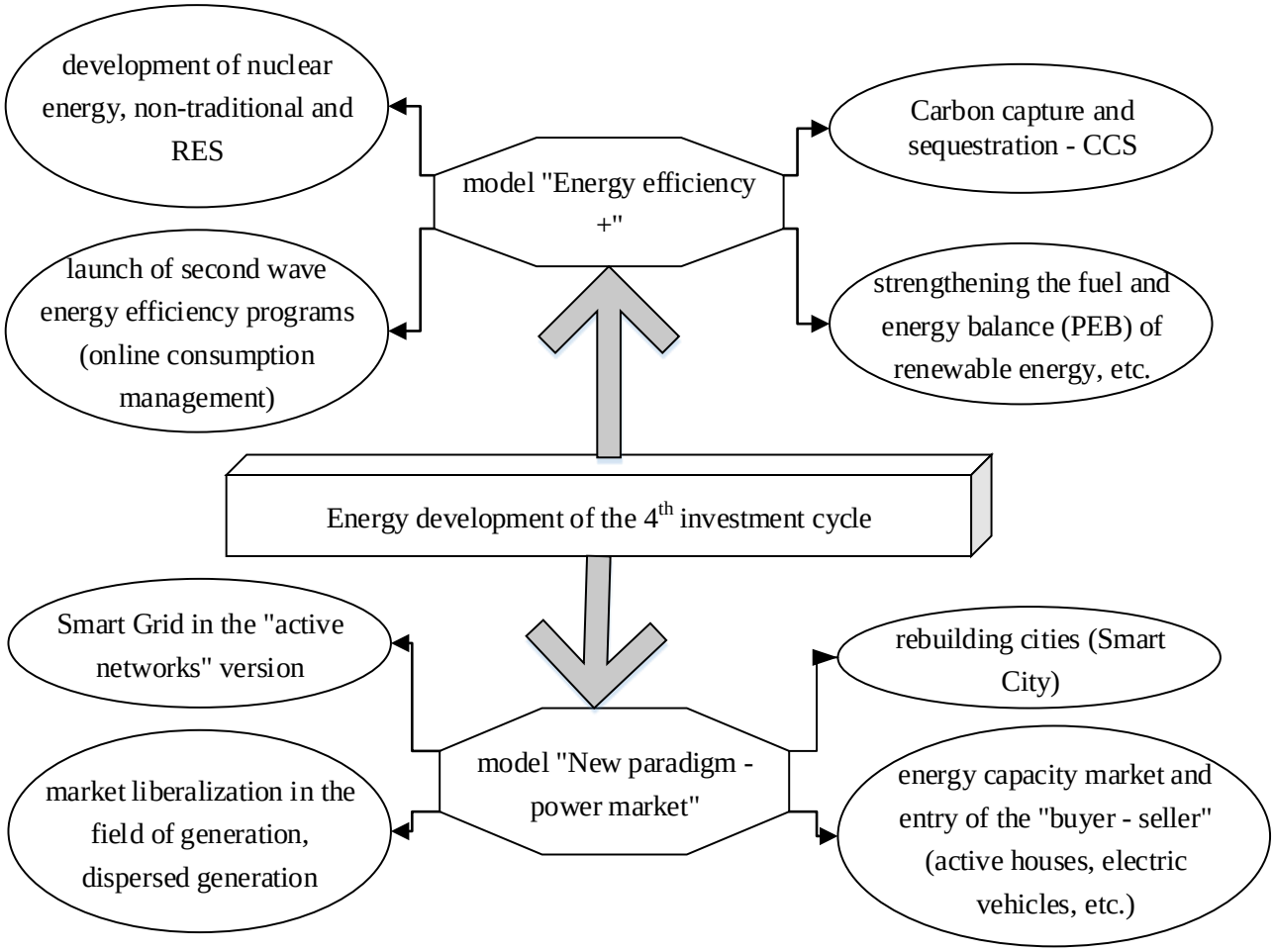

Fig. 1. Architectonics of formation of models of energy development of the 4th investment cycle

Source: Hilorme (2020)

Issues of energy savings due to rising energy prices, shortages, the need to import energy resources, their irrational consumption remain in the spotlight at the present stage of development of society. The negative factor is the high energy intensity of the Ukrainian economic system.

This especially concerns economy sectors, such as metallurgy, chemical industry, coal mining, technical equipment of communication devices of the housing and communal services sector, etc. Energy consumption of industrial companies does not meet the conditions of an energy efficient society (Kim and Huh 2018).

High costs of fuel and energy resources limit the competitiveness of national production, particularly in conditions of external energy dependence. A significant part of energy consumption does not allow companies to obtain the necessary values of profit, slows down development. As a result, the high share of expenditures on fuel and energy resources

in the production costs of companies does not increase the competitiveness of national products.

Fuel and energy resources of own production are not enough to meet the needs of industry and households in Ukraine, which requires the import of energy at a fairly high price. Assessing the prospects for energy development in Ukraine, it should be noted that it is advisable to introduce renewable energy sources as an alternative to outdated resource-intensive technologies for sustainable development.

Due to the depletion of non-renewable energy sources, their high cost and low efficiency in use, the harmful effects on the environment in the world are increasingly used by alternative and renewable energy sources. For the last years there has been a growing trend in the share of energy supply from renewable sources in Ukraine, which leads to the active development of technologies for the construction of devices for their conversion into heat and electricity. The implementation of such energy generation technologies contributes to the active development of the entire field of energy saving and energy efficiency.

Recently, technologies, technical solutions and equipment for active energy saving that use soil heat and solar energy, environmental heat, etc., ventilation systems that utilize waste heat and other secondary energy resources have come to the fore. In this direction the greatest potential for creating efficient energy-saving technologies and devices for the energy sector is concentrated. However, the mechanical connection of traditional architectural elements, such as solar panels, photovoltaic batteries, etc., which are already widely used in the world and are designed to use renewable energy sources, leads to insufficient implementation of the functionality of energy systems. Currently, a promising area of energy saving is a comprehensive simultaneous regulated production, conversion, redistribution and accumulation of energy (Ghasempour 2019).

A brilliant example of the technical implementation of such opportunities is the use of energy-active fences (EAF) (Nakashydze et. al 2019). This technical approach makes it possible to ensure a significant reduction in the energy intensity of the energy received and the stability of its generation. An important aspect of this approach is that it comprehensively takes into account: the impact of energy-intensive fencing and the peculiarities of their location on the architectural form of the building; thermal energy influence of natural climatic conditions on the shape, size and thermal balance of objects; the effect of heat load on the air conditioning system.

In this technical solution, the increase in energy efficiency is due to the fact that in the construction of energy-active fences it is important to analyze the climatic features. This is necessary to determine the possibility of meeting the energy needs of the facility through solar energy and the choice of appropriate orientation of energy-active fences (Tonkoshkur et. al 2021).

Also at increase of energy efficiency in this case the choice of a material from which constructive elements of an energy-active fence are made plays an essential role. The energy-absorbing panel of the energy-active fence must be made of materials whose mechanical, thermal and chemical properties meet the functional and operational requirements.

Liquid coolant in the energy supply system can be used as a working fluid during the operation of the energy-active fence. In this case, the energy-absorbing panel must be designed for pressure that corresponds to the allowable operating pressure in the solar circuit of the power supply system, and maintain strength and tightness in hydraulic tests at a pressure equal to twice the worker. In order to increase the energy saving level, the pipelines should be designed to ensure guaranteed filling with coolant without the formation of air cavities.

The level of energy efficiency is also conditioned by the fact that the outer translucent layer of thermal insulation of the energy-active fence is a single or multilayer glass or polymer coating. Therefore, it is important to have resistance to atmospheric and operational influences. The main criteria when choosing materials for the outer layer of multilayer translucent insulation of energy-active fence are: preservation of properties in the temperature range from minus 45 ^{0}C to plus 100 ^{0}C, and the inner layer – from minus 45 ^{0}C to plus 150 ^{0}C; the service life of translucent insulation must be at least 10 years (Chen et.al 2021).

In the technical solution of the energy generating device, the level of energy efficiency is determined by the design features of energy-active fence – the presence of the layer that prevents atmospheric moisture from entering the structure and protects from moisture condensing on its inner surface.

The increase in the level of energy efficiency of this technical solution is due to the fact that it is advisable to use the thermal energy of ventilation discharges in energy supply systems. To do this, the design of energy-efficient fencing provides for the installation of ventilated air layers. At the same time, the channels of the air coolant should be rationally located between the energy-absorbing and decorative-protective layers. Ducts must have cut-off elements that allow them to be forcibly closed with a height of not less than the height of the floor, but not more than 6 m. The minimum cross-sectional size of such ducts must be at

least 40 mm. It is advisable to cover one of the surfaces of the layer with aluminum foil or a coating with similar reflective properties to reduce heat loss due to re-radiation.

It is important that energy efficiency is increased due to the fact that in this technical solution it is possible to regulate the amount of absorbed solar energy. The air pumped by the ventilation duct washes the heat-receiving elements and heats up. Next, the air heated in this way enters the heat exchanger type "air – liquid" heat pump. To create a large area on the facade of the heat-absorbing surface, collector-air duct is used, which allows to connect separate modules of energy-active fences in parallel or in series.

Technically, the process of increasing energy efficiency proceeds to the fact that thermal insulation with a moisture-proof energy-reflecting layer and translucent thermal insulation form a ventilation duct. In the duct there is a heat-receiving element which is executed in the form of rotary blinds. On the one hand, the blinds have a surface that reflects sunlight well, on the other – a surface that absorbs it well.

There is also a version of energy-active fence, which is mounted directly on the insulated frame of the roof or facade when organizing the energy supply system. There is an increase in energy efficiency because in this embodiment, the design of air ducts and collectors of liquid circuit, supply/discharge. The energy supply system includes a heat pump and a seasonal heat accumulator, which uses energy from alternative sources – solar energy, soil and air heat (including ventilation emissions). In a complex with the heat pump of an energy-active fence allows to receive heat from air and in the absence of the sun (night, clouds), carrying out at the same time function of the chiller heat exchanger (Borowski 2021).

The effects of energy saving can be significantly enhanced if we implement integrated systems in the implementation of energy supply systems. Such systems should include energy-active fences that convert energy from alternative sources such as solar radiation, ambient heat, ventilation air heat, and so on. Energy-active fence is a building structure that performs the functions inherent in heating, hot water, and power supply systems, providing conversion, generation, and redistribution and storage of energy.

The effect of the implementation of integrated energy supply systems with energy-active fences is associated with the possibility of significantly reducing the number of fuel bases, restructuring the fuel supply infrastructure, transport network and energy distribution.

In the considered energy supply systems it is proposed to use not only energy-active fences, but also heat pumps, ground heat accumulators and energy from alternative sources, such as solar energy, geothermal energy, bioenergy, etc. The implementation of the presented

technical solutions will lead to a significant financial cost to a significant effect of energy saving, will improve the environment, reduce dependence on the use of organic energy. The above approach to the construction and design options for energy-active fences can be used to improve the energy efficiency of buildings. They do not reflect all the possible variety of technical solutions. The advantages of using innovative energy supply systems with energy-active fences are demonstrated by the example of a 9-floor typical building. Preliminary calculations show that passive thermal modernization of the building will reduce heat loss in the cold season by an average 1.5 times. But thermal modernization with the use of energy-active fences as alternative source that uses energy, can reduce energy consumption by an average of 3.5 times during the cold season.

In the warm period of the year, the use of innovative energy supply system with energy-active fences can reduce the load on the air conditioning system by 3 times, and energy from renewable sources can be used to replace energy consumption for hot water, and its excess – for storage in seasonal heating. This allows us to talk about the payback of such systems in 5-7 years. "Progressive results" means focusing on samples (countries, companies) with the highest energy efficiency. This is possible by comparing these indicators with estimates of the best and most advanced technologies (Best-in-Class) in the research area based on determining the distance between the research result and the efficiency limit.

Thus, the following energy efficiency categories can be identified based on the Best-in-Class methodology and the attributive approach in order to realize the potential (Fig. 2).

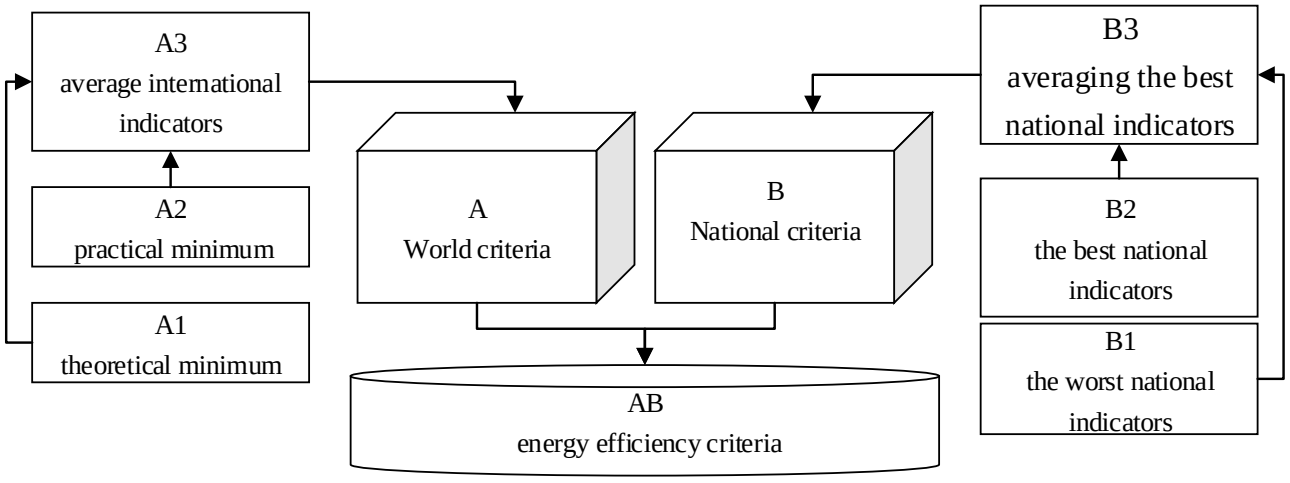

Fig. 2. Defining energy efficiency criteria based on the Best-in-Class methodology in order to realize the potential

Source: Hilorme (2020)

AB as a set of energy efficiency criteria is a general set of global criteria *(A)* and national *(B)*: $AB = A\Delta B$. It should be noted that in order to ensure the competitiveness of national enterprises in world markets on the basis of energy saving, national criteria should be closer to the world: the covariate functor reflects the function $f : B \to A$. Each block of subsets *A* and *B* is a boulevard of local indicators: respectively, $2^A = \{A1, A2\}$; $2^B = \{B1, B2\}$. A subset of the second type with respect to the induction assumption, 2^A or 2^B, a subset of the first type defines a subset of this type obtained from some single subset of the second type by adding an element a_0, therefore: $2^A = A1 \cup A2$ та $A1 \cap A2 = \otimes$.

Each of the minima is a minimum criterion of energy efficiency. Thus, if we define the criteria of technological equipment as a technological basis for energy efficiency of the enterprise, we can characterize this minimum: *A1* "Theoretical minimum" is the specific energy consumption required to perform certain work or conversion of materials in accordance with the laws of electromechanics and thermodynamics; *A2* "Practical minimum" – the best in the world practice of specific energy consumption when using on a commercial basis technologies that have a certain efficiency.

Of all the technically feasible energy efficiency measures, only few are economically efficient and economically attractive over a period of time. To determine the best way to achieve savings from investing in energy efficiency projects, it is important to distinguish economically reasonable and financially attractive projects. The difference between economically reasonable investments and financially attractive investments is explained by the different discount rates between public and private investments, the indirect impact of energy savings and the impact of external factors. Decomposition analysis can be used to study the influence of factors influencing the energy intensity of GDP (Table 1). This method recommends that the International Energy Agency (IEA) be involved in the practice of enterprises (Al-Turjman and Abujubbeh 2019).

Table 1. Logical and structural model of the influence of factors that cause changes in the volume of final energy consumption

Level	Factors	Economic sector		
		Industry	Household	Transport
1	"Activity"	added value of the total output of goods (value-added output)	number of people	passenger traffic or cargo transportation volume

2	"Structure"	share of output of different types of products	number of square meters per person	passenger traffic or cargo transportation volume
3	"Efficiency"	the amount of energy used per unit of activity in each of the final energy consumption sectors		

Source: Hilorme (2020)

The considered decomposition analysis is used for in-depth analysis of energy efficiency and requires additional initial data. In order to overcome this shortcoming of the considered methodology, it is necessary to determine the aggregate energy efficiency, which consists of individual indicators: energy intensity, electricity intensity and fuel intensity of GDP (Nakashidze et. al 2020).

The indicator of energy intensity of GDP reflects the trends of economic development at the macro level from the standpoint of energy consumption with the definition of the appropriate type of economic activity: intensive (energy saving) or extensive (energy consuming). Energy efficient societies can successfully solve the problem of efficient provision of energy resources for the socio-economic development of the country. At the same time, appropriate measures are used in the state regulatory policy in order to increase the influence of energy stimulating factors on the vector of social development based on the optimization of energy consumption (Dranka and Ferreira 2020).

In the 21st century, the problem of increasing the efficient use of energy resources can be solved only by introducing the latest energy-efficient technologies and equipment that meet the appropriate level of scientific and technological progress. Unfortunately, only some sectors of the economy are gradually entering the era of Industry 4.0 in Ukraine. At the same time, developed countries have begun to discuss the peculiarities of the entry of national economies already in Industry 5.0. Today, business efforts should be focused on innovative development, especially in overcoming technical and technological backwardness. According to the attributive approach, innovative change of the system is possible only with radical changes in its functional properties (attributes) (Żywiołek et.al 2022). In the table Table 2 shows the comparative characteristics of the change in the attributes of energy systems in accordance with the technological structures of Industry 3.0 and Industry 4.0.

Table 2. Comparative characteristics of the attributes of energy systems in accordance with the technological structures of Industry 3.0 and Industry 4.0

Systems attributive feature	Technological way	
	Industry 3.0	**Industry 4.0**
Price level information for the final consumer	Unavailable or too late	Displayed in real time
Power flow control	Limited	General management
System generation	Centralized	Distributed
Equipment inspection	In place	Remote monitoring
Communication between elements	One-sided or complete absence	Bilateral
Topology	Radial prevails	Network prevails
Reaction	On the consequences of the accident	Anticipation and prevention (prevention) of accidents
Duration of work	Until complete failure (breakdown)	Continuous monitoring, self-diagnosis
Restore network operation	Manual	Automatic
The level of system accidents	High	Low
Disconnection from the network	Manual, fixed	Adaptive

Source: Hilorme (2020)

Analysis of changes in the attributes of the energy system, built on the principles of Industry 4.0, has significant advantages: controllability, economy and efficiency. This will significantly increase energy efficiency and provide the expected benefits for all stakeholders. The implementation of key requirements based on a basic approach can be guaranteed by combining traditional development with the creation of new attributes of its key element, the energy system.

A necessary condition for the development of "Smart Grid" is the formation of a strategic vision of tasks that must meet the requirements of stakeholders. The following stakeholder groups can be distinguished: companies, end users and the state (Fig. 3).

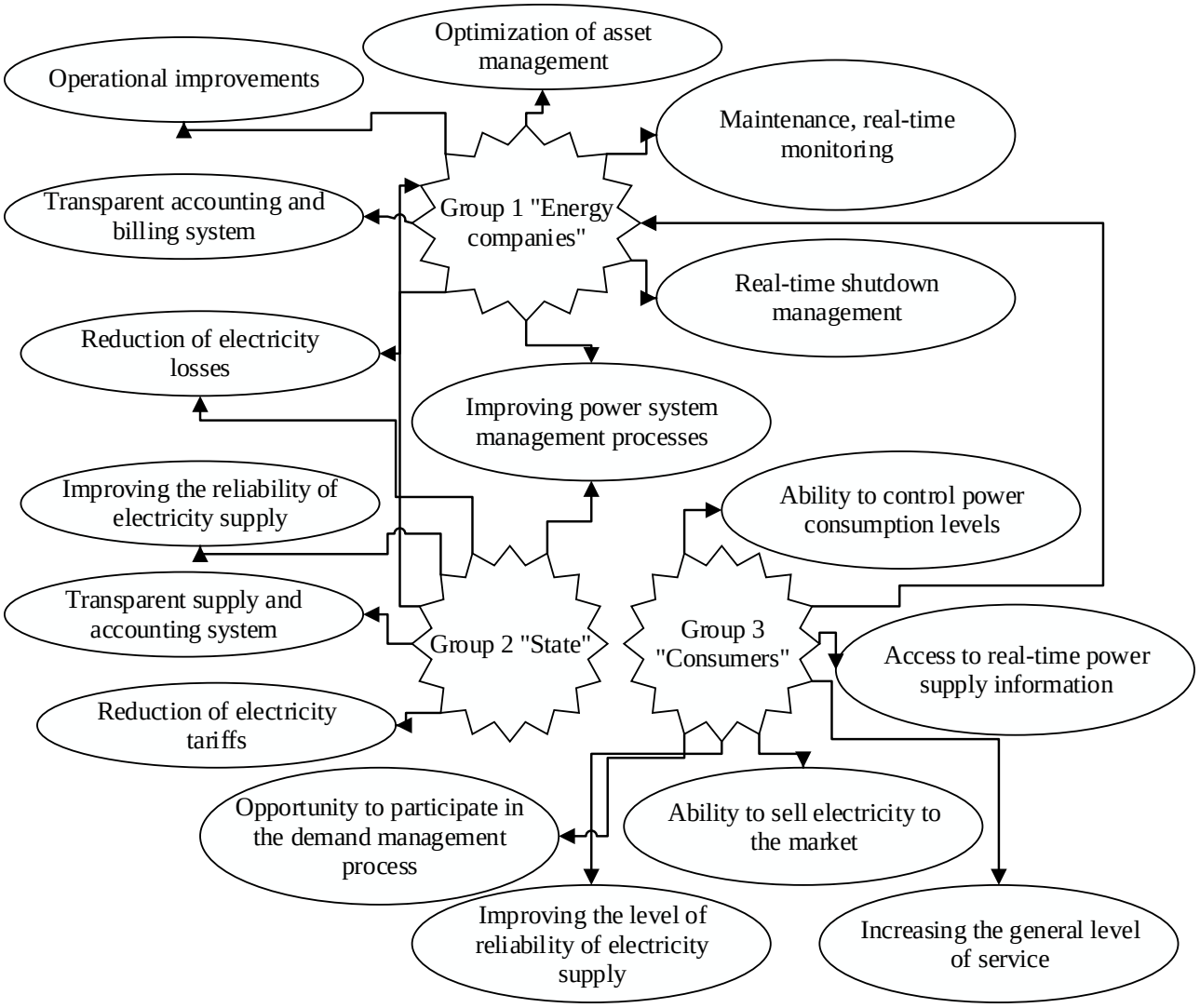

Fig. 3. Requirements of 3 groups of stakeholders (energy companies, state, population) for the implementation of the concept of "Smart Grid" in energy

Source: Hilorme (2020)

Of course, these groups can be supplemented by other stakeholders, such as investors. For each country, stakeholders have an individual character, which is determined by the factors of the national economy.

Thus, for Ukraine, Group 1 "Energy Companies" includes stakeholders: wholesale sellers of electricity, capacity; retailers of energy services; transmission companies; distribution network companies.

Group 2 "State" includes the following stakeholders: government regulators; wholesale electricity market operator; reliability regulators. Group 2 "Consumers" includes the following stakeholders: enterprises, institutions, organizations; people.

It is necessary to note the following features of the requirements of the considered groups of stakeholders. Firstly, group 2 "Government" and group 3 "Consumers" in addition to the requirements for the state of the country's energy system have the corresponding requirements/expected effects to group 1 "Energy companies".

This is due to the fact that energy companies provide energy services to other groups of stakeholders. Secondly, Group 1 and Group 2 have the following common requirements/expected effects: reduction of electricity losses and improvement of energy management processes.

The reduction of electricity losses forms the expected profits of energy companies, and for the state this parameter allows to build an energy-efficient society. And the improvement of energy management processes satisfies the condition for the development of energy systems from the standpoint of these groups of stakeholders. Thirdly, the requirement "Opportunity to sell electricity on the market" applies only to the population as a subgroup of final consumers.

The formation of an energy-efficient society makes it possible to solve the problem of efficient energy supply successfully at all levels of the economy: national - promotes socio-economic development of society; microlevels – contributes to the successful innovative development of business. Therefore, it is necessary to develop appropriate Energy Efficiency Standards at each level, which will allow to identify landmarks and vectors of development based on the concept of resource conservation, in particular, energy conservation. Thus, the development of Energy Efficiency Standards of Ukrainian society will help determine the impact of relevant factors (especially energy costs) on GDP and achieve a high quality of life (life, work, leisure, etc.).

Appropriate measures can be applied to manage the process of achieving energy efficiency. Six groups were separated: financial renewal; pricing mechanisms; financial measures and tax incentives; commercial development and capacity building; technological development; mechanisms of regulation and control.

The potential for improving energy efficiency should be considered as a promising market that should stimulate Ukraine's technological development in the field of energy saving and energy efficiency. The presence of significant energy-saving potential in Ukrainian economy is an opportunity for modernization and development of innovations. At the same time, it is important to avoid attracting outdated foreign energy-saving technologies to the Ukrainian market.

Increased energy consumption because of increased energy efficiency is Jevons' paradox. Reducing resource efficiency reduces the cost of a resource and increases its demand and consumption by measuring its usefulness (Sun et.al 2021). Jevons' paradox is the claim that technological advances can increase energy consumption by increasing resource efficiency.

The opposite effect is determined as a percentage of the energy consumption decrease, which is projected to be lost with increasing energy consumption. The Jevons' paradox arises when the adverse effect reaches a value of more than 100% and exaggerates the initial savings by increasing efficiency. At the macrolevel, technological advances that improve energy efficiency tend to increase overall energy consumption. Therefore, energy consumption can be reduced with or without energy efficiency, and energy consumption can increase simultaneously with energy efficiency.

The implementation of energy efficient technologies does not always lead to reduction in energy consumption because of the opposite effect. The relative reduction of energy prices by increasing energy efficiency stimulates an increase in energy consumption (direct adverse effect).

Energy saving measures will reduce the amount of energy used per unit of products, works and services and increase energy consumption. However, scientists believe that at the microlevel, the increase in energy consumption because of adverse effects is less due to the initial decline in energy consumption caused by the introduction of energy efficient technologies. At the corporate level, increasing energy efficiency leads to a reduction in overall energy consumption, even if we take into account the purchase of additional energy resources from the released funds, the opposite effect is 100%.

However, more detailed studies of energy efficiency processes show that the adverse effects of energy efficiency measures occur at both the macro and micro levels. Cheap energy resources and reduced energy consumption do not hinder or stimulate the increase in overall energy consumption.

But even with the adverse effects of energy efficiency, there are many benefits for the company, especially in terms of technological and economic development. It should be noted that the opposite effect is not evidence of energy shortcomings, and the Jevons' paradox does not lead to futile efforts to save energy.

Small increase in energy efficiency does not allow business to increase energy consumption. Only in the presence of high energy efficiency energy consumption can be significantly increased. Therefore, we can assume that the greater the adverse effect, the more justified is the reduction of specific energy consumption, i.e increase energy efficiency. The presence of adverse effects on the activities of economic agents is an indicator of energy savings. A higher level of adverse effects is possible only if energy efficiency is improved, production is expanded, and the corporation is improved.

Improving energy efficiency can lead to significant benefits for business: development, increased end results and increased competitiveness.

The energy efficiency increase at the present stage of STP is mainly the result of the implementation of innovative energy saving technologies, particularly, the use of alternative energy sources. At the same time, in the presence of energy saving, the total consumption of energy resources may decrease, but sometimes increase due to the opposite effect.

In order to reduce energy imports and the environmental impact on the country, companies need to reduce energy consumption and the share of non-renewable energy consumption. Companies should be able to carry out the planned volumes of their activities with the least possible use of energy resources. In these conditions, the question of the need to avoid the opposite effect – the consumption of energy resources depending on changes in production. When analyzing the transformation of scientific approaches to determining the content of energy saving and energy efficiency in enterprises at the four stages of development of the concept of energy saving, certain features of enterprise development are separated taking into account this concept. It is necessary to consider in more detail the development of the energy platform as a basis for enterprise management based on the concept of energy saving. At the same time take into account the trends of the current stage of development of energy efficient societies, especially the concept of "Smart Grid".

Conclusions

Four stages of formation of the energy saving concept as a global trend in the historical concept are identified. The architectonics of formation of models of energy development of the fourth investment cycle as interrelation of two models of development of energy efficient technologies is defined: "Energy efficiency +" and "New paradigm - power market".

The directions of implementation of these models as ensuring sustainable socio-economic development at all hierarchical levels of the economy are clarified: consumer

(nanolevel); enterprises (microlevel); countries (macrolevel); world (megalevel). It is proved that the components of activating the driver of the development model of "Energy Efficiency +" are: the dominance of centralized energy; development of trigeneration; development of dispersed generation; economically justified innovations; development of intelligent energy models in individual clusters (Smart Grid 1.0).

An understanding of the energy efficiency criterion based on the Best-in-Class methodology and the attributive approach in order to realize the potential is offered. Based on decomposition analysis, a logical-structural model of the impact of factors causing changes in final energy consumption in three sectors of the national economy (industry, household, transport), and identified hierarchical levels of three factors: activity, structure, efficiency. It is established that the aggregate energy efficiency indicator consists of individual indicators: energy intensity, electricity intensity and fuel intensity of GDP.

The driving forces of energy efficient society development are systematized as a set of four categories: economic development and competitiveness; energy security; climate change; public health. This made it possible to develop a system of energy efficiency policy measures (financial renewal, financial measures and tax incentives, technological development, commercial development and capacity building, regulatory and control mechanisms) and their respective implementation tools. The defined methods of energy saving and energy efficiency assessment, scientific paradoxes, postulates and plots allowed to build a semantic system of transformation of scientific approaches to determining the content of energy saving and energy efficiency.

Prospects for further research are to determine the effectiveness of Smart Grid 1.0 technology in the implementation of projects on energy-saving technologies based on renewable energy sources.

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The Interpretation of the Fiscal Policy Eco-Consciousness Index

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ABSTRACT

Current trends in society are increasingly encouraging both government and business policies to help achieve the 17 goals of sustainable development, formed by the Brundtland Commission within the concept of "sustainability". These goals provide for a balanced and comprehensive solution to economic, social, and environmental issues. In this regard, it is suggested to consider the "fiscal policy eco-consciousness index" which reflects how tax and budget policies contribute to the three pillars of sustainable development – economic growth, social development, and environmental protection. It is envisaged that this index comprehensively assesses such components as the tax system, tax control and administration, and the system of financial resources distribution by budget levels and types of expenditures. It is established that each of these components has its own function in the process of ensuring the implementation of all components of sustainable development. It is also emphasized that the effectiveness of the regulatory function of the tax system and the preventive function of the tax control and administration system is significantly influenced by the characteristics of individual and social consciousness (set of values, goals, and behavior), including their attitude to the current tax system, tax authorities and the principles and objectives of sustainable development.

Keywords*: fiscal policy, eco-consciousness index, sustainable development, tax rates, government revenues and expenditures.*

Introduction

During the years of the XXI century, and in particular the months of 2022, the key principles of the life of each person and its foundations have changed greatly, and new ideas, new requirements, and new challenges facing humanity are announced. One such challenge for several decades has been to achieve the goals of sustainable development. The concept of sustainability implies the achievement of such conditions of development, which meet the current needs of society without significant harm to future generations. Accordingly, such an issue should be addressed comprehensively at the state level, which means that all policies should be aimed at achieving the goals of sustainable development.

The fiscal policy of each country is constantly changing, but new challenges for humanity require its serious transformation as a key security system for the functioning of each country. The fiscal policy has a lot of ways to impact sustainable development, which manifests mainly in the form of the impact of government tax and expenditure decisions on incentives to work, spend, save and invest (International Monetary Fund, Fiscal Affairs Dept., 2002).

The concept of "sustainable finance" has even appeared in the economic literature. But achieving sustainability is only possible if all three key and interconnected areas of human life – economic, social, and environmental – develop together, comprehensively and in a balanced way (Ziolo & Bruno, 2019). The direction, pace, and nature of the development of each of these three areas are largely determined by state policy, in particular fiscal policy. Therefore, in order to achieve comprehensive and balanced development of economic, social, and environmental spheres, it is essential at the stage of formation of managerial and political decisions to evaluate them in terms of compliance with the principles of sustainability.

But the direction of fiscal policy and how effectively it will be implemented, as well as the direct nature of social and economic processes in society directly depends on the actions, conceptions and plans, goals, and values of the individuals. Therefore, considering sustainable fiscal policy, the question of researching the concept of its eco-consciousness as a comprehensive reflection of the orientation of social behavior to the principles of sustainability becomes relevant.

Methods

This study of the fiscal policy eco-consciousness is based on a deep and meaningful study of scientific literature, which has a theoretical and practical direction of research. The results of analysis of previous publications have shown that there is a lot of research works on fiscal policy to ensure long-term growth (International Monetary Fund, Fiscal Affairs Dept., 2002; Moreno-Dodson, 2013), or to or stimulate the fight against social inequality and poverty (Martínez-Aguilar et al., 2017; Booth & Coles, 2007), or to promote environmental protection, or green fiscal policy (Petrie, 2021), or, for example, through the prism of the budget policy (Brandner et al., 2001), or the debt policy (Novo-Corti & Picatoste, 2017). However, Magdalena Ziolo, and Bruno S. Sergi (2019) argue that the concept of "sustainable" is compatible with fiscal policy only if it is aimed at ensuring integral sustainability, which can represent a balanced social, economic and environmental development (Ziolo & Sergi, 2019).

Analysis of many studies on the impact of cultural and behavioral aspects on tax processes has shown the need to take these factors into account when analyzing the direction of fiscal policy to achieve sustainable development goals.

Eugster and Parchet (2019) argue that beliefs and preferences shared by individuals affect economic outcomes and institutions, therefore the territory with different cultures

are therefore expected to choose different tax policies and levels of redistribution. The researchers find that culture-specific preferences are reflected in statistically significant differences in tax levels. Vehovar, Mumel, and Hauptman, (2018) created the conceptual model of the relationship between personal values and personal tax culture regarding the perception of tax system fairness.

Güneş and Polat (2016), Ivanyna, Moumouras, and Rangazas (2016) proved that the level of democratic development of society, democratic freedoms, and established ethical norms (such as attitudes towards corruption) significantly affect the results of fiscal policy, economic growth and the level of latency of the country's economy. Charles et al. (2013) add that the institutional, demographic, and attitudinal factors of influence determine the level of development of fiscal relationships and in particular the propensity of taxpayers to violate tax laws. As a result of the analysis of research works in the field of psychology and taking into account the main current trends in society, the need to apply the concept of "eco-consciousness" to fiscal policy the content and principles of which correspond to the dogmas of the concept of sustainability was identified.

Thus, it should be noted that the issue of assessing the focus of fiscal policy on the integrated implementation of all components of sustainable development – economic growth, social development, and environmental protection – has not been fully explored. It is also necessary to identify the main components of fiscal policy that ensure the achievement of the three pillars of sustainable development, and the factors that determine the impact on them.

Given the fact that the nature of fiscal policy in relation to sustainable development may change from period to period, and in order to monitor these changes in policymaking, assessing the focus of fiscal policy on the integrated implementation of all components of sustainable development should be formalized in a certain integrated indicator. In this regard, the issue of introducing the concept of the "fiscal policy eco-consciousness" and defining the components of this concept is especially relevant, which led to this study.

Results

The key center of the functioning of any socio-economic system is a human who is the bearer of consciousness. In turn, consciousness is a special formation that is formed in a person during socio-historical development as a result of his or her work. Human consciousness performs several functions: 1) *cognitive function* (analysis and assessment of the environment, and the surroundings), which is manifested in the accumulation, processing, and use of information (information and knowledge obtained as a result of life, both individual and all previous generations) about the surrounding reality; 2) *regulatory function*, which is manifested in the control of his or her behavior and emotional manifestations, as well as the evaluation of other people's activities through the prism of his or her beliefs and needs; 3) *prognostic function*, which consists in planning the future and/or future life, setting goals based on his or her material and spiritual needs; 4) *reflexive function*, which is manifested in the very process of thinking, reasoning, doubt, faith, knowledge, desire; 5) *communicative function*, which consists in organizing and supporting communication with other people. Thus, human consciousness depends not only on biological factors (gender, age, nationality, physical well-being, etc.), but also on communication with people, through the acquisition of skills, and substantive actions. Therefore, in a narrower sense, human consciousness can be interpreted as a function of the brain, which is expressed in purposeful and generalized reflection of the objective reality, in the preliminary construction of actions in the mind, and in predicting the results, as well as manifests itself in rational management and self-control (Cherusheva et al., 2012). With the help of consciousness and the interaction of its constituent structures, a person analyzes the information received from the outside, evaluates it, and processes this information to make various decisions in the process of life, including economic decisions.

In the scientific literature (Tart, 1975; Vasilyev, 2009; Morozov, 2013; Priest, 2000) they distinguish such forms of consciousness as public and individual. Public consciousness is a set of knowledge, ideas, and views, theories that are inherent in a particular society or all of humanity at a certain stage of its development or at the time of its transformation into progressive development (Morozov, 2013). In turn, public consciousness can take various forms, which can be divided into two groups: 1) *regulation of human relations*: political consciousness – a set of political views, concepts, doctrines, and programs; law – a set of norms and rules of conduct of people approved by the state; morality – a set of norms of behavior established by society at a particular stage of its development; 2) *science, art,*

philosophy, religion – forms of spiritual and spiritual-practical perception of the environment that surrounds a person.

Individual consciousness is a set of knowledge, ideas, and views of the person (Morozov, 2013). Individual consciousness has many forms of manifestation: 1) in the field of cognitive processes (self-analysis, self-observation, self-evaluation, self-criticism, etc.); 2) in the emotional sphere (self-confidence, self-praise, insolence, modesty, conscience, sense of duty, etc.); 3) from the volitional point of view (self-control, restraint, self-control, independence, initiative, self-discipline, etc.). Due to the presence of an individual form of consciousness a person can set goals dictated not only by instincts and physiological needs, but also goals formed through individual, abstract thinking based on social, scientific, and everyday knowledge.

Both forms of consciousness, social and individual, affect each other throughout their existence but are not reduced to each other. They, first, differ from each other in bearer, role, way of existence, time frame, degree of generalization, etc. And secondly, public consciousness is not the sum of individual consciousnesses, and not every individual consciousness absorbs public consciousness. It should be noted, that as a result of such interaction there is a development of both public and individual consciousness of all people. For example, in the process of learning, obtaining new information, as well as as a result of human interaction with other people and society the transformation of individual consciousness takes place. But depending on what information a person chooses and with what people he or she interacts, this transformation can lead to degradation (borrowing negative patterns of behavior and thinking) or, conversely, to the development of his or her consciousness (for example, borrowing socially responsible patterns of behavior and thinking).

Since 1987, when the Brundtland Commission (Brundtland; United Nations – WCED (World Commission on Environment Development) stated the concept of "sustainability" as a global issue (Ziolo & Sergi, 2019), significant changes began in the public consciousness, which was reflected in the changing views of society on the key tasks of its functioning. However, this new concept provided that the economic, environmental, and social spheres ("three pillars of sustainability") "…as linked spaces that must advance together and be balanced in order to achieve sustainability, which is only possible by complying with these premises" (Ziolo & Sergi, 2019). Accordingly, the part of public consciousness that is responsible for regulating human behavior and relationships – politics, law, morality – has

been transformed in accordance with this concept. In other words, there is a need to reconsider one or another political decision, changes in legislation, tax and budget policies to ensure compliance with the main objectives of sustainable development. So, in the scientific literature the concept of "sustainable fiscal policy" appeared.

It should be noted that the concept of "environmental friendliness" began to be applied not only to the environment, but environmental thinking or socially responsible attitude also began to characterize the relevant ideas or actions in the social and/or economic sphere. In this regard, we consider it necessary to introduce the concept of "environmental friendliness" in the field of fiscal policy as a set of ideas, views, and theories that, on the one hand, have a significant impact on social, economic, and environmental processes and, on the other hand, is the result of the development of socio-economic relationships within a country.

The fiscal policy is one of the main supporting systems for the functioning of each country and is one of the important forms of government regulation of socio-economic processes. At the same time, through the reallocation of financial resources, the fiscal policy impacts the economic growth and the process of stabilization of the economy, the social equity, and the environmental protection, and balances the interests of the state and society, and in this way, it has a long-term effect on the context of creating conditions for sustainable development (Sushkova et al**.,** 2021). Therefore, it can be argued that the strategic direction of sustainable development of the country depends on the parameters of fiscal policy, its instruments and their focus on solving economic, social and environmental issues.

The fiscal policy combines two components – budget revenue policy and budget expenditure policy. At the same time, given the fact that on average 70% of the revenue side of the budget of any country in the world is tax revenue, revenue policy can be reduced mainly to tax policy and its instruments (types of taxes and mandatory payments, tax rates , tax benefits or simplifications, tax administration, tax control, etc.). Revenue policy and expenditure policy are interdependent components of fiscal policy. Thus, state revenue policy, using taxes and fees, and mandatory payments to the budget (e.g. state duty) to tax the economic, social, and ecological spheres, determines the parameters and scope of expenditure policy, and its financial potential. Instead, state expenditure policy, using financing of state programs for small and medium business development, infrastructure improvement, innovative development, education, and health care systems, social protection and security, spiritual and physical development, or environmental protection, determines the degree of development of the ecological-social-economic system, and accordingly, the volume of the

tax base or tax potential of the country (Fig. 1). But in general, this scheme describes the role of fiscal policy in ensuring sustainable development.

Based on the idea that the central link of any ecological-socio-economic system is human, and also given that the level of development of the ecological-socio-economic system and any state policy (tax or expenditure) is the result of purposeful human activity, we propose to introduce the concept of "eco-consciousness" about fiscal policy. This concept aims at the existence of such public and individual consciousness, the complex existence of which is reflected in the degree of orientation of fiscal policy to support and comprehensive implementation of all three pillars of the concept of sustainable development (economic development, social development, and environmental protection).

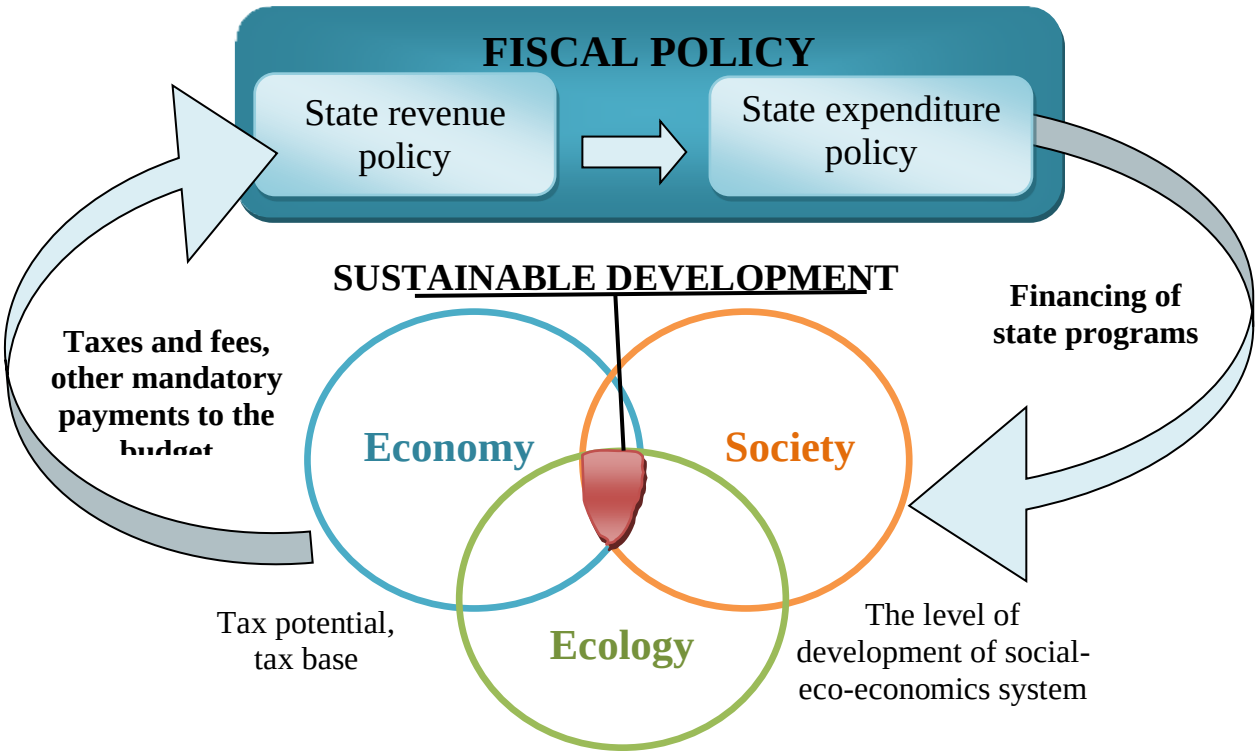

Fig. 1. Components of Sustainable Fiscal Policy and their relationships

Source: prepared by the author with (Novo-Corti & Picatoste, 2017)

As mentioned above, the scientific economic literature considers mainly such instruments of fiscal policy that influence sustainable development as the tax system and governments' spending decisions, and in particular, how they affect incentives to work, spend, invest, and save (International Monetary Fund, Fiscal Affairs Dept., 2002). However, in our opinion, in addition to the application of the tax system and budget expenditures, it is also necessary to consider such levers of influence as the system of tax control and tax

administration, which is designed to ensure control over the implementation of the principles and rules on which the tax system is built, and the system of redistribution of financial resources between different levels of the country's budget. Research by the International Monetary Fund confirms this view, arguing that effective institutions are very important not only in the context of implementing fiscal policy itself but also in helping to address environmental and social issues (International Monetary Fund, Fiscal Affairs Dept., 2002).

Therefore, we propose to consider the following components of the fiscal policy eco-consciousness and their functions in the process of ensuring the achievement of the three pillars of sustainable development:

1. Tax rates. One of the most powerful tools for the impact of fiscal policy on economic growth, social development, and environmental protection is the system of taxes and their interconnectedness, the size of their rates, and the provided tax exemptions (tax benefits). This tool forms the framework in which the economic and entrepreneurial activity of business entities and the population, and their interaction with public authorities. How balanced and considered is the impact of fiscal policy on economic, social, and environmental processes, and in general, contributes to sustainable development depends on the combination of tax elements (parameters of the tax system) that form the tax system of a country and from the combination and proportion of different types of taxes in the system (income taxes, taxes on business activities, property taxes, social taxes, environmental or green taxes, etc.).

As an example, where tax or levy rates are an effective tool for achieving sustainable development goals, there is Ukraine's experience with the military levy. The 16th goal of sustainable development "Peace, justice and strong institution" promote that "…people everywhere should be free of fear from all forms of violence and feel safe as they go about their lives whatever their ethnicity, faith or sexual orientation. High levels of armed violence and insecurity have a destructive impact on a country's development" (United Nations, Goal 16). Thus, starting from August 3, 2014, after the annexation of Crimea and the military invasion of the eastern regions of Ukraine, Ukraine introduced a military tax of 1.5% of the income of individuals (employees, businesses, self-employed persons – residents and nonresidents) and certain individual transactions for the benefit of individuals. The military service is targeted, but the revenues from the military levy are credited not to a separate trust fund, but to the State Budget of Ukraine and spent on financing the reform of the Armed Forces of Ukraine. Thus according to the results of eight years Ukraine was able to improve its military potential, to update and modernize military equipment.

However, it should be noted that by their nature, none of the taxes or any of the groups of taxes (for example, environmental or social) has a narrowly focused impact (for example, only on social or only on environmental processes), one type of tax may affect several or all components of sustainable development at the same time. For example, in Ukraine, the social insurance tax (as of January 1, 2022 – 22% of the salary fund of employees, or income of individuals – entrepreneurs, or income from contracts civil) belongs to the group of social taxes, but in addition to the formation of a fund to finance pensions, or health insurance for the population, or social protection of vulnerable groups of the population, this tax has a significant impact on economic processes because it is an important component of the price of all goods, products and services. Thus, it can be argued that the statutory tax system (types of taxes, their proportions and combinations, tax rates, benefits, etc.) performs a regulatory function regarding the formation of eco-consciousness in the field of fiscal relationships. This means that when formulating any political decision to reform, change or update the tax system, it is necessary to take into account and comprehensively analyze its regulatory impact on the economic, social, and environmental processes (the three pillars of sustainable development), and the process of implementing the financial support of expenditure policy as well. If the results of such an analysis of the policy decision meets all the established criteria of eco-consciousness, then such policy-making can be considered focused on sustainable development.

2. Tax control and tax administration. At the same time, the combination of the tax system parameters forms certain rules of conduct for economic entities and individuals, and determines the individual's attitude towards the tax system and the state tax authorities as control bodies. This is reflected in the level of tax culture of the population and is manifested in the spread of tax evasion or avoidance, and the effectiveness of the tax administration system as well. Therefore, if we consider the system of tax control in terms of ensuring compliance with tax laws and completeness of payment of all mandatory payments to the state budget, it can be argued that the tax control system is one of the supporting links in promoting sustainable development and should be considered as an element of sustainable fiscal policy.

In the context of the effectiveness of the system of tax control and administration, the concept of eco-consciousness of fiscal policy is of the utmost importance. Hofstede (1980) was the first one to draw attention to the interconnectivity between national culture and related tax culture and tax evasion (Richardson, G., 2008). Later a large number of scientific studies

on the impact of cultural and behavioral aspects on the tax payments (Feldman et al., 2015; Litina & Palivos, 2016; Fischer & Poortinga, 2012; Vauclair et al., 2015) prove that the key role in motivating a person to make ethical decisions and ethical behavior is played by personal values that reflect the principles and beliefs of a person, as well as his or her goals in life (Nejad et al., 2017). But ethics is not an innate human skill, socially responsible attitude towards other people and the desire to be ethical are formed in a person as a result of education (including self-education) and under the influence of social, cultural, economic factors and the environment in which individuals live.

In addition to the level of culture, ethics, and social responsibility of a person, the decision-making process on the tax payments is influenced by the results of one's own assessment of the probable consequences of a particular behavior or decision. But the choice or act will always be determined by the individual's own interests and focused on the scenario that maximizes the positive results and minimizes the negative ones (Vehovar et al., 2018). Vehovar A., Mumel D., and Hauptman L. (2018) established that taxpayers' perceptions of tax system fairness have a significant impact on the taxpayer's choice of ethical or unethical behavior. But it should be noted that the very perception of the taxpayer's level of the tax system fairness is influenced by the personal level of tax culture (consciousness) and personal values. If we consider tax control as a system aimed at ensuring uniformity and fairness of taxation (all taxpayers are equal in accordance with the law, the payment of taxes depends on available and/or received income, etc.), we can argue that the level of development of the system of tax control and administration, its effectiveness and its focus on preventing violations of tax legislation depends on how public consciousness and individual consciousness of business entities are focused on ethical behavior in paying taxes, how businesses relate to tax evasion or avoidance schemes, how often they use such schemes and how common these schemes are in the country, the extent to which the relationship between the country's tax authorities and taxpayers is a partnership.

In Ukraine, after the widespread introduction of risk-based approach to tax control and ax administration which included the creation of a separate unit of risk management with highly qualified specialists, determining risk criteria for non-compliance with tax legislation for each type of tax, improving criteria, selection algorithms and methods of testing risky taxpayers, the number of businesses that were involved in schemes to minimize tax payments has decreased significantly.

In the context of the partnership between tax authorities and taxpayers, Uslander (2005, p. 87) came to the conclusion that "…countries with high levels of corruption also have higher levels of theft and tax evasion" (from Ivanyna et al., 2016). People see corrupt regimes and believe it is acceptable to steal and especially to hold their taxes ". Ivanyna M., Moumouras A., and Rangazas P. (2016) proved that the level of trust in government and perception of it has a strong influence on the attitude of taxpayers to the use of tax evasion or avoidance schemes, which is realized through feelings of personal guilt for violation of social norms. Nejad J.G., Khedri M., Dahmarde M., and Panjekoobi M. (2017) asserted that political, social, and cultural mechanisms created by moving towards a democratic environment are very effective in increasing the spirit of legalism in people and increasing tax payments.

Returning to Ukraine, we can cite an example when a high level of civic cohesion and social responsibility (signs of a mature civil society) is manifested during the war in the active volunteering of business representatives. This format of activity, when the taxpayer provides free of charge financial, material, labor, and other resources for the needs of society, can be considered one of the forms of taxation (self-taxation) – voluntary accumulation of material resources to finance socially important needs (Schwabii, K., 2022). The readiness for self-taxation is the indicator that the social, cultural, and political mechanisms functioning in the country have contributed to the formation of individual and public fiscal eco-consciousness.

That is, by forming a responsible attitude in society to pay taxes and perform the duties of a taxpayer, the system of tax control and tax administration helps to increase the revenues to the country's budget and thus the formation of financial support for public funding of economic growth, social development, and environmental programs. But it should be noted that tax control does this only by adjusting (educating) the public consciousness and, accordingly, the behavior of taxpayers. Thus, it can be argued that the system of tax control and tax administration performs a preventive function in relation to the formation of eco-consciousness in the field of fiscal relationships, preventing unethical behavior of taxpayers.

3. Budget expenditures (by budget line items). As mentioned above, the taxpayer's individual attitude to the tax system affects his propensity to perform his tax duties conscientiously. That is, the set of parameters of the country's tax system and the nature of tax control and tax administration applied in the country directly affect the amount of tax revenues in the country's budget as the main source of funding for the state programs of economic growth, social development, and environmental protection. But in addition to the financial capacity of the country's budget, the nature of the orientation of fiscal

policy (in terms of budget policy) to achieve sustainable development goals is influenced by the principles of distribution of financial resources between different budget expenditures.

Thus, how much fiscal policy (in terms of the budget component) is focused on achieving sustainable development depends on the proportion or balance of the distribution of the country's financial resources between the economic, social, and environmental components of sustainable development.

But again, as mentioned above, the principles and rules for the allocation of financial resources under various budget items are set by policymakers. Therefore, it can be argued that the fiscal policy eco-consciousness is also influenced by the individual values and responsible behavior of each policymaker involved in the process of developing and improving budget allocation rules, and the degree to which all sustainable development pillars are taken into account within this process.

This means that when formulating any political decision to reform, change or update the budget allocation system, it is necessary to comprehensively take into account and analyze its impact on the financing process of state programs of economic growth, social development, and environmental protection and the relationship between the three pillars of sustainable development. Thus, we can conclude that the system of budget allocation for different budget expenditures performs a supporting function regarding the formation of eco-consciousness in the field of fiscal relationships.

4. Budget system (state and local budget). In addition to the nature of the distribution of budget resources under different budget expenditures (economic, social, or environmental), the level of the fiscal policy eco-consciousness in relation to the implementation of budget policy is also influenced by the system of the budget allocation of financial resources by budget levels (state budget and local budgets).

Following the example of Ukraine, in this context, it is necessary to consider both established by the Budget Code of Ukraine the rules of tax revenues distribution at different levels of budget and the procedures for financing different types of the state programs for economic growth, social development, and environmental protection, depending on the level of government and the list of their powers. Thus, it can be argued that the system of the budget allocation of financial resources by budget levels (state budget and local budgets), i.e. the nature of budget federalism, performs a distributive

function in relation to the formation of eco-consciousness in the field of fiscal relationships.

As a result of the generalization of the conclusions from four aspects of fiscal policy and the application of the method of formalization, a model scheme of the fiscal policy eco-consciousness index was developed (fig. 2) which reflects the main components of this index, the nature of the relationship between these components and their impact on economic, social and environmental processes.

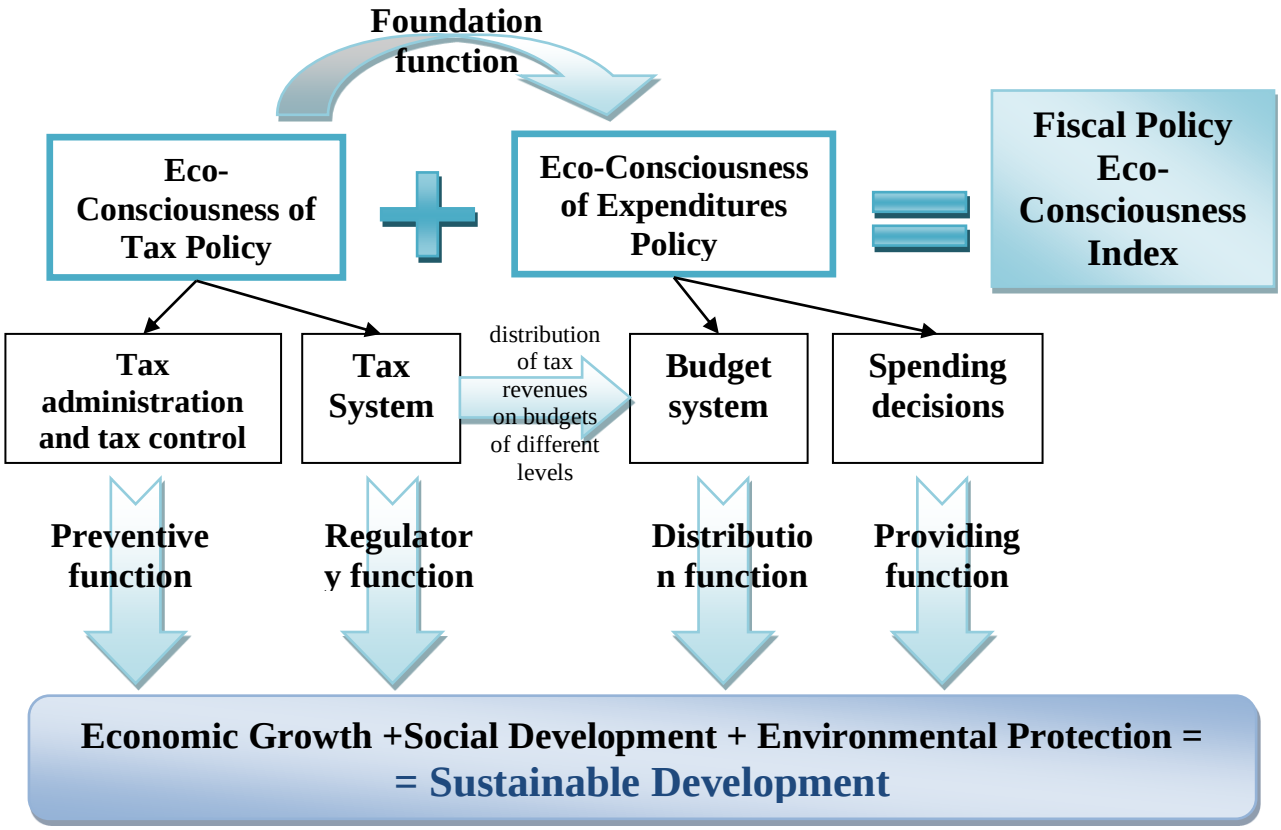

Fig. 2. Components of Fiscal Policy Eco-Consciousness Index and their functions

Source: prepared by the author

Summarizing the results of the study of fiscal policy components in its direction to achieve sustainable development goals, we can formulate a definition of the fiscal policy eco-consciousness index as an integrated indicator that allows a comprehensive assessment of the degree of orientation of each component of fiscal policy (the tax system, the system of tax control and administration, the system of distribution of financial resources by budget levels and types of budget expenditures) to achieve the three pillars of sustainable development (economic growth, human resource development, and the environment) and reflects the level

of focus of individual and social consciousness in the country on responsible compliance principles of sustainability.

Conclusions

Thus, the results of the study determined that the index of eco-consciousness of state fiscal policy allows assessing all aspects of implementation and manifestations of fiscal policy in relation to its contribution to sustainable development in the context of its three pillars (economic growth, social development and environmental protection). On the one hand, this index reflects the level of balance of the tax system in terms of its impact on socio-economic processes, the level of tax culture in the country and the effectiveness of tax control in combating tax evasion and avoidance schemes. On the other hand, the index reflects the extent to which fiscal policy, in particular in its budget component, ensures a balanced allocation of financial resources to address economic, social and environmental issues and contributes to the main goals of sustainable development.

It is established that in the process of ensuring the achievement of the three pillars of sustainable development, each of the considered components of fiscal policy performs its own function. Thus, the current tax system performs a regulatory function, as its parameters directly affect and, accordingly, determine the direction and pace of economic development, and the extent to which social and environmental issues are addressed. In addition, the impact of the regulatory function of the tax system extends to the budget component of fiscal policy, due to the definition of the value of financial resources (fiscal capacity) allocated through the budget system to economic, social, and environmental development programs. In order to ensure the implementation of the regulatory function assigned to the tax system and, accordingly, to adjust the economic behavior of taxpayers, the system of tax control and administration performs a preventive function.

The system of spending decisions approved by law is designed to perform a supporting function for specific areas of solving certain economic, social, and environmental issues in society through the mechanism of direct funding by the state. At the same time, the system of distribution of financial resources according to the levels of the budget determines the nature of this distribution in accordance with the solution of the national or regional level of issues of economic growth, the environment, and human resource development.

Further research should be aimed at developing a detailed methodological approach that would allow a comprehensive assessment of the level of the state fiscal policy eco-

consciousness for all four components – the tax system, the system of tax control and administration, the system of distribution of financial resources by budget levels and types of budget expenditures – and would provide indicative information on the nature of the impact of these components separately on each of the three pillars of sustainable development – economic growth, social development, and environmental protection. Applying this methodological approach in policy-making to reform or change the current tax or budget policy of the country would allow making more informed policy decisions that in the short and long term ensure sustainable development and secure lives of future generations.

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Axiologization in Future Teacher's Professional Image Forming

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ABSTRACT

Focus has been placed on the significance of axiological approach to the formation of future teacher's professional image. It is the axiological approach that serves as core perspective improving social, psychological, moral and spiritual function of education, where exactly the value-oriented activity penetrates pedagogical activities and develops significant personal and professional qualities. The analysis of modern views on the problem of axiologization in educational environment has been carried out. In the context of this problem, future teacher's professional image is studied as a dynamic characteristic that is constantly interacting with the world and depends on it, as well as personal innovations (needs, abilities, values, attitudes, Self-concept, etc.). Formation of professional image is based on values, which allows us to consider it as a value-oriented activity. Generalization of approaches to define structural components of pedagogical image, considering its features, criteria and indicators of formation, used by modern researchers, are presented by axiopsychological structure of future teacher's professional image. The structural components of this model are: cognitive, motivational and values-based, emotional and values-based, moral and spiritual and self-estimating levels. Defined components allow us to imagine the process of forming a professional image as a process and result of involving future teacher's personality in the system of values, as well as his personal and professional growth during the learning process in higher establishment's educational environment.

***Keywords*:** *axiologization, axiological approach, axiosphere, spirituality, subjectivity, professional image, pedagogical activity, values, value orientations.*

Introduction

One of the components of professional pedagogical activity is to create a positive teacher's image as a subject of educational interaction. Modern research today focuses on a large number of different technologies aimed at forming, developing and maintaining the image of various specialties. Analysis of scientific literature shows that the problem of teacher professionalism, his worldview culture, spiritual and moral character is one of the most relevant in pedagogy, psychology and philosophy of education. A great part of scientific community shows interest to it, because teachers' personal qualities affect quality of educational service, youth's education in the process of learning and development, self-learning and self-development.

Consistent and harmonious creating qualities of successful and competent pedagogical specialists, of course, includes “revival” of professional image. Forming a professional image is one of the most important tasks in the strategy of forming future teacher’s competitiveness. It is commonly accepted that image is a core structural element of professional success in general. Teachers, as professionals who perform global tasks of comprehensive development of the child’s personality, must to a certain degree own all the characteristics of professional image. Therefore, the image, as a synthesis of personal and professional characteristics, requires definition of the basic approach to its formation.

Choosing axiological approach as a methodological basis for future teachers’ image forming allows us to determine the content of this process as a system of values. Necessity to actualize this approach to the formation of the content of higher professional education, in the context of modernization, is conditioned by urgent demand to create conditions for the formation of a single humanistic system of values as the basis of modern students’ worldview. Axiological approach acts as a link between pragmatic and cultural approaches in forming the content of education, combining theory and practice. This approach allows to solve the problem of studying possibilities to meet students’ needs and humanization of society as a whole.

Within axiological approach human is presented as the highest value of society and is a priority goal of social development. Implementing this approach to the content of higher pedagogical education gives possibility to approbate new direction in education, eliminates training “faceless” qualified personnel to create effectiveness for future specialist’s personal and professional development. Today, it is indisputable that content and nature of personality’s value orientation depends on solution of social and economic issues, as well as human security and life. In this regard, it is significant to study the nature of teacher’s image as a value, its place and role in the hierarchical structure of professional values, relationship of these values, as well as creating an axiological model of professional image.

Therefore, generalization of existing research and publications in recent years suggests that characteristics of future teachers’ professional image are still insufficiently studied. Today there is an ambiguity in the approaches to the conceptual apparatus, conditions and factors that affect effective image forming, criteria and indicators for process effectiveness. It is the axiological approach in education that is becoming one of the leading directions in modern science, which indicates relevance of developing this problem in psychological and pedagogical science.

Results

1. Axiological approach in the system of future teachers' professional training

1.1. Axiological issues of pedagogical education

Modern professional (pedagogical) education in the period of intensive development of science, implementation of information technology is more and more focused on fulfilling the social order, that is training of professionals who know their job responsibilities and rights, are confidently oriented in technologies of professional activity. From this perspective the issue of axiological component of educational strategy and tactics becomes quite urgent.

Researching relevance of axiological potential in university students' professional self-determination is growing under the conditions of development of Ukrainian higher school. This encourages us to take into account the component of professional education, which is responsible for forming personality of a specialist who masters an orderly system of value orientations. This system is the basis for forming future teacher's professional image, his moral and spiritual, pedagogical (professional) and personal values. Mastering these values will ensure students' orientation to realize professional goals and objectives in the context of their value consideration. This makes it possible, on the one hand - to understand the role of values as a defining principle of pedagogical activity, on the other - to initiate the search for a new value paradigm. The implementation of this paradigm will redefine goals, principles and content of education of future professionals, will prevent deformation of the idea of spirituality, humanization in the practice of its implementation. Focusing on the axiological approach actualizes integration of axiological principles of traditional and innovative pedagogical professional education.

In the dictionary and reference literature axiology is interpreted as a study of values, their place in the structure of life and attitude to the facts of reality (Philosophical dictionary, 2005). In modern conditions, axiology is considered as a theory of values and is characterized by a significant shift in attention to universal human values, which are determined in the minds of people by modern realities of life.

Axiology is one of the most significant conditions for the development and implementation of new educational policy, its strategic direction, based on moral and spiritual, humanistic values. "Reflecting the hierarchy of educational values, it determines personality's values-based consciousness, values-based attitude and values-based behavior" (Boryshevsky, 2011). Reliance on the axiological approach in psychological and pedagogical

theory and practice means that in educational field “national and universal human value priorities are increasingly fixed”(Boryshevsky, 2011). Combining values heritage of Ukrainian and world psychological culture, axiology has great forecasting potential.

The axiological approach was first used in psychological science in the late XIX century and marked the beginning of studying human values-based phenomenon. Such researchers as Karpenko (2018), Zhygailo (2008), Savchyn (2010), Boryshevsky (2011) made a significant contribution to the development of the axiological approach. Researchers consider this approach as a philosophical and psychological strategy that allows implementing professional axiological orientations in education system; forming knowledge about personal, universal human, pedagogical and professional values, and also enables future teacher’s personal and professional development.

The axiological approach in professional training and education is based on the idea of moral and spiritual, aesthetic professional attitude to reality. In the process of learning (at different levels of education) a person acquires values of profession, masters them, builds his activities and communication in accordance with acquired values. Since the world of values is actually socio-cultural reality, human life and society, this approach supporters believe that “values of life and profession become the content of professional education” (Ruchka,1986).

The content of this approach involves future teacher’ understanding of mental health, well-being and personality as values. This suggests necessity of individual approach to each student, as well as studying methods for the formation and development of their physical, mental, social, moral and spiritual, psychophysiological and personal qualities. Thus, the axiological approach to the process of teachers’ professional and pedagogical training will actualize development of special knowledge and skills that will allow future teachers to have values-based view on the process of teaching, education and development, master special methods of preserving and forming students’ mental and personal health.

Plemenyuk (2008) highlights special significance of axiological approach for the content of education. The researcher marks out that educational process is the main opportunity to educate in students spiritual, humanistic and values-based qualities. According to the researcher, the axiological approach is a link between pragmatic and cultural approaches in forming the content of education. It strengthens social role of education, as value-oriented nature inherent in all human activities. The axiological approach is quite urgent not only in education system, but also in society as a whole, because the concept “human” itself is considered the highest social value.

Axiological approach, has been considered by researchers (Karpenko, 2018; Plemeniuk, 2008) as a philosophical and pedagogical strategy that shows ways to develop professional art, usage of pedagogical resources for personal development and offers prospects for improving education system. Scientists have drawn attention to the fact that consistent and competent use of axiological approach in educational system is an indicator for further development of modern education. Therefore, implementation of professional axiological orientations in the pedagogical process is an important step for the entire education system.

Studies by many researchers Bekh (2012), Boryshevsky (2011), Isayev (2000), Karpenko (2018), Savchyn (2010), Pomytkin (2005), etc. of theoretical and methodological principles of axiological issues in education, allows it to be considered as a basis for future teacher's spiritual culture.

Obviously, this can explain developmental, ennobling influence on personality's development as a potentially spiritual being, dialogical orientations, mastery of which leads to the formation of skills, desire, ultimately a steady need to listen, perceive others, without introducing distortions. This establishment of consciousness and self-consciousness is the basis of human existence. In addition, such an attitude is the key to true creativity, a condition to move towards full life, a condition of internal activity - that is personality's self-activity, stability.

It should be noted that modern psychology is focused on the formation of values-based attitude to the world as a principal goal of education, "a natural result of reflection on the fundamental principles of scientific knowledge, characterized by the drift of today's dominant post-classical rationality to universal (post-postmodernism) world view and human study"(Karpenko,2018).

As we can see, interpretation of "value" concept is core in axiology. Variety of interpretations is due to differences in addressing the issue of objective - subjective, material - ideal, individual - social in terms of values. Thus, the main idea of Rokych's (2011) concept of values is as follows: the total number of values is small; all people have the same values, but the same values have different "weight" for different people; values are organized into systems; the origins of human values can be traced in culture, society, public institutions and in personality; the influence of values can be traced in almost all social phenomena. No less common is the view on values as a kind of personality's social attitudes, interests that regulate its behavior through direction and structuring (Yadov,2013).

Constructiveness of "value" concept is primarily related to the development of values typology at the level of "ideal types", which ensures creation of empirical typologies. In these cases, values are defined as any object, material or ideal, idea or object, in relation to an individual or group take an evaluative position, giving them an important role in their lives and the desire to acquire values they feel necessary for.

Thus, Frankl's (2019) works reflect subjective experience that any value can take a position above or below another. This position was developed by Yanytsky (2012) that "values are not isolated from each other, so when reproducing person's value orientation to any individual value, the priority position of a value is also taken into account as a subjective significance for other values that are not part of studied person's value system" (Yanitsky,2012).

According to Golovanova (2011): "Within the axiological approach it is extremely important to understand that the world of values is objective, it is socio-cultural reality, human life and society. The values of life become the content of education; figuratively speaking, education studies the younger generation and solves the problem of "how to live". However, values also have personal manifestations: value orientations (attitudes, beliefs, interests, aspirations, desires, intentions). It is the value orientations that determine personality's attitude to the world around him and to himself".

The author is convinced that axiological approach is based on the process of understanding and mastering different values. This process includes the following steps:

• presentation of value in real conditions of education, training;

• initial evaluation, ensuring emotionally positive attitude to this value;

• identifying the meaning of value and its significance;

• acceptance of conscious value;

• inclusion of the accepted value attitude in real social conditions of actions and students' communication;

• consolidation of values in students' activities and behavior (Holovanova,2011).

Thus, in modern educational conditions, the axiological approach is one of core methodological principles of future teachers' professional training.

An appeal to the philosophical theory of values allows us to consider the content and structure of pedagogical education as an area of subject-subject and inter-subject relations, where knowledge, teacher and student are united by values-based attitude to reality. Analyzing axiogenesis of professional and pedagogical training, modern researchers thus

substantiate a new methodology in psychology, which allows distinguishing both the system of values of educational process and universal human values.

1.2. The future teacher's axiosphere

The axiosphere of future teacher's personality is a system-hierarchical structure of professional and personal value orientations. It can be imagined as a system that includes universal human, professional and personal, moral and spiritual values and values-based qualities, each of which, in turn, is considered as an independent system formed by many personal meanings. These values have their own unique content and occupy a certain place in the hierarchy of axiological directions in creating future teacher's professional image. If we present the axiosphere schematically, it will take the form of a three-dimensional system, where all the selected blocks are balanced (Fig. 1).

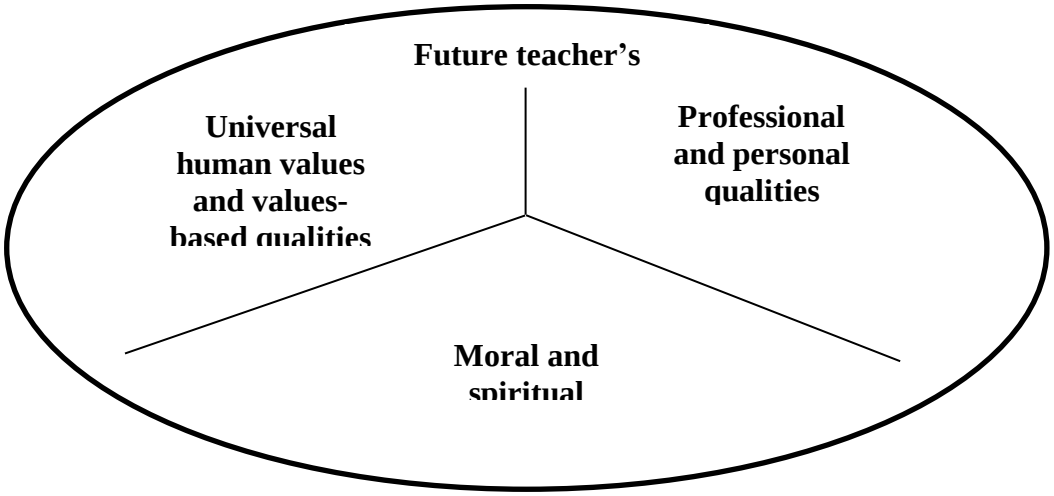

Fig. 1. The axiosphere of future teacher's personality.

The axiosphere of future teacher's personality is presented by us in the form of a circle (Figure 1), divided into three equal sectors, each of which is consistently interconnected. Constructing the axiosphere we followed the following point of view:

- first, allocation of universal human values is explained by the fact that the teacher, above all, is a personality with his own individual value system. At the heart of all human values is his attitude to his own life, to the fact of his own existence, including all its aspects and possible experiences in it.

Existential psychotherapist A. Lengle (2004) noted in this regard: "Value becomes value when it is experienced. Specific value perception cannot be thought of, they can only

be felt. Values encourage person to move, they seem to collect lenses that focus human's life force. Sense of value is an inner commitment and at the same time enthusiasm, full of things that undoubtedly concern everyone. Anything that can cause such a touch is a personal value".

- secondly, professional and personal values and values-based qualities can be considered "compulsory" because they arise due to the requirements of education system.

In our opinion, significant factor to form student-teacher's professional values will be not only his personal value system, but also the effective use of this system for the development of professionally important qualities. Successful teacher's performance will depend largely on how he can, focusing on his value system, help the child understand the consequences of his actions for his own life and the well-being of others.

Professional and personal values and values-based qualities (defined by the subsystem of future teacher's pedagogical education) establish effectiveness and purposefulness of the teacher's choice of professional and pedagogical value orientations, their transition to his behavioral motives and pedagogical actions, which is a core component of professional image. Also, researchers (Ansari, 2013, Isachenko,2004, Zatvorniuk,2014) indicate professional values dependence on the peculiarities of professional development, degree of awareness, variability of professional activity, trajectory and intensity in development of professional activity characteristics.

- thirdly, moral and spiritual values ensure integrity of professional worldview, its stability. This factor contributes to the development of professional orientation, structuring their behavior and professional pedagogical performance. The structure of these values includes human inner world and models of behavior and relationships.

Highly essential issue in this regard is work motivation: it is significant for future teacher to consider his work not only as a means of material support, but also to be aware of and feel noble impact of his performance on his mental development, mental functions, abilities. Working, which is primarily perceived by human in his personal, humanistic sense, is an inexhaustible source of spiritual enrichment and personal growth.

It should be highlighted that working without motives related to awareness of its social, civic significance, its spiritual content, can motivate human mind and will to cold-blooded premeditation, provoke person's vile intentions and actions. Work perceived by human only as a means of obtaining material goods, a means of enrichment, accumulation, entails emergence of such negative traits as selfishness, ambition, extortion, avarice, the desire to succeed at work at any cost. Thus, working not inspired by moral, humanistic content can

become socially dangerous, harm the person himself, other people, society as a whole. Thirst for harmony of feelings, constant need for self-improvement, desire to live in soul dimensions, detachment from unnecessary worries about material goods (money, career, fame and other insignificant day-to-day "values" that can become insatiable, relentless source of envy and other wicked manifestations that destroy everything human in personality and, ultimately, make him unhappy) all this and the like allows the student to develop ability not only to see and feel human nobility as a bearer of spirituality, but also to actively create this nobility in everyday life and in relationships with others.

A spiritually perfect person has inner freedom that does not contradict freedom of others. In this way a person is distinguished by sincerity, certainty and stability of his life views, orientations, beliefs, which he is ready to defend persistently and openly and without boasting, as well as correct, clarify, improve. Spirituality is the ability to see the unusual in the ordinary, which defines spiritually perfect person's sublimity, optimistic mood of life perception. To understand and clarify the axiosphere described above, we give a classification of teacher's values by Isayev (2000). The author draws attention to the demand to form teachers' professional and pedagogical culture. The author calls the first component of presented culture the axiological component, which he understands as a combination of teacher's professional values. Taking specialist's professional activity as a basis, Isayev (2000) suggests the following classification of teacher's values:

1. Values-goals - values that reveal the content and goals of teachers' professional and pedagogical performance.

2. Values-means - values that reveal the content of methods and means of professional and pedagogical performance.

3. Values-relations - values that reveal the meaning and significance of relations as core mechanism for functioning of holistic pedagogical performance.

4. Values-knowledge - values that reveal the importance of psychological and pedagogical knowledge implementing pedagogical performance.

5. Values-qualities - values that reveal the content and meaning of qualities of teacher's personality: a variety of interrelated individual, personal, communicative, professional qualities of teacher's personality as a subject of professional and pedagogical performance, manifested in special abilities, creativity, ability to design his activities and predict its consequences, etc. (Isaev,2000).

Presented classification allows to systematize modern teacher's professional values more completely. However, it should be noted the conditional nature of classification, variability and interdependence of selected groups of values. Considering that the essence of pedagogical activity is determined by specific motives, where the leading position in the hierarchy of needs is the need for self-development, self-realization, self-improvement and development of others, and "child's personality" and "professional" concepts are interrelated.

Therefore, educational process must be built in such a way that future specialist could understand social functioning of values, see variability of professional activity values, correlate them with cultural norms, give a reflective evaluation of his own values and orientations. In this context the problem of axiology can be solved at the individual level, which will enable to find stability in new positive values of society and educational establishment, in particular.

2. Theoretical foundations of professional image forming

2.1. Axiological structure of professional image

Future teacher's image is a sum of positive images of an employee who has a high level of pedagogical culture, psychological and social competencies, aims at personal and professional self-improvement, and is considered by students, their parents, colleagues and society as a successful, socially and personally important person and qualified specialist.

Many scholars write the following about the image: "Image is not a mask, not a decoration of professional appearance. The main thing here is the opportunity to convey information about yourself, about your true (personal and professional) traditions, ideals, plans, actions. Given the iconic nature of the image, it can be considered as a message addressed to the audience. In order for the audience to perceive such a message, it must be written in a language they understand, and therefore use the usual symbols (signs) in their usual meanings" (Kaliuzhna, 2012).

From Greilich's(2007) point of view, teacher's image is "an emotionally colored stereotype of teacher's image perception in the minds of students, colleagues, social environment, in mass consciousness. In the process of teacher's image forming, the real qualities are closely intertwined with attributed by environment ones" .

Ukrainian specialist of image issue Palekha (2005) defines it as "a combination of developed professional, moral, aesthetic and ethical norms and the subject's attitude to his

professional responsibilities. In most cases, a good personal image is the result of skillful orientation in specific conditions, the correct choice of a particular model of behavior".

Psychologists Zatvornyuk (2014), Isachenko (2004), Popova (2008), Shepel (2002) convincingly prove that personality's image is the basis of professional image, which is characterized by social roles that the person performs. The image that is formed in the process of professional activity acquires professional characteristics and depends on compliance with expectations of society and professional group.

The results of Kovaleva's (2007) psychological research enabled her to formulate special characteristics of image in pedagogical performance: teacher's activity is quite regulated and limited by requirements to educational process, in contrast to other activities where image can be realized; image formation depends on its bearer (teachers); the level of competition is much higher than in other human activities; the introduction of one's own image is carried out in conditions of stereotypes and stereotypes of its perception; insufficient material support of the teacher; lack of motivation for self-improvement based on the invariability of material security, both with a positive image and without it.

The concept of Shepel (2002) is also complete and relevant, which distinguishes two groups of image functions: value and technological. Value functions include personal growth. With the help of an effective image around the personality, an aura of attractiveness is created, it becomes socially popular, liberated in the manifestation of its best qualities; constructive interpersonal relationships are created. The charm of people objectively adds more sympathy and friendliness, tolerance and tact to communication.

Possessing high level of communicative and organizational skills affects, on the one hand, effectiveness of pedagogical performance, and on the other - mastery of skills and abilities to form their own image, which begins in the process of training. Due to the awareness of their uniqueness and increased sociability, a person acquires stable beliefs and positive qualities.

Technological functions, according to Shepel (2002), include interpersonal adaptation. Thanks to the right image, you can quickly enter a specific social environment, attract attention, establish friendly relations; present their personal, professional, moral and spiritual qualities.

Each teacher, as a person, is characterized by an individual teacher's image (Popova, 2005). According to the author, it includes individual personal qualities, physical data, teacher's attitude, self-esteem, appearance.

Image model according to Donskaya (2004) provides in the structure of teacher's image the core image (natural component), internal level (personal, professional, behavioral components) and external level (visual, auditory, olfactory, kinesthetic components). Internal image reflects person's self-consciousness, a combination of systemic and functional professional's qualities. The image, consisting of external qualities, is derived from understanding of teacher's social significance, his abilities, providing effective professional interaction with students, colleagues and society.

Kalyuzhna (2012) suggests considering the image as a holistic concept, which includes the following components: personality's value system, his inner philosophy; professional, emotional, intellectual, communicative, spiritual or moral style of behavior; specialist's audiovisual culture.

According to Kravets (2019), it is necessary to pay attention to the following elements in image structure: personal component (self-concept, orientation, interests, values, motivation, personal qualities); audiovisual component (visual, auditory, verbal, kinetic, habitual, olfactory, kinesthetic components); social component (social roles, patterns of behavior and communication); functional (style and content of professional activity process)" .

Emphasizing importance of studying future teacher's professional image, it is necessary not to limit considering it as only a harmonious correspondence between internal and external and vice versa. We consider future teacher's image as a dynamic characteristic that is in constant interaction with the world around us and depends on it, as well as on personal innovations (needs, abilities, values, attitudes, Self-concept, etc.)

Analysis of teacher's image concept also allows us to conclude that it has several aspects: 1) the ideal image, which the image bearer wants to have himself; 2) the ideal image that meets the expectations of others; 3) the real image.

Sharing the scholars' views on the selected structural components of professional image, the importance of axiological approach in educational process, in the context of modernization of pedagogical education, we present the axiological structure of future teacher's professional image (Fig. 2).

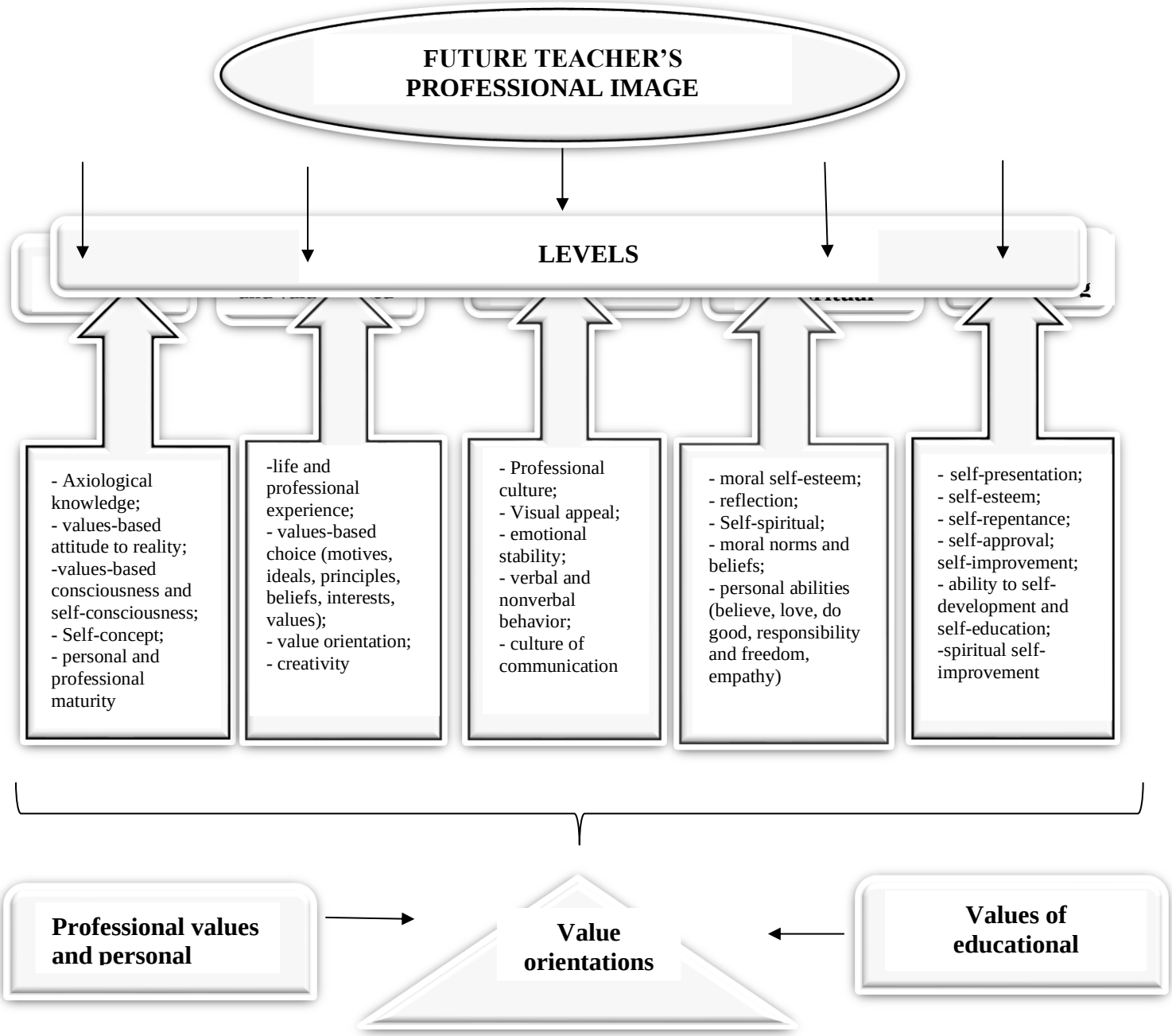

Fig. 2. Axiopsychological structure of future teacher's professional image

The basis of cognitive level of professional image is axiological knowledge. Its significance for students is determined by value bases; value attitude to reality, which is associated with cognitive activity. It is cognitive activity and its result - knowledge - that have clear value characteristics. The basic foundation of future specialist's personal development is involving students to knowledge as a value that ensures successful professional performance. In addition, it is important to form students' active attitude to the process of cognitive activity as a pedagogical value aimed at spiritual and theoretical acquisition of surrounding reality.

In the hierarchy of values, many scholars in the first place put the dominant (knowledge, cognitive activity, communication), stimulating (pedagogical methods, technologies, controls), related (aimed at compulsory (standards), moral norms)) knowledge that are closely related among themselves and together form the basis of pedagogical axiology.

Knowledge itself can be defined as one of the priority, dominant values, as its various forms are values-based, because by their nature they provide a choice of alternatives in the process of any activity.

Let us mark out another peculiarity of axiological knowledge - it always acts as a product of subject-object and subject-subject relations: the subject refers to the object of cognitive activity and to another subject - a participant of educational and cognitive activities as to the value. This peculiarity emphasizes importance of another dominant value - communication, as students' acquisition of knowledge occurs primarily in the process of communicating with the teacher, students. Without communication, the process of educational and cognitive activity is impossible.

Since knowledge acts as a result of cognition, therefore, the process of cognitive activity itself acquires value, which ensures forming various types of knowledge: concepts, ideas, theories, concepts, and others. Cognitive activity always acts as one that presupposes effectiveness of subject of activity. In addition, the availability of students' knowledge as a certain systematized information - is only their first step in professional development and it is important to form a positive attitude to knowledge in the future, to enable them to project their future professional activity, that is, to form a potential readiness to act on the basis of acquired knowledge.

Axiological knowledge significance also lies in the fact that they enrich the content of education, promote better understanding of other cultures' values and intentionally form a new positive system of youth's values.

Common way in forming motivational and values-based level of future teacher's professional image means not laying ready motives and purposes in student's consciousness, but necessity putting it in such conditions and situations of developing activity where desirable motives and purposes will be postponed and developed taking into account student's past experience, individuality, inner aspirations. Therefore, professional education should create conditions for axiological self-determination.

Motivational and values-based component, in our opinion, is characterized by the following indicators: attitude to the profession as a value; understanding and experiencing its significance both for society and for personal development. It is also characterized by personality's axiological orientation, system of meanings and needs that are manifested in the value of chosen profession, professional responsibilities, other people, nature and cultural heritage of Ukrainian people. Emotional and values-based component of the image is traced in the process of communication and is determined by such indicators as: professionalism, emotionality, expressiveness, speech compliancy, etc. Emotionally rich teacher, has techniques of verbal and nonverbal expression of feelings and intentionally uses them, capable to enliven the lesson, make it expressive, closer to natural communication.

Personal growth, self-acceptance, independence, awareness life goals - these indicators are integrated into the concept of life values, which are the basis of psychological health and essential for teachers' professional performance, where human is the main value.

Degree of formation of spiritual and moral level defines student's moral education (formed moral traits, ability to make moral choices). It is proportional to the development of such traits as conscientiousness, responsibility, altruism, empathy, honesty.

Defined part of teacher's image is high self-esteem, self-confidence; faith in good; social and personal responsibility ("I am the cause of all the positive and negative in my life"); desire to change and ability to take risks having a healthy sense of self-preservation.

Scholars who have studied the process of spiritual formation of personality Zhygailo (2008), Boryshevsky (2011), Savchyn (2010), Pomytkin (2005) believe that condition for successful development of spirituality is personality's early genesis, educators' spiritual position and definition of their ideals, development of spiritual values, personality's religious consciousness and self-consciousness; it is a complex mental phenomenon of personality's self-awareness, inner perception, appropriation of cultural sphere, humanization, growth in it and understanding as personal property.

Semantic center of self-estimating component is "self-esteem" concept, as a qualitative, in ethical and psychological dimension, personality's attitude to himself (self-attitude). Activities, the subject of which is personality's self-esteem, can be caused by his real actions. Qualitative characteristics of self-esteem directly depends on these indicators. Self-esteem is one of the most important components of personality and a mechanism for managing personal behavior. It is confidence in personal significance and necessity for others, in personal uniqueness.

Self-esteem level is related to spiritual personality's self-improvement - a process that is inseparably linked with development and self-development. This is a complex, intense activity aimed at positive change of Self; personal thoughts, feelings, actions, development of personal capabilities, abilities, positive changes in the environment, overcoming everyday life, mastering higher meaning of human life. It is clear that beginning and continuation of this complex internal work largely depends on mentor's talent, his humanity, wisdom, his responsibility for student's fate.

Based on the described structural components of the image, we can identify such groups of qualities that give an idea of its concept. The first group contains qualities of communicative nature: sociability as the ability to easily establish contact with people; empathy as the ability to empathize with others; reflexivity, which allows to understand another person; eloquence as a component of verbal influence. All this directly indicates personality's communicative competence. The second group includes personality's qualities as a result of his education and upbringing: moral values, mental health, possession of axiological knowledge. The third group includes knowledge related to personality's life and professional experience, as competence in this area contributes to personality's positive image forming. This is especially true for teacher, whom young people consider not only knowledge bearer, but also a wise person in the secular sense.

Thus, future teacher's professional image is a holistic system, characterized by stable relationships between its components, which can be considered as a program of personality's self-improvement in the process of professional development. Under the influence of image-making activity there is an intensive development of personal and professionally significant teacher's image qualities, his image position in the pedagogical process is confirmed.

2.2. Value orientations as an important component of professional image

Value orientations are a defining part of future teacher's image. From the point of view of psychology, value orientations are a structural component of personality, which defines the structural unity of life and has functions of organization, direction and regulation. As a result of such a structure, value orientations are developing in parallel with personality's leading and system-forming quality - orientation.

Value orientations are "an element of personality structure that operates at conscious level and determines general focus of human life, a complex of personally significant attitudes that direct human development and determine his behavior in society" [23, p. 432]. At the same time, psychology, thanks to various approaches to the study of personality and his inner

world, enables analyzing value orientations as a combination of special psychological innovations that have a complex hierarchical order and exist in personality's structure.

The system of value orientations, being not only an element of spiritual sphere, a manifestation of social creativity, at the same time acts as a projection of students' attitudes to the surrounding social reality. In this sense, it is not only a barometer of students' sentiment, but an indicator of social stability. Subject's professional development involves, above all, personality's development in the process of choosing profession, professional education, training and performance of professional activities. Career is an important trend, as a result of person's conscious position and behavior in the field of work related to personal and professional growth (vertical or horizontal career). A person builds trajectory of his career movement himself, agreeing with peculiarities of internally organized reality and, most importantly, with his personal goals, desires and attitudes.

Rokich (2011) understands value orientations as "abstract ideas, positive or negative, not related to a particular object or situation, expressing person's beliefs about types of behavior and desired goals". Values that are central to personality's belief system are guiding principles of life, determine person's behavior, what state or way of life should be met and aimed.

Yadov (2013) spoke about personality's value orientations, which meant "Personality's orientation on certain values of material and spiritual culture of society". They marked out that value orientations are very close to essential psychological concepts of attitude, need, interest".

Concept of value orientations occupies one of the leading places in Yadov's (2013) dispositional concept of personality. The author suggested that orientations, social attitudes, value orientations are in a certain hierarchy and together form a kind of dispositional system. Yadov's (2013) model of values includes: 1) values of external status, forming a stable core; 2) values of average status (structural reserve); 3) values below the average status (periphery); 4) values of lower status. The first and last values are sedentary, and those occupying an intermediate position are in constant motion. Thus, according to Yadov (2013), value orientations, along with the general orientation of personality's interests regulate his social behavior. It should be noted that value orientations ensure personality's integrity and stability, form general direction of his interests and aspirations, form a hierarchy of individual preferences, form the level of personal desires, so it is important to form a system of value orientations. We consider value orientations as subject's orientation for activity and certain

values that can be formed already in the process of this activity. This approach leads to the consideration of professional image forming as values-oriented activity.

Studying youth's value orientations enables to identify degree of their adaptation to new social conditions and its innovative potential. Since the value attitude is formed in the process of activity and is realized through activity, student can choose a goal, form a strategy for future behavior, based on the individual value system. The main problem of students' value orientations is their fundamental polarization, which has a direct impact on their value orientation forming. Value orientations as a component of spiritual values system are a basic foundation in the structure of personality's consciousness and self-consciousness and define content and essence of personality's Self-concept. Emphasizing personality's uniqueness as a subject of spirituality, it is worth emphasizing destructive impact on personality's spirituality, where the actual "Self" is in isolation from "non-Self". Such self-awareness destructiveness is manifested in self-opposition to others, in emergence of belief in self-uniqueness, "superiority" over others. Such a person is tempted to give freedom to realize any personal, and worst of all - selfish needs to harm others' interests. It is important to emphasize that selfishness is incompatible with spirituality, because selfish orientations are an insurmountable obstacle in the direction to goodness and justice.

In the context of these considerations, it should be noted that the meaning of axiological approach, as one of the most significant principles in pedagogical process, is not only to help students realize themselves as a unique person, but also to promote their ability to perceive themselves, their "Self" as part of others' "Self", that is "non-Self". Achieving this goal of axiological approach in pedagogical process is, of course, a very difficult and at the same time responsible task in ensuring humanistic orientation of development and self-development of personality as spirituality owner.

Particular emphasis should be placed on the role of faith in the emergence of the need for self-analyses, which is an important basis for development of reflexive ability. One of the most expressive personal dimensions of strength and spirituality effectiveness is personality's attitude to work, to himself as working subject, activity in general, which reveals essential characteristics of spirituality. Such personal characteristic as diligence, under certain conditions, becomes one of the most important characteristics of human spirituality. Indicators of true, not ostentatious, apparent (demonstrative) faith is person's ability to repent, his willingness to overcome in his behavior what is incompatible with the need to do good, not in words but in concrete deeds, deeds to serve another person. Equally important is person's ability to forgive as a sign of tolerance and respect for another person. In addition, forgiveness by a

spiritually rich person is not perceived as self-sacrifice or as a sign of generosity. Forgiveness in its essential, profound sense can have nothing to do with any selfish motives of the person who forgives. It is an expression of an inner need, which satisfaction is not connected with reward expectation or at least expression of gratitude on the part of forgiven person.

As we can see, value orientations underlie the formation of each component in the structure of professional image. They determine human spiritual core, express his attitude to the world and himself, influence orientation and content of professional and social activities, fulfill life with sense and are the main channel of spiritual culture. Axiological knowledge, as well as transformation of cultural values into incentives and motives for practical behavior, is a systemic element of the worldview.

Therefore, value orientations should be considered as complex formation that has absorbed different levels and forms of interaction of social and individual in personality, certain forms of personality's internal and external interaction, specific forms of personal awareness of the world, past, present and future, as well as essence of personal "Self". They are a certain level that determines sense of human life, his orientation, position in relation to life in general and lives of others. Students' awareness of object's value in professional activity, and in pedagogical environment - is education, upbringing, development, life and human health, forms special attitude to it, that is values-based attitude to their professional activities. Future specialist's values-based attitude to profession in pedagogical environment is considered as a result of understanding acquired knowledge, skills and abilities.

System of formed value orientations is a stable basis for personality's behavior and activity, which includes a clear direction of needs and interests, in this regard, value orientations can be called a determining regulator of future teacher's professional image.

Conclusions

Future teacher's professional image forming is a part of the process of forming a holistic harmonious specialist's personality, for whom his professional activity will be an integral life part and an element of his personal self-realization. This formation depends not only on the level and content of professional training, but also on the future teacher's awareness of values essence. That is why axiology of education has a significant impact on future teacher's professional image forming. The axiological approach is aimed at forming a system of humanistic, social, moral and spiritual, personal value orientations of personality,

who is initial for society development, as well as personality's personal and professional development.

The graduate must have a complete stable system of value orientations, which will immanently determine his life and professional career in the future. Value orientations are manifested in a certain direction of consciousness and behavior being their focus, determining the structure of future teacher's axiosphere.

Value orientations are the basis for professional image forming, which allows us to consider it as a value-oriented activity. This approach allowed to determine the axiopsychological structure of future teacher's professional image. The structural components of this model are: cognitive, motivational and values-based, emotional and values-based, moral and spiritual and self-estimating levels. Defined components allow us to imagine the process of forming a professional image as a process and result of involving future teacher's personality in the system of values, as well as his personal and professional growth during the learning process in higher establishment's educational environment.

Therefore, "teacher's image" has peculiarities inherent in value qualities, and future teacher's image forming is a professional demand. Future teachers' knowledge acquiring, along with other professional values, will allow to create an ideal model of future professional activity in student's mind, which will serve as a standard, orienting point in professional performance.

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Ekphrasis Complex and Its Main Characteristics

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ABSTRACT

Ekphrasis is a description of artifacts, i. e. objects that are the human activities' product. In this research, ekphrasis complexes are analyzed, which are targeted at the description of one of the Ekphrasis varieties – paintings, as well as drawings, sketches, copies, and reproductions of paintings. In the course of research, the cognitive-psychological and verbal-psychological mechanisms of constructing ekphrasis and ekphrasis complex were considered in close cooperation, i. e. the description itself and the surrounding context that defines the corresponding referential situation. The conducted research made it possible to clarify and systematize the ways of various perceptual acts' verbalization, deepen the understanding of subject-object correlations in the process of contemplating works of art, and describe the specifics of reflecting the features of the artifacts' perception in a literary text.

Keywords: *ekphrasis, artefacts, ekphrasis complex, subject-object correlations, a literary text.*

Introduction

The phenomenon of ekphrasis is a kind of link between the verbal narrative and the fine art object, thus, ekphrasis is a text created at the junction of two different artistic systems, the characteristic feature of which is the performance of a descriptive function. The result of this implementation is the transfer of the emotional and stylistic components of the artistic image. The descriptive power of ekphrasis promotes the better transmission of verbal information related to fine art works to the reader. Of particular interest is the emotional aspect of an artistic canvas perception by the percept, when the objects depicted on it acquire the ability to literally "come to life" on a lifeless canvas and effectively influence the surrounding people. Ekphrasis itself, which is responsible for the visual component's qualitative transmission along the route "visual object –percept – text object – reader", should, as it seems, have the same or as close to its impact as possible.

The ekphrasis complex includes not only ekphrasis description, i. e. the actual description of paintings, drawings, and sketches, but also all contexts associated with the painting or graphic image perception.

This research "blending" into the general system of works aimed at identifying the conceptual and semantic foundations of interaction between subject and object in the process of perception and the specifics of their refraction in a literary text, as well as in the works' mainstream that reveals the interaction between various features of translation of some signs into others (in this case – iconic into verbal) gives a very topical significance to the current work.

The various methods and techniques were used in the process of research based on the general dialectical approach, such as the direct observation and selection method, the comparative method, the descriptive method, the contextual analysis method, the distributive-statistical analysis method, the transformational and comparative analysis method.

Results

The Concept of Ekphrasis

The concept of ekphrasis and the history of the phenomenon denoted by this term were considered in detail by Freidenberg (1998) in her works: "In ekphrasis…," – she noted, – "we have not a description of the nature itself, but a secondary description, a description of a thing already invented by one of the types of craft – something contextured, drawn, woven, glued. Ekphrasis is a description of a description".

Freidenberg (1998) emphasized that this type of description has its roots in some prehistoric times when pictography predated the appearance of verbal writing and reigned everywhere: "Ekphrasis is a very ancient description, a description of not yet a nature, but of a thing already "described" in a more archaic way, a thing drawn, woven, forged, elaborated" The understanding of ekphrasis close to Freidenberg's definition can be found in other researchers. So, Aryev (2003), who analyzed this phenomenon in the works of the poet Ivanov, defines ekphrasis as follows: "Ekphrasis is a verbal quotation from the painting".

The term ekphrasis in national linguistic and stylistic literature has been used to a limited extent until recently. The descriptive characteristics of this phenomenon were more often used: the verbal means of representing the image; the verbal code of painting; the verbal painting (Dmitriyevskaya,2013). The term "ekphrasis" was more readily used by researchers of ancient literature and art (Averintsev,1981; Freidenberg,1998)

The "ekphrasis" term's introduction and wider use were facilitated by some conferences that were held in the XX–XXI centuries, in particular the so-called Lausanne Symposium (2002), which gave an impetus to a new surge of interest to the analyzed phenomenon, while the participants of the mentioned Symposium actively used the term ekphrasis in their reports.

The report of Geller (2002), who has outlined the main ways and means for ekphrasis further study, can be considered truly programmatic. The researcher dwelled on such problematic issues as the ekphrasis term's breadth degree, object's image recoding features, etc.

The reports of the "Icons – Texts – Icontexts" conference were equally interesting and informative; they were reflected in the corresponding collection of articles (Wagner, 1996).

The understanding of the ekphrasis term is ambiguous itself. The first use of the ekphrasis term is attributed to the ancient Greek historian Dionysius of Halicarnassus (second half of the I century BC), who understood ekphrasis very broadly, or rather, as a description of any object of reality.

In modern scientific works on literary criticism, linguistics, and art history, this term is understood in different ways. For example, Heffernen (1993) defines ekphrasis as "a verbal representation of visual representation" which reflects a very broad understanding of the term.

Other scientists, for example Geller (2002), believes that the meaning of ekphrasis should be reduced to describing works of art. Thus, according to this understanding ekphrasis as "a description of decorated objects and works of plastic arts".

Some researchers are trying to find common characteristics of diegesis and ekphrasis (Shatin, 2004). Morozova (2006) believes that ekphrasis is an intermediate link between description and narration.

It seems to us that ekphrasis is a kind of description, and not at an intermediate link. Ekphrasis does not contribute to the plot's advancement – it does not have signs of diegesis. The ekphrasis dynamics is not equivalent to the narrative dynamics. The ekphrasis dynamics has an internal nature, it shows itself within the ekphrasis context itself, while narrative dynamics has an external nature, it promotes the plot's movement.

Only when the picture is revived, the image, as a result of metamorphosis, transfers into the LT's diegetic space, turning the object of perception into an actant of action. Some issues of such a transformation are considered in the article by Shatin (2004).

Georgy Ivanov is considered to be one of the most skillful masters of ekphrasis description in world literature. He wrote poems based on London and Leipzig colored

engravings, paintings by Watteau, Lorrain, Gainsborough, the "Little Dutchmen", and concerning domestic painters he chose those who worked with historical "gallant" subjects – Serov, Somov, Lansere. His "There are… in the lithographs of ancient masters" and "Again whitewash, sepia and soot…" have already become textbook examples in terms of ekphrasis.

Gogol has shown himself as a master of ekphrasis in his story "Portrait" (1966), which gives several descriptions of portraits of secular aces, their stupid wives, and daughters. A terrible description of the usurer-devil's portrait, from time to time coming to life and leaving the frame of the canvas – his usual place of "living" is presented to the reader.

Edgar Poe (1983), John Galsworthy (1960), Agatha Christie (2004), Arthur Conan Doyle (2004), Iris Murdoch (1975), Dan Brown (2003), Somerset Maugham (2005), John Fowles (1965) and some other famous prose writers paid attention to ekphrasis description in English literature.

At first glance, ekphrasis description is a relevant component of texts that are devoted to the painters' work. And in many cases, they are actually there. For example, there are ekphrasis descriptions in Murdoch's novel "The Sandcastle" (1975), which has the fate of a young artist as its centerpiece. In Huxley's novel "Crome Yellow" (1976) Gombauld one of the central characters is also an artist. The appearance of both ekphrasis descriptions' paintings in their artistic and living space seems to be quite natural.

At the same time, despite the expectations, there is not a single full-fledged, detailed ekphrasis description in Maugham's novel "Of Human Bondage" (Maugham 2005), although the focus is on the fate of a person, the prototype of which was the famous artist Toulouse-Lautrec. Thus, ekphrasis descriptions are the optional, albeit an organic text element in novels and short stories devoted to the artists' life or the issues of painting.

Baeva (2007) is looking at the ekphrasis phenomenon from the intertextuality standpoint, calling descriptions of such spheres of art as theater, music, dance, and painting the "syncretic intertextuality"

The "intertextuality" term is also used in such researches; its author is the German scientist Otto Hansen-Löwe (Tishunina, 2003). He interprets "intertextuality" as the inclusion of texts from other semiotic systems in the fabric of the work of art text.

When it comes to the intersection between verbal and non-verbal texts, Lotman (1984) uses a different term, "intersemioticity". Finally, Arnold (1995) uses the "syncretic" term when he analyzes cases of interaction between elements of different semiotic systems. While recognizing the legitimacy of using all these terms, we want to emphasize that the mechanism

of recoding, the transformation of elements of one code (visual) into another – verbal is the basis of ekphrasis.

We define ekphrasis quite broadly as a verbal representation of an artifact, i. e. any object that is the product of human activity. It can be a tool, a household item, as well as an art object.

In our thesis, we consider cases of a verbal description of only such objects of art that are called canvas paintings (pictures), as well as drawings, drafts, and sketches made on paper, glass, and other materials of natural and artificial origin. Thus, the focus is on only one kind of ekphrasis, namely graphic ekphrasis.

The peculiarity of ekphrasis lies in the fact that another sign system, the iconic one, is subject to verbalization. The iconic signs are verbalized, transformed into a verbal fabric, i. e. move to another code. The specificity of such transformation lies in the fact that a literary text does not set the task of achieving a complete sign match, i. e. quantitative equivalence (one iconic sign → one verbal sign), it is literally impossible (Srebryanskaya, 2005).

The method of iconic signs' selection and their verbal representation completeness depends on many factors and, above all, on the artistic task that the author faces, and on the functions that ekphrasis must perform in a literary text.

Ekphrasis is impossible outside of a perceptual event. The perceptual event shows itself in three plans:

1) situational, which involves the interaction of the subject of perception with the object, and is the generative basis of perception;

2) apperceptive, which is a system of internal conditions for the successful perception of what is happening by the individual;

3) imaginary, which is associated with the phenomenon of perception (Barabanshchikov,1997).

The situational plan captures the combination of external conditions, or determinants of the perceptual phenomena emergence, functioning, and development.

This plan usually receives verbalization in a literary text in the form of a frame structure that frames the pictorial information.

The apperceptive plan reveals the internal conditions of perception that characterize a certain state of the subject of perception (the observer). It also lends itself to verbalization to a sufficient extent and is explicated in a literary text by the corresponding lexico-semantic groups.

The imaginary plan emphasizes the originality and uniqueness of the perceived object's sensual image. And this aspect is fixed quite actively in the ekphrasis complex of a literary text in the form of the graphic line's description.

It is possible to say that all components of the perceptual event in various proportions are presented in the ekphrasis complex in the form of corresponding text segments or linguo-architectonic "nodes".

Actually, the individual (the observation subject) is not only given the external components of the observation object at any time but functional-objective meanings are revealed to him. This fully applies to the canvas painting.

We are talking about perceptual meaning, – the meaning of things perceived "here" and "now", i. e. things that in perceptology are called the actual perception object (APO). It is performed in a sensory form through a modal-qualitative or spatio-temporal dimension however, it can also be verbalized (Leontiev,1999).

The information content, as if being intertwined from subject "nodes" that form a perceptual semantic network. The latter acts as the subject-semantic basis of perception (Rosch, 1978).

APO is revealed to the subject as a core, a functional center of information content. In our case, this is a fine art work.

The actual subject, i. e. a canvas painting, a drawing, etc., exists in a system of potentially significant connections, properties, and relationships that make up the background.

Along with the core of information content, this allows distinguishing its periphery. The background properties are reflected in the real situation of perception in generalized, reduced, and distorted ways (Barabanshchikov,1997).

The latter is often described in a literary text with a sufficient degree of detail, resulting from specific artistic tasks, as well as the peculiarities of the work author's creative style.

The perceptual event is based on a specific perceptual situation or perceptual process.

The perceptual event is heterogeneous. It includes conative, cognitive, dispositional (attitudinal), and executive components, the unity of which (apperceptive complex) becomes an internal prerequisite for the interaction of the perception subject with the object.

The need for specific visual information (the conative component) acts as a "spring" that starts, controls, and stops the perceptual process.

If the conative component initiates and maintains a perceptual event, while the cognitive and executive components organize and transform the perceived content, then the

dispositional component pulls heterogeneous processes in one direction and keeps them together until the end of the event.

The successive change of perception stages, according to psychologists, is not represented in the observer's mind. They believe that only the final product of a perceptual event is revealed to the observer – the image of the object, accompanied by the experience of gaze direction.

However, the writers penetrate the most remote corners of humans' psyche and describe the various stages of perception in a literary text. They have access to both controlled and uncontrolled actions of the observer, the sphere of the unconscious, etc. This is one of the specific features of verbalization and description of perceptual processes in a literary text, including within the ekphrasis complex.

Ekphrasis Complex as a Verbal-Compositional Analogue of a Perceptual Situation

The situation of perception is characterized by the content and functional heterogeneity of its elements, connections, relationships, and their orderliness relating to the perception subject. The vector connecting the positions of the subject and the object (perception object) sets the objective orientation of the individual's interaction with the environment, the subject of perception with the object. This is shown in the indicators of the spatial comparison of the subject and object.

According to our calculations, the indicated spatial comparison in a literary text is fixed in 67 % of cases. Accordingly, in 33 % of cases, it remains verbally unmarked.

The perceptual situation is distinguished not only by integrity but also by dynamics and development. This is a system of events unfolding in time, i.e. having a beginning, a climax, and an end. In the case of ekphrasis complex in a perceptual situation, it is possible to single out text segments denoting the following:

1. preparation for the APO perception and its beginning;
2. the process of perception, together with the graphic line's elements fixation;
3. the perception process completion.

All these stages can be verbally recorded in a literary, but some of the stages, and sometimes the whole situation of the perception process, are not reflected in the ekphrasis complex. According to our data, cases, where all three stages are presented, amount to 38 %. The complete absence of such information accounts for 24 % of ekphrasis complex. In other

cases, there is no verbal fixation of either one (17 %) or two stages of the perceptual situation (15 %).

Appeal to the perceptual situation allows us to consider the entire spectrum of perception's information content, coming from the features of both the environment, including the actual (or immediate) perception object (picture, drawing, sketch), and the individual-subject, taken in their interaction and dynamics.

The subject and semantic organization of the information content of perception, or rather the perceptual situation, is provided by a perceptual scheme, i. e. a cognitive structure that carries the "semantic core" of the perceptual situation – its main, or rather essential and typical features.

A perceptual scheme that reflects a perceptual situation in its verbal dimension contains information about the main elements and relations of the perceptual situation: the location in the subject's space and the perception's object, background objects, etc. At the same time, this information is given both in figurative and propositional forms.

The scheme sets the frameworks, guidelines, and direction of the perception subject's activity (Nisser,1981). Due to the scheme, any perceptual situation is somehow determined for the subject, it is oriented in it. In other words, the scheme creates a context that directs the subject's activity along a certain channel (Norman, 1975).

Sensory impressions in the course of perception are assimilated by the scheme, filling and enriching it with concrete content. Due to the scheme, the reality is perceived not chaotically, but as an organized whole. Thus, in the case of painting, the strokes of paint on the canvas are perceived not as separate elements, but as images of people and nature.

The scheme carries the norms of relations between the elements of the perceptual situation, including the coordinate system of space and time, the standards of harmony, as well as the rules according to which the perceptual world is built.

It is especially important for us that the schemes open the possibility of signifying the information content of perception and including it in the language system (Leontiev,1999; Nisser,1981; Freidenberg,1998)

The introduction of ekphrasis into the fabric of a work of art, as already noted, is carried out through the corresponding perceptual situation.

The situation of perception, including the visual one, is an integrative formation, including heterogeneous elements of the individual (subject of perception) and the environment, primarily the object (subject) of perception, which are united by the common

place and time of their existence, objective relationships (cause-and-effect, structural, and functional) and perceptual-sensory relations. The cementing role and initiative in a perceptual situation belongs to the individual.

The logic of perception's situation development is based on the priority of internal connections over external ones, and the predominance of centripetal forces over centrifugal ones. In the situation of visual perception, two key links are distinguished: the individual, i. e. subject (S), and the perception subject/object (O).

The leading factors of the perceptual situation are the intentions and goals of the subject. They determine the type of situation, its structure, the object of perception, and the strategy of activity. An integral unit of the perceptual situation's analysis is an episode – a relatively complete fragment of a life situation, due to the unity of local-temporal parameters, the unity of participants, and a certain dominant frame, which is understood in the sense that this term acquires from Minsky (1979) and his followers.

In our case, such a basic frame is a situation involving visual perception, description, and reaction to the oculomotor perception of a painting object in a certain local-temporal system, the subject of which is a person (individual).

A verbal-compositional unit within the literary text that is adequate to such a perceptual situation will be called an ekphrasis complex, which, however, has its specifics and is not identical to a real perceptual situation (PS).

It becomes obvious that this basic PS frame has its modifications in a literary text. Thus, actually, any person, both a professional and an amateur, can act as a subject of observation. Here real perceptual situation and ekphrasis complex coincide. However, not only people but also entities of inanimate nature, phenomena, and representatives of the animal and plant world can be the subject of observation in a literary text.

Of course, the animal is endowed with a sensory-motor apparatus for visual perception of the environment, but it actually cannot see its aesthetic value in a painting. As for the inanimate nature, it is generally not possible to talk about the sensory capabilities of the latter in the real world.

The perception objects (a canvas painting as a whole or an image, drawing, sketch) are inanimate entities in the real world. The image can come to life in a literary text by acquiring the person's features, its physical properties (the body volume), etc., i. e. turn into an anthropomorphic, or rather, an anthropological entity.

When contemplating an object that performs the Percept's functions, the perception subject acts in a real PS as an Experient (Paducheva,2001). During the period of preparation for the perceptual process, the subject of observation can also act as an Agent and the object of observation as a Patient. Let's recall that the Agent assumes an active, up to physical, impact on an object (Patient). The concept of an Experient does not imply a physical impact on the object of contemplation (Percept).

However, there is often a change, or reversion, of functions in a literary text: an object can turn into an Agent, or an Experient, and a subject into a Patient or a Percept. The perception in a real perceptual process can be carried out holistically. The description of perception is always discrete in a literary text. It can only be fixed element by element. The final recipient of visual information, the reader, receives this information indirectly, through a verbal code that cannot fully reflect all the details and nuances of the image. The principle "It is better to see once than hear ten times" or, if we rephrase, "… than read ten times" clearly applies here. The scheme of the real perceptual process in the case of a canvas painting or drawing is presented in Table 1.

Table 1. The real perceptual process frame

Core situation	The subject of observation is a person as an active principle, having his motivation for contemplating. It fulfills the role of the Agent and the Experient here;
	object (subject) of observation is a picture, drawing, sketch, stationary, static planar, two-dimensional, vertically, and horizontally limited image. The image object is not limited both thematically and substantially; it fulfills the role of the Patient and the Percept here.
Correlation "subject-object"	Mutual influence: (1) direct – in case of "subject → object" and (2) indirect – in the case of "object → subject"

This universal scheme can be violated in a literary text. A person is not necessarily the subject of observation, it can be animals, objects of inanimate nature, or phenomena that act as an Experient or Agent.

The object of observation as a whole or the object of the image can acquire dynamic properties and characteristics in a literary text (animation of the image, acquisition of corporality, three-dimensionality, biologicalness). It can turn into a subject of action – an Agent from a Percept/Patient, including in relation to the subject of observation.

The object of observation, which actually has only an indirect effect, can have a direct physical effect in a literary text. The relationship between the object and the subject here

becomes reversible. The image – the Percept becomes the Agent, and the observer becomes the Patient.

This is typical for fantastic, mystical, and fairy-tale works. Thus, in Gogol's "Portrait" (1966) story the image of the usurer comes to life, it repeatedly leaves the frame of his image – the painting, performs certain actions, in particular, opens bundles with cons, and so on. He causes horror to the next owner of the painting with his devilish gaze, he brings him misfortune and death.

The perceptual act is carried out in time and space. The time of perception in ekphrasis complex is usually transmitted using various indicators of time, which may indicate the stretching, slowing down of time, or its compression, which leads to its distortion compared to the real one.

The local determinant of a real PS is ambiguous. This may be a special room for viewing a work of art – a hall of a museum, exhibitions, etc. It can be ordinary residential or non-residential premises or a studio. Finally, it can be an open space.

There are no restrictions in a literary text in this regard either. At the same time, our observations have shown that the authors of a literary text remain in fairly traditional positions. Usually, the PS place for them is a room where the appearance of a picture is quite natural, and appropriate, – a studio, an artist's home, an exhibition hall, a living room, and so on. Thus, the picture either stands on an easel or hangs on the wall (80 %).

The authors of a literary text most often proceed from a two-stage spatial scheme of object's localization discrete representation: a room is indicated, and then the immediate position of the picture in this space is fixed. Thus, Langdon comments on Dan Brown's portrait of the Mona Lisa in a darkened penitentiary library, and the projected image of the Mona Lisa on the library wall (Dan Brown, 2003).

However, the second localization indicator is often omitted, while the first is consistently present in the ekphrasis complex (ratio 1:3).

Actually, all stages of the perceptual situation follow one after the other in a strict sequence. First of all, it is preparation for visual perception and the perceptual process itself, then the emergence of certain visual images in the observer, about which the observer has corresponding thoughts and emotions.

This natural order of perceptual actions is easily violated in a literary text. The author can skip certain stages and links or give them in any order. Often visual impressions precede the graphic line's description.

Some authors clearly fix the beginning of the perceptual process, but say nothing about its end. The general impression of the picture may precede its detailed description or description of its inspection and perception process. For example, in Agatha Christie's "Five Little Pigs" novel (Christie, 2004) Poirot first conveys his surprise, i.e. impression of the picture, and only then proceeds to describe its graphic line. The violation of the natural sequence order of the visual perception's stages allows applying the retardation (suspense) technique. Due to this, the reader's attention reaches a level of maximum concentration. Undoubtedly, he quickly wants to know what has made such an impression on the famous detective in Christie (2004):

> "Poirot caught his breath. He had seen so far, four pictures of Amyas Crale's: two at the Tate, one at a London dealer's, one, the still life of roses. But now he was looking at what the artist himself had called his best picture, and Poirot realized at once what a superb artist the man had been".
>
> (Christie, 2004, p. 124).

As we can see, the retardation takes up a whole paragraph. Only by achieving the effect of the most intense expectation, Agatha Christie proceeds describing the portrait itself:

> "The painting had an old superficial smoothness. At first sight it might have been a poster, so seemingly crude were its contrasts. A girl, a girl in a canary-yellow shirt and dark-blue slacks, sitting on a grey wall in full sunlight against a background of violent blue sea. Just the kind of subject for a poster."
>
> (Christie, 2004 p. 124).

At first, it seems to the observer, i. e. Hercule Poirot, that he sees some kind of poster, – the colors are too flashy: the poisonous yellow, canary color of the shirt, blue trousers, bright sunlight, – everything is built on contrasts, which is typical for banners and posters. Only then he realizes that this is a work of art, not a poster painting.

The first impression is deceiving. Thanks to the analysis, Poirot manages to understand what is the power of the picture's influence: in the powerful energy, in the vitality that is felt in the girl depicted in:

> "And the girl –
>
> Yes, here was life. All there was, all there could be of life, of youth, of sheer blazing vitality. The face was alive and the eyes…
>
> So much life! Such passionate youth! That, then, was what Amyas Crale had seen in Elsa Greer, which had made him blind and deaf to the gentle creature, his wife. Elsa was life. Elsa was youth."
>
> (Christie, 2004, p. 125).

The analytical train of thought is interspersed with estimates and a description of the model:

> "A superb, slim, straight creature, arrogant, her head turned, her eyes insolent with triumph."
>
> (Christie, 2004, p.125).

This correspondence acquaintance with Elsa Greer through her portrait precedes their meeting with E. Poirot. The sharp contrast between the portrait and the live model strikes E. Poirot even more. Elsa Greer, being alive, made of flesh and blood, seems lifeless, while the image is full of dynamics and vitality. This ekphrasis complex in the novel is multifunctional. It is a plot-forming element that performs a utilitarian function: it allows E. Poirot to find clues for solving the mystery of the artist Amyas Crail's murder. The power of the portrait's impact is not immediately revealed by E. Poirot. Only later he realizes what struck him so much in the portrait: the farewell glance of the murderer woman, who looks from the picture at her victim – the artist.

> "I should have known when I first saw that picture. For it is a very remarkable picture. It is the picture of a murderess painted by her victim – it is the picture of a girl watching her lover dies…"
>
> (Christie, 2004, p. 125).

Thus, the secondary image precedes the direct object's description. This makes it possible to compare various characteristics, compare the impressions of the artist with the impressions of the direct subject of observation, i. e. creates a multi-dimensional artistic image of the character. At the same time, the precedence of a portrait description to direct perception always increases the tension of the reader's attention. A pictorial portrait performs a preparatory function, allowing later to note the similarities and differences between a living impression and an impression from an iconic image. The portrait (painterly) characteristic is

always more concentrated. The most important thing in a person appears in a concise, capacious form, while many accompanying circumstances interfere with a direct impression.

Conclusions

1. The ekphrasis refers to the description of artifacts, i. e. objects that are the product of human activity. One of the ekphrasis' varieties is pictorial ekphrasis, which is characterized by a description of paintings and their duplicates. It is the main subject of this research. Ekphrasis in a literary text is represented by ekphrasis descriptions, which are the compositional-content dominant of the ekphrasis complex.

2. The ekphrasis complex is a virtual analog of the real perceptual situation in a literary text and includes the fixation of the entire set of processes of perceiving works of art in verbal form.

3. The ekphrasis complex as the literary text component has its specific features. In particular, this concerns the ekphrasis complex's compositional-temporal organization. Its elements associated with the corresponding stages of perception, in contrast to the actual perceptual situation, can follow in any sequence, regardless of their order in reality. The latter is due to specific artistic tasks, in particular, the desire to increase the tension degree of the reader's attention, to create the retardation effect.

4. The ekphrasis complexes can be complete (full component) and incomplete (partial component). The complete ekphrasis complexes contain elements of four basic linguo-compositional planes, namely: the pictorial (ekphrasis description), perceptual, emotional and axiological, and historical and culturological. The elements of one or more plans are missing in incomplete ekphrasis complexes, which contributes to an increase in the narration dynamics.

5. As it has already been noted, the ekphrasis description, i. e. the graphic line is the basis of the ekphrasis complex. However, the research showed that the ekphrasis description can be presented in the most concise form. At the same time, the main emphasis, as a rule, is shifted to the emotional and axiological sphere.

6. The ekphrasis complex performs several functions in a literary text: plot-forming, characterological, aesthetic and decorative, and utilitarian (for example, a picture is an evidence in a prosecution).

7. The "subject-object" correlation, which actually is reduced to the "Agent-Patient" or "Experient-Percept" relationship, undergoes various modifications in a literary text,

including those in which the role reversion occurs: the object acquires the subject's properties and vice versa.

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Formation of Social Success and Life Optimism in Pupils in Crisis Conditions

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ABSTRACT

The necessity of development and introduction of a new socio-pedagogical paradigm of education, which affirms universal values (dignity, mutual assistance, care, etc.) as a basis for the formation of life optimism and social success of the individual. Trends of modern educational process (focus on results in the form of competencies, further deepening of digitalization, virtual and augmented reality, STEM-approach as preparation for future professions, creolized texts, project-based learning, media education, gamification, formative assessment) are revealed. Taking into account these trends, scientific approaches (axiological, acmeological, personality-oriented, competence, activity and project-technological) to the formation of pupils' social success and life optimism are highlighted. The technologies of formation of such qualities – «case-study» and portfolio are characterized; their common and distinctive features are defined. Two groups of portfolio types have been identified and analyzed (portfolio of successful personality and portfolio of external achievements).

Keywords: *social success, life optimism, pupil, educational process, portfolio.*

Introduction

Changes in the socio-political and economic spheres, which are taking place in the modern world under the pressure of various crisis factors, make new demands towards the education system. Currently, the main challenges to the effective functioning of Ukraine's general secondary education institutions are the cumulative impact of destructive social factors (Russia's military aggression, mass emigration from the occupied territories and territories where brutal hostilities are taking place, social apathy and loss of optimism, stress, unemployment, alienation of the child from the positive emotional support of various child and adult communities, etc.). This entails a violation of the rights and freedoms of individuals and communities, in particular the rights of the child to life (Article 6), education and a standard of living adequate for the physical, intellectual, moral, cultural, spiritual and social development (Articles 28-29), defined by the UN Convention on the Rights of the Child (Unicef, 2019), complicates the implementation of educational influences on the growing personality of the family and teachers of educational institutions.

The program of education «New Ukrainian School» in the progress of values» emphasizes «the complexity of modern educational problems requires a comprehensive approach to their solution and development of socio-pedagogical paradigm of education. The basis of this paradigm is the child's personality, recognition of its highest value, teacher's orientation to humane, democratic principles of joint life with the child» (IPV, 2019). Thus, the basis of education are universal values (dignity, honesty, respect for themselves and others, mutual assistance, care, solicitude) on their basis socially significant motivation, vital optimism, joint responsibility and partnership, social success are formed. We focus on two interrelated basic concepts of our research: «pupil social performance» and «pupil life optimism».

Social success of the pupil – the ability of the pupil to achieve educational and social goals, fully fulfill their responsibilities, overcome difficulties, show curiosity, actively and creatively perform social roles; to have recognition of their achievements in the immediate social environment, school staff.

Life optimism of the pupil – the ability of the pupil to see the positive in any life situation, easy to find and attract resources to overcome difficulties in achieving certain goals, solving pressing problems; confidence in a better future, victory.

In the current conditions of war, Ukrainian society more than ever needs active citizens capable of spiritual, moral and socio-cultural self-creation, ready to constructively adapt to social realities, constantly nurture their own self-development, increase their competence, and find optimal ways to solve crises caused by war, to organize themselves and others for prosocial service to the state and society. The humanistic vector of development of educational processes in Ukraine draws increased attention of pedagogical science to the tasks of value orientation of pupils in the crisis realities of public life, forming the basis of their success in life in the form of life optimism, self-sufficiency and prosocial activity. Pupils must cultivate the strength and skills to grow as responsible and proactive citizens, open to change and confident competitive professionals, active participants in the democratic restoration of the state (Kyrychenko, & Necherda, 2022, p. 146).

At the planning and strategic level, this should monitor the challenges facing the education system, and at the organizational and tactical level – in a timely manner to select adequate to the challenges content and instrumental and technological support for training, education, development and socialization of pupils.

Achieving these goals can provide only radical changes in all educational units, thoughtful methodological reflection of classical pedagogical heritage, comprehensive understanding of trends in modern educational process, intensification of partnership between scientists and teachers in providing the necessary and sufficient conditions for forming a competent personality capable of accumulating internal and external resources, to develop adequate responses to the challenges and threats of the modern world and, at the same time, to use all opportunities for self-development and self-realization.

Results

Trends of The Modern Educational Process

At present, educators must focus on ensuring the mobile reorientation of pedagogy, its rapid adaptation to today's crisis, and the conscious use of research results in the field of didactic renewal. Now more than ever it is necessary to take into account the psychoneurological features of modern pupils (the so-called *Generation Z* (Z) and *Generation A* (Alpha), skillfully track and use trends in social and personal development, turning them into effective tools of educational influence.

We understand the term «trend» as the dominant direction in development, public opinion. Hence, being in trend means «keeping up with the times» and staying up to date with the latest news concerning particular topic. Included observations of educational practice give us reason to say that for the formation of social success and life optimism of a pupil in a crisis the most relevant trends are: focus on results in the form of competencies, further deepening digitalization, virtual and augmented reality, STEM approach as preparation for future professions, creolized texts, project-based learning, media education, gamification, formative assessment. Let us dwell on them in more detail.

Digitalization. Modern man should feel comfortable in the digital environment, because it depends on how successful and productive he is in life. Quarantine restrictions related to the COVID-19 pandemic and actual hostilities have exacerbated the need to improve the quality of education through digitalization. These are the time requirements for teachers to make extensive use of the possibilities and benefits of networking (Web 2.0) and a variety of digital tools while working with pupils and their parents.

These can be:

- *information tools*: applications that provide information in various formats (text, sound, graphics or video, multimedia encyclopedias or resources on the Internet); organizationally it can look like distance learning (mass open) online courses;

- *search and research tools:* modelling, simulators, educational games and virtual reality;

- *design tools*: relations in social networks that allow you to organize your ideas or thoughts, design your thoughts and share them with others using cloud technology;

- *communication tools*: e-mail, Skype, chat, online groups, video conferencing, social media, etc.

Digitization is increasingly blurring the line between real and virtual worlds, making it easier for pupils to access information.

Competence of education is the orientation of education towards the result in the form of developing values and developing key competencies of pupils, promoting their successful self-realization in the profession and life. Taking into consideration the abovementioned, one of the strategically important activities of a modern educational institution is the introduction of a competency-based approach to learning. Therefore, the task of each teacher is to ensure the formation of competencies of modern pupils with didactic tools and instruments that best meet peculiarities of pupils. In this case, the result of learning will be knowledge, skills, abilities, and ways of thinking, attitudes, values, and other personal qualities acquired by pupils in the process of learning, education, development.

In the future, the most successful and in-demand employees will not be those who once learned a lot of information, but those who can effectively adapt to new conditions, learn throughout life, find necessary and correct information, produce non-standard solutions and work with others. With this in mind, employers are increasingly paying attention to the so-called «soft skills», in particular, the formation of four of them:

- critical thinking (ability to see, formulate and evaluate the problem);

- creativity (ability to solve problems in a non-standard way);

- collaboration (ability to work in a team);

- communication (ability to build a system of productive relationships).

Educators and social educators need to focus on these «soft skills».

STEM education. Education should benefit those who receive it and be advanced, i.e. meets tendencies of development of society in the future. It should be noted that educational

institutions mostly do not prepare pupils for successful life by choosing the priority professions of the future (such as climatology engineer, robot designer, space tourism manager, personal safety designer, virtual world designer, city farmer, personal brand manager, emotion designer, mind fitness trainer, etc.). However, there is already STEM education or the direction of innovative development of natural and mathematical education, based on the integration of interdisciplinary and applied approaches into a single learning scheme. It allows graduates to develop the qualities and skills of socially successful personality, because through STEM education pupils develop logical thinking and technical literacy learn to solve problems, become innovators, inventors.

Another task of STEM is to promote better socialization of the individual, adapt the education system to the needs of real life: the pupil not only masters a certain amount of information from individual sciences, but also gets a concrete result in practice from the synergy of all subjects.

Organizational and pedagogical conditions of successful STEM-training are recognized: developed project culture; reliance on practice; introduction of inverted learning; support for courses in the online environment; use of online services; making (DIY approach).

Creolized texts. The transition to distance learning has naturally increased interest in the visualization of information in education: the combination of text and images has become almost the main link between pupil and new knowledge, as visual information is perceived by the brain 60 times faster than text (Draiden, & Vos, 2005).

It is not easy to attract the attention of the current generation of students, but it is real. Here creolized texts come to the rescue. A combined text formation can contain visual and audio elements.

The term «visualization» comes from the Latin «visualis» – something that is perceived visually; visual. This means the process of presenting individual textual data in the form of an image in order to make them easier to understand. The main purpose of visualization is to make textual information complete, readable and functional, add the necessary effects and eliminate unnecessary. Therefore, the key role in creolized texts is played by the image itself (pictures, symbols, diagrams, charts, font compositions).

Creolized texts include: comics, motivators, posters, logos, doodles, photo collages, booklets, book trailers, animated educational videos, tag clouds, crosense, scribing, pan books, scrapbooking, emoji stories, info graphics, smart cards, etc. (Bohosviatska, 2021). Usually, pupils are eager to participate in the creation of creolized texts, as they are proficient

in a variety of digital tools and devices, and therefore can gain experience of successful activities and present their skills.

Academician Bekh emphasizes the importance of the educational effect of such activities for pupils: «If a pupil exercises in creative and independent activity, he will later transfer it to the construction of life plans» (Bekh, 2018, p. 71).

Immersive learning – the use of *Virtual Reality* (VR) and *Augmented Reality* (AR) technologies in the educational process.

The immersive format allows first, to create a realistic environment as close as possible to real life; secondly, to purposefully train in concrete actions, blurring the boundaries between theory and practice. As a result, the right skills are learned faster and better.

Virtual and augmented reality allow you to add elements of play and interactivity to learning, make it more visual and, of course, more interesting. This assists pupils to easily master even very complex learning topics; easily focus on the learning process; understand how to apply the acquired knowledge in practice.

Thanks to virtual and augmented reality, participants in the educational process get a great opportunity to jointly analyze difficult life situations, resolve conflicts productively, and improve themselves. It should be noted that today these technologies are very expensive. However, in the future VR will become available, glasses, helmets will be more and more high quality, and cheap, and thus the experience of creating and using effective VR-projects for personal development will be enriched.

Gamification is the use of game thinking, game dynamics, elements and techniques inherent in games, in order to increase student motivation, facilitate their involvement in the conscious solution of various educational problems. In other words, it is education in an entertaining format, or edutainment; appropriate integration of elements of entertainment, games and learning. Modern technical means allow making «fun» (sense of satisfaction) synonymous with learning. With this approach, the game can become a canvas of educational activities (Draiden, & Vos, 2005).

Enjoying the process of learning is the basis of a lasting interest in learning, so it is not surprising that the quality and quantity of edutainment projects around the world is constantly growing. In times of crisis, when pupils are forced to study at home for many days, they especially need encouragement to acquire knowledge – gameplay just adds drive, arouses interest and desire to learn something new. It:

- develops teamwork skills, support each other, creativity;

- improves attention, encourages competitiveness and teaches competitiveness;

- has a positive effect on motivation, contributes to the gradual success of dynamics and increase achievements;

- gives emotional benefits, improves mood and strengthens life optimism.

Personalization of learning. Personalization is a shift of emphasis in focusing the educational process not on educational standards and requirements, but on the pupil. His personality, strengths and weaknesses, talents and abilities, learning environment and cultural context are all factors that personalization offers to take into account and to adopt them.

It is time to focus on individual learning. That is, the main thing in the educational process is the focus on the interests, commitments and experience of pupils, taking into account their needs, age and individual characteristics. This is facilitated by the individual educational trajectory (personal way of realizing the personal potential of each pupil in education). The personal potential of the pupil here means a set of his abilities – activity, cognitive, creative, communicative and others. The process of identifying, implementing and developing such abilities of pupils takes place during the educational movement of pupils through individual trajectories.

Digitalization of education and *artificial intelligence*, which make the learning process interactive and safe, help to ensure personalization of learning for each pupil and the implementation of individual educational trajectory, take into account the methods and pace of learning material, develop the necessary competencies for the child.

Project-based learning always involves pupils to look for different solutions to a specific problem. This, on the one hand, is done using a variety of methods, teaching aids, on the other – by integrating knowledge, skills from different fields of science, technology, art and more. The results of the implemented projects must be «tangible»: if it is a theoretical problem, then its specific solution, if practical – a specific result, ready for implementation.

Project-based learning is a mandatory element of the modern educational process, one of the leading means of mastering pupils' skills of planning their own activities, selecting ways to successfully implement life plans, forming and updating pupils' life experiences. No wonder project-based learning is one of *the technologies of the XXI century*, which teaches, above all, to adapt to the rapidly changing conditions of human life in a crisis society.

Participation in project activities contributes to the development of aim-subject competencies and actual life competence, forms the skills of developing their own strategy of life and the development of their own lives as a project. This is a powerful mechanism for

involving pupils in solving acute social problems of educational institutions and the local community, the practice of social service, gaining experience in the successful implementation of many socially significant ideas.

Media education. Professionals involved in the problems of education are concerned about the imperfection of the means of protecting pupils from immoral ideologies and values, and other socially harmful information influences that overwhelm media content. By consuming poor quality information, the current generation of pupils distorts their perception of the world around them, social norms and moral principles of human interaction, destroys mental health, so «it has never been so important to be able to separate facts from personal judgments, reasonable thoughts from stupid, truth from lie» (Robinson, & Aronika, 2016, p. 137). This highlights the need for media education, or purposeful preparation of a growing individual for the safe and secure use of a variety of media resources, which has a powerful but contradictory impact on its formation.

It is considered that media education is related to all types of media (print, graphics, audio, visual, etc.) and various information and communication technologies. It should assist people to understand how mass communication is used in their societies, and learn to use the media productively in communication with other people (Ministry of Education and Science of Ukraine, 2022).

From that, we can conclude that the main tasks of school media education are *to promote the formation of media immunity* of the individual. Such media immunity makes it able to withstand aggressive media environments, provides psychological well-being in the consumption of media products and *promotes reflection and critical thinking* as psychological mechanisms of media literacy that ensure conscious consumption of media products. Thus, educational institutions can equip their graduates with knowledge and skills to actively use the information field of the press, radio, television, cinema, the Internet to build their own life strategy and positive self-realization.

Asynchronous learning mode. This great approach gives more freedom to both pupils and teachers in distance and blended learning situations that prevail in times of crisis. Asynchronous mode gives pupils the opportunity to work on learning tasks at their own pace, reducing stress. There is no need to try your best to catch up with the class; you can safely pay more attention to a topic that seemed difficult. However, asynchronous learning is impossible without the skills of self-organization, self-discipline and the ability to manage time, a responsible attitude to their own lives. Therefore, it is not suitable for all pupils.

Proactivity. One of the most important educational trends in the formation of a successful personality and life optimism is proactivity. It points to a person's ability to act independently, to take responsibility for his life, not to wait for the right time, not to be hostage to someone else's opinion, to react quickly to change (Bohosviatska, 2021). Proactivity is one of the necessary skills of a successful person, because successful people «direct their energy to what is subject to their influence», which expands their opportunities to succeed in the chosen field of activity (Kovi, 2007).

Being a proactive person means that a person is aware of his deep values and goals, acts according to his life principles, regardless of conditions and circumstances, freely disposes of freedom of choice, is effective in achieving success, responsible for his own life, mood, achievements and mistakes (Proactyvnist, 2019).

Proactivity can be considered as *a quality of personality* and as *a style of behavior*. According to scientist Erzin, proactivity is a stable characteristic of a mature person, which is expressed in at least five aspects:

a) self-determined behavior, i.e. behavior that is due to internal motives of the individual, rather than external impetus;

b) the ability to effectively cope with situations and environmental requirements that could potentially cause distress;

c) the ability to predict the occurrence of a certain life event, as well as to build behavioral strategies focused on the future;

d) ability to set long-term goals and strive to achieve them;

e) willingness to actively influence environmental conditions in contrast to passive adaptation (Erzin, 2014).

Proactivity as a pattern of behavior, expressed in the form of personal responsibility, helps to overcome obstacles and difficulties, create new opportunities and cope with difficulties, and as a result – creates a healthy relationship between people. When we consider proactivity as a style of behavior, it plays an important role in effectively overcoming difficult life circumstances, in building the potential for personal development.

Formative assessment is a consistent meaningful interaction between the pupil, teacher and parents to determine the pupil's achievements based on clear goals and criteria, as well as changes in educational programs and selection of teaching methods and education according to individual pupil trajectory.

Formative assessment – assessment of a pupil's progress in learning, the formation of his self-confidence by emphasizing his strengths, rather than mistakes or miscalculations. Such assessment is extremely important for the formation of social success and life optimism of a pupil, because it provides a reflective understanding of the dynamics of his progress towards the goal, gaining self-confidence through awareness of their own strengths, not mistakes or miscalculations.

Researchers consider a portfolio as a modern means of formative assessment, which helps to analyze the abilities and interests of pupils in the process of their learning and development, organically combine and take into account the results of educational, creative and socially significant activities. Its special significance lies in the ability to provide accumulated formative assessment, which helps to identify the extent of pupil achievement in general, consolidate and assess his willingness to apply the acquired knowledge, skills and abilities in practice (Sánchez, & González, 2015).

Approaches and Technologies of Formation in Pupils of Social Success and Life Optimism

Currently, in search of an effective model of forming pupils' social success and life optimism, scientists use different theoretical and methodological approaches: axiological, acmeological, personality-oriented, competence, activity and project-technological.

We share the established views concerning the methodological approach as a comprehensive pedagogical tool, which includes the following components: *conceptual and categorical* (basic concepts which the architecture of changes in the processes of organization, management and renewal of educational activities are built on); *content* (the main centers of the organization of education, upbringing, development and socialization of pupils); *instrumental and practical* (techniques and methods of educational process). Portuguese researchers consider the content of any approach to be crucial, as «it significantly determines the deep meaning of educational influences and contributes to the development of relationships in the educational environment» (Nobre, & da Silva Pereira, 2020, p. 31).

Note that in the process of streamlining the conceptual and methodological foundations of the formation of social success and life optimism of pupils, teachers and social partners of educational institutions of territorial communities can act simultaneously within several methodological approaches. We adhere to the scientific position of the American researcher Kalaian that such a conscious purposeful combination of different approaches to achieve one

goal is important for educational practice of the XXI century, as it provides synergy of pedagogical influence and, ultimately, optimizing the process of social success and life optimism (Kalaian, 2017).

Comprehension, selection and coordination of theoretical and methodological approaches in the formation of social success and life optimism is based on the principle of logical complementarity, taking into account the neuropsychological characteristics of pupils of a certain age and socio-cultural conditions of their adulthood.

The development of society is impossible without a system of humanistic socio-moral value orientations of the individual. Value orientations are one of the criteria for socialization of the individual, because they perform the functions of regulators of human behavior. That is why «Ukraine's education system must form in the younger generation an inner need to live and act in accordance with humanistic universal values» (Vitvytska, 2015). Therefore, in the education system, the implementation of the tasks of forming social success and life optimism of the pupil is impossible without *an axiological approach*. It allows us to consider the process of educating pupils in the qualities and abilities necessary for social success as a means of forming universal values (life, freedom, peace, honor, truth, work, knowledge, health) and those that have recently become a priority in the new coordinate system social development (stress, competence, initiative, mobility, assertiveness, competitiveness, etc.).

In the practice of formation of social success and life optimism of a pupil with assistance of axiological approach the pupil *discovers* the content of a value and its meaning, ensures its *awareness* and *emotionally positive attitude* to this value, its *inclusion* in the subject-subject relationship of pupils with adults and peers and strengthening values in pupil behavior.

The basis of *the acmeological approach* is the focus on «acme» – the maximum manifestation of personal resources, which is achieved by constant self-improvement at all stages of human life and activity. The pupil's acmeological development involves an optimistic view of him and his future.

Introduction of acmeological approach in the process of formation of social success and life optimism ensures rising in pupils of motivation for effective socialization, development of skills of independent goal setting and planning, choice of priorities, self-regulation, including self-control and self-correction, as well as reflection, self-reflection and self-actualization, social activity, so «the mission of the acmeological school is to help students master the technology of life and social success» (Sazonenko, 2010, p. 31).

The combination of axiological and acmeological approaches will take into account the possibilities of the educational environment of the institution of general secondary education and develop as accurately as possible the individual trajectory of the formation of social success and life optimism of the pupil.

The uniqueness of the personality of each pupil, his right to moral and intellectual freedom declares *a personality-oriented approach*. It means focusing on the pupil's personality as the goal, subject, result and main criterion of the effectiveness of the educational process, as well as the organization of emotionally rich multi-subject interaction of teachers and pupils.

Personality-oriented approach involves building a system of personal values that will provide pupils with support in the spiritual and practical development of the world around them, determining moral life guidelines, choosing behaviors.

Competence approach is the focus of the pedagogical process on the formation and development of basic and subject competencies of the pupil, which is expressed in the knowledge, understanding, values, and skills of pupils. According to Tanzanian scholars (Mkonongwa, 2018), the competence approach has the greatest impact on the effectiveness of educational activities and the quality of the educational process, as its implementation is based on awareness of the importance of developing constructive life strategy of pupil, development of his interethnic and intercultural competence and life optimism.

The conclusions of Irish scholars are unanimous, emphasizing the value of competency-based education for the humanization of relationships in society, at the interstate and international levels (O'Sullivan, & Burce, 2014). Event analysis (including analysis of the dynamics of events) of the educational process of experimental educational institutions shows that a person with social and civic competencies can be socially active and mobile, motivated to succeed, optimistic and socially successful.

To prepare pupils for successful self-realization, it is necessary to involve them in full-fledged social and moral activities. *The activity approach* motivates, encourages and ensures the exercise of personality in selected activities. This approach considers pedagogical phenomena from the standpoint of holistic coverage of all components of activities: goals, motives, actions, and operations, methods of regulation, correction, control and analysis of results.

According to Indian researchers, the activity approach requires recognizing the pupil as a subject of knowledge and work, who must learn to «plan and organize activities, regulate

and control it, be able to self-analyze and evaluate the results of their activities» (Sharma, & Kumar, 2018, p. 472). These abilities directly affect the personal self-development of a pupil, the optimization of his life, openness to continuous improvement in crisis conditions. That is why the expediency of using the activity approach in the formation of social success and life optimism of a pupil is beyond doubt.

It is important to note that personality-oriented, competency-based and activity-based approaches are closely interlinked and should be logically complemented and consistently implemented in educational practice. Thus, a personality-oriented approach allows the student to better understand their own nature, their strengths and weaknesses and outline the vectors of personal self-improvement. The goal of the activity approach is to transform the pupil into a subject of learning, education and self-development. In turn, the competence approach should logically complete the transformation of a pupil into a subject of social practice, i.e. successful activities in selected areas of self-realization.

In modern conditions, the transition from «pedagogy of events» to «pedagogy of partnership» is crucial, i.e. a conscious systematic combination of efforts of pupils, their parents, teachers and social partners of educational institutions – local communities in shaping social success and life optimism of a pupil.

This is ensured by the application of *design and technological approach*. This approach allows to comprehensively solving social and educational problems, to develop relevant tools to achieve educational goals, to determine and coordinate the stages of implementation of educational programs and projects.

In this regard, Indonesian scientists emphasize that in modern conditions, technology is becoming the dominant characteristic of human activity and means the transition to a qualitatively new level of efficiency and optimality (Rahmawati, Suryani, Akhyar, & Sukarmin, 2020).

The common essential features of the formation of social success and life optimism of a pupil in all these approaches are dialogue and creating situations of success, which contributes to the formation of a person with the maximum possible individualization, able to responsibly define their life goals and successful self-realization in society.

The formation of such a personality in general secondary education is carried out through the introduction of innovative methods and technologies that create an environment of success in education encourage pupils to seek ways to their own success in inseparable social well-being and gain optimism in individual experience of social successfulness.

Effective technologies from the formation of life optimism and social success by experts from among scientists, practical psychologists, educators and representatives of the parent community included, first, *«case-study»* and *portfolio*.

Content analysis of research of domestic and foreign psychological and pedagogical science and practice has shown the successful experience of implementing technologies *«case-study»* and *portfolio* in the educational process of general secondary education. We agree with the findings of Australian researchers, in particular, Beckers, Dolmans, van Merriënboer, according to them the portfolio is an effective means of developing the qualities and skills necessary for successful socialization of students (Beckers, Dolmans, & van Merriënboer, 2016). In turn, Baškarada notes that the use of case-study technology in educational institutions helps to create situations of success, increases pupils' motivation to be successful and provides a combination of theoretical knowledge with real life practice (Baškarada, 2014). The Bulgarian scientist Galcheva reveals the pedagogical potential of portfolio technology. The researcher quotes scientists Petrov and Atanasova: «Portfolio characterizes the processing, action, organization and functional side of pedagogical activities, including goals, motives, research content, methods and tools, as well as evaluation of results» (Galcheva, 2018, p. 651). The «case-study» also provides an opportunity to combine theoretical material with experience tied to a specific context to strengthen the skills identified in the learning objectives, however, case technology helps pupils better understand individual situations, organizations, problems, phenomena (Stepurko, & Ihnashchuk, 2017).

Common is also a widespread interpretation of the English words *«case»* and *«portfolio»*: briefcase, folder, bag for papers, documents. However, we must note the significant differences between these technologies. Thus, the case (the basis of «case-study» technology) is a creative task for the development of thinking, which aims to process large amounts of information and develop an algorithm for decision-making for a specific situation described in the case, and for similar situations. In addition, the case is an example of teamwork of pupils in micro groups (with the contribution of each participant is a process of gaining new knowledge and experience).

The portfolio helps to record the results of this process as a form of control of the acquired knowledge, skills and assessment of the achievements of individual pupil activity. That is why one of the tasks of portfolio implementation, researcher Galcheva notes, is to illustrate a person's efforts in a particular field and a specially organized set of evidence used to monitor pupils' knowledge, skills and attitudes, etc. (Galcheva, 2018, p. 652). Thus, «case-

study» and portfolio complement each other, facilitating the achievement of pedagogical tasks and ensuring the effectiveness of educational influences.

We agree with the scientific position of scientists from Canada and the United Kingdom, according to them *the algorithm of work on the case* involves the organizational part, individual independent work of pupils with the necessary additional information; checking the comprehension of theoretical material; pupils work in small groups; collective discussion; formation of works by pupils; protection of projects-solutions of problems-situations and summing up by the teacher (Heale, & Twycross, 2018).

Domestic researcher Osina has similar scientific views on the process of case implementation; she focuses on *three possible strategies of teacher behavior* during pupils' work with the case: teacher gives keys for solution in the form of additional questions or additional information or does not interfere in the process (Osina, 2018).

Presentation of the results of work on the «case-study» technology takes place with the help of appropriate *forms*: multimedia presentation, defense of the project, miniature work, skit, oral presentation, etc.

It should be noted that, according to teachers-practitioners of experimental educational institutions, the use of case technology has significant advantages for the teacher and at the same time makes significant demands on him. Among *the advantages of «case-study» technology*, teachers note: organization of a flexible educational process; actualization of subject knowledge and skills of the teacher; integration of knowledge from their academic discipline and other disciplines and the arsenal of life experience; continuous training; the possibility of implementing some elements of the case in cooperation with parents, social partners of the educational institution and extracurricular activities.

At the same time, teachers note that *the case is a flexible pedagogical tool* for forming the necessary qualities and competencies of socially adapted competitive personality of a pupil. Polish researcher Mucha notes that the experience of implementing «case-study» technology in the educational process of educational institutions has shown its high effectiveness in forming *key competencies of socially successful personality*, which she defines as a set of knowledge and skills needed for active citizenship, self-realization, personal development and social integration (Mucha, 2019), as well as such leading *qualities* of socially successful student personality as *creativity* and *curiosity*.

Because of the introduction of «case-study» technology, work with individual portfolios took place. This contributed to the development of pupils' life optimism, such

qualities necessary for social success as individual responsibility and self-discipline, as well as skills of self-assessment, formulation of work goals and choice of future tasks. That is why Australian scholars consider the portfolio *an effective means of developing self-education skills* (Beckers, Dolmans, & van Merriënboer, 2016).

In addition, mass pedagogical practice shows that a necessary component of the process of forming social success and life optimism should be to develop students' ability to self-assess their own achievements. Psychological and pedagogical sources (Kyrychenko, Necherda, Harbuziuk, & Tarasova, 2019; Beckers, Dolmans, & van Merriënboer, 2016; Galcheva, 2018) state that this task is effectively solved by *portfolio technology*, which is based on the method of formative evaluation of results of their activities. *The purpose of this technology* is to teach pupils to self-organize their own lives, their motivation to carry out active cognitive search, the formation of skills of retrospective and projective reflection, goal setting, and self-evaluation of results and consequences of their activities.

The essential advantage of the portfolio is that the subject of evaluation and further improvement are not only the academic achievements of a pupil, but also his meta-subject and personal positive dynamics. Observations of educational practice confirm that portfolio technology effectively captures, accumulates and reflects on individual pupil achievement over a period. Self-reflections, especially those made with the help of portfolios, are considered by researchers to be an integral part of the educational process (Beka, & Ganimete, 2021), as pupils' reflections on the portfolio allow teachers to define and refine goals in the system of educational influences.

The pedagogical philosophy of the portfolio involves shifting the emphasis from what the pupil does not know and cannot, to what he knows and can, to the development of his personality, as well as giving preference to formative assessment, shifting pedagogical emphasis from external assessment to self-knowledge.

Targets for the implementation of the portfolio in the formation of social success and life optimism are the following:

- maximum disclosure of individual abilities of each child, creating conditions for its self-realization and self-actualization in various areas of school and extracurricular life;

- creating a situation of success for each pupil, increasing self-esteem and confidence in their own abilities;

- development of pupils' cognitive interests and formation of readiness for independent cognition;

- formation of attitude to creative activity, development of motivation for further creative growth;

- acquisition of skills of self-reflection, formation of ability to analyze own interests, inclinations and needs and to correlate them with available possibilities, to adequately estimate results of own activity.

Two groups of portfolio types are important for the formation of social success and life optimism: *the portfolio of a successful personality* and *the portfolio of external achievements*. The purpose of the first variety is the knowledge of pupils of their resources, needs, interests, abilities, life values in order to improve them in a certain direction. This is a kind of fixation of steps towards the implementation of the outlined guidelines for personal growth.

The difference between *the portfolio of successful personality* and the second variety – *the portfolio of external achievements* is that the subject of systematization is not evidence of success in learning or certain extracurricular activities, and materialized results of the dynamics of personal development in its various manifestations. This is not a collection of various facts, but students study the features of their personality in the system of its social relations and planned work to improve them to achieve new qualities of the subject (responsibility, creative and social activity, energy, assertiveness, optimism, self-criticism, sociability, self-discipline, purposefulness, initiative, self-confidence).

Conclusions

Social crisis, life difficulties, troubles, losses and injuries have a significant negative impact on human resources, personal potential and functionality. Instead, in difficult periods, including martial law, a person is expected to be more active and balanced than ever, responsibility and prudence, a clear personal position and so on.

In such a situation, human activity, its adaptation to change or crisis conditions, productive socialization will largely depend on the formation of social success and life optimism. These qualities (abilities) strengthen the inner reserves of the individual, enrich his strengths and reduce weaknesses, become a means of restoring inner strength, overcoming confusion, depression, apathy. Social success and life optimism allow: to analyze and evaluate the consequences of change; think critically and interact constructively with other people; quickly mobilize and carry out strategic and operational planning for future life.

The formation of social success and life optimism of the growing individual is gradual from awareness of their own individuality and the meaning of existence in society to a

developed willingness to develop and implement their own life projects. The result of this process is clearly defined values and semantic landmarks, developed life competencies, constructive life position, i.e. the opportunity to act successfully in a particular life situation, including crisis. It is necessary to cultivate social success and life optimism from school age, taking into account the latest educational trends and features of modern students, using a set of appropriate scientific approaches.

It is necessary to develop innovative technologies, psychological and pedagogical means of forming social success in the educational environment, to create the necessary conditions for the practice of life optimism, working out mechanisms to improve the level of development of this quality. «Case-study» and portfolio are effective technologies for the formation of social success and life optimism. Their combined use helps to: create situations of success for each student, increase self-esteem and self-confidence, and at the same time identify and get rid of a set of qualities associated with disbelief in their own strength; to form an attitude to creative and exploratory activities, to strengthen the motivation for further creative growth; to form positive moral and volitional qualities that promote self-improvement, self-development and self-realization.

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Conceptual Principles of Post-War Reconstruction of Coastal Cities of Ukraine

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ABSTRACT

Given the need for post-war reconstruction of Ukrainian cities, including coastal ones, the issue of urban planning, damaged and destroyed by military action to prevent future risks and solve economic, environmental, socio-psychological problems with their impact on human life. The aim of the study is to substantiate the conceptual foundations of postwar reconstruction of Ukrainian cities, including the coastal type, to reveal the essence of local governance as a habitat and human material base in complex socio-economic and ecological systems based on achieving sustainable development goals. In the study the negative effects of hostilities on Ukrainian cities are analyzed, including coastal ones; conceptual aspects and principles of post-war revival of cities (villages, settlements) of Ukraine are substantiated taking into account the typology of cities (coastal, etc.); the modern tendencies and factors of development of cities and urban settlements are analyzed; the principles of sustainable urban development as typologies of cities, determining the needs of the population, priorities, innovative inclusiveness, emotional and spiritual healing, ambience, atmospheres, restoration of protected objects are proposed, which includes the development of urban areas as an economic, ecological and socio-emotional system; approaches to city management through socio-economic and environmental components in the context of post-war reconstruction, revival, restoration and development of Ukrainian cities have been developed.

Keywords*: city, port, coastal cities, post-war reconstruction, urban trends, branding, atmosphere, anthropocentrism, ecocentrism.*

Introduction

Sustainable development of Ukraine in the context of solving security issues should become the central idea of economic transformations of post-war reconstruction. Going the hard way can be the birthplace of new transformations. This is a powerful impetus and a future example of a brighter expression of power through the formation of a unique model of the country on the basis of sustainability, innovation, inclusiveness, creativity, through the implementation and improvement of a positive world experience. This is especially true of island and coastal states, where the seas and oceans provide daily life, livelihoods, economic opportunities in poverty and food shortages. A stable basis is needed as an urban planning and restoration of Ukraine's coastal and port cities as a result of hostilities. The current state of affairs, trends and identified problems actualize the purpose of scientific research.

Methods

The analysis in comparison with the best analogues was performed using the comparison method. Design issues for the study of comparison methods include the choice of measurement methods, the number of measurements and the range of conditions under which measurements are made (Hanneman, 2008). The method of comparison allowed to identify current trends and factors in the development of cities and urban settlements and present their comprehensive rationale.

The modeling method is used in creating a comprehensive analysis of aspects and building principles of the post-war revival of cities (villages, settlements) of Ukraine. Using the modeling method, each problem is solved by creating a model or, more often, adapting a known model to the specifications of the problem. The modeling method can facilitate the solution of textbook problems by providing a deeper physical understanding. But he also supports neglect of textbook problems (Hestenes, Wells & Swackhamer, 1995). Research schemes have been developed with the help of the graphic method. Graphical method used to visually describe sample data (Chegg, 2022).

Results

Problems of post-war reconstruction of cities are considered in their research Hein & Schubert, (2021), Pedersen, (2003), Mirisaee, Ibrahim, & Faizah, (2015), Rabani, (1997), Johnson, & Olshansky, (2017), Bădescu, (2015), Biron, (2019), Bou Akar, (2018), related urbanization processes Hukalova & Omel′chenko, (2015), Voynova, (2015), Zasadko, (2015), Serhiienko & Voytsits′ka, (2019), Cooper & Yue, (2008), Unikel, (1968) and others. The task of optimizing spatial development, creating comfortable living conditions, placing sustainable land use systems for food production, forming a new face of cities and the atmosphere is urgent (Antoniuk & Pohonin, 2015). Accordingly, the development of human life should take place with a systematic, environmentally safe and rational development of territories, which prevents the negative impact of military processes (ONUAA, 2016).

The world experience of cities that have suffered great destruction, in the vast majority is characterized by the fact that after quite severe events, cities are rebuilt from scratch. This allows cities to become dynamic founders of innovative architecture. This is what happened to Chicago, which gave birth to a completely new building called a skyscraper and the first passenger elevator. "The great legend of Chicago is that it is a 'phoenix city' – it was almost instantly rebuilt from the ashes bigger and better" (WTTW, 2022, Smith, 2020). Since any

unpleasant event is an experience from which it is necessary to draw conclusions, the cities of Ukraine naturally need to improve the safety of buildings, structures and other infrastructure. So, after the fire, Chicago began to introduce stricter fire regulations, new architecture and other urban landscapes. Architects and builders began to test new methods, new rules were adopted. The forecast that Chicago will have a population of 1 million people came true 10 years earlier.

According to leading architects, the idea of rebuilding one city without information about the general state of Ukraine is incorrect (Hahn, 2022). An analysis of the current situation in Ukraine is needed. According to several methods of calculating losses from direct destruction and the general impact of hostilities, including deteriorating economic situation in our country, rising unemployment, blocking trade, declining consumer demand, according to the latest official data, the direct loss is 2608.02 billion hryvnias and indirect – 16620.11 and 17733.06 billion hryvnias. The losses are compared to the consequences after the Second World War.

According to data, as of April, the total amount of documented direct damage to infrastructure caused to Ukraine amounted to 2608.02 billion hryvnias, while a large number of houses and roads were destroyed (Quinn, 2022). The Ministry of Economy of Ukraine estimates that the infrastructure alone suffered $ 119 billion in losses from the war.

Some places cannot be restored in the aspect in which they existed, so there is a need to build housing elsewhere. New roads, bridges and railways are to be rebuilt, supply routes and logistics chains will be changed. The aviation industry is suffering huge losses, many airports have been damaged or destroyed. Many schools, kindergartens, hospitals, cultural facilities and enterprises were destroyed. More than 23 thousand km. roads were damaged in the amount of 1019.34 billion UAH. More than 40% of the square meters of real estate was damaged or destroyed.

Investment losses, labor outflows and defense spending determine the additional negative impact of military action on Ukraine's GDP, amounting to UAH 20160 billion. (564 billion dollars) to 21150 billion UAH. ($ 600 billion).

Great damage was done to industrial, educational and other facilities. The cost of damage to roads and houses is a major part of the large amount of money needed to rebuild Ukraine.

The action plan for urban planning should be aimed at rational, inclusive, green and efficient reproduction. Based largely on grants with careful coordination of funding sources,

be aimed at increasing economic productivity, stimulating high levels of investment, encourage the transformation of the economy to carbon-free, architecture to green, bioclimatic and safe.

The task is not to return everything to its place, but to give a new foundation for life. The system of revival of Ukrainian cities may be non-linear, the reconstruction of some components will provide a basis for accelerating the recovery of others. Reconstruction should be based on a certain scientific concept and principles (Fig. 1):

- typologies of cities;
- determining the needs of the population;
- priorities;
- innovative inclusiveness;
- emotional and spiritual healing;
- ambience;
- atmospheres;
- restoration of protected objects.

The principle of typology of cities. Restoration of cities and settlements of Ukraine requires consideration of their diversity. A special state reconstruction program requires an individual reconstruction approach to each Ukrainian city in the context and with the help of best practices and specialists (President of Ukraine, 2022).

For example, port cities are a typical urban type that differs from other types of cities, such as the capital, factory cities, or university centers. Port (coastal) cities with an emphasis on trade and the historical intertwining of port and urban actors have a special capacity for economic, institutional and environmental sustainability (Hein & Schubert, 2021). They require a large, long-term specialized, cost-effective infrastructure, long-term planning and cooperation, and an adaptation process.

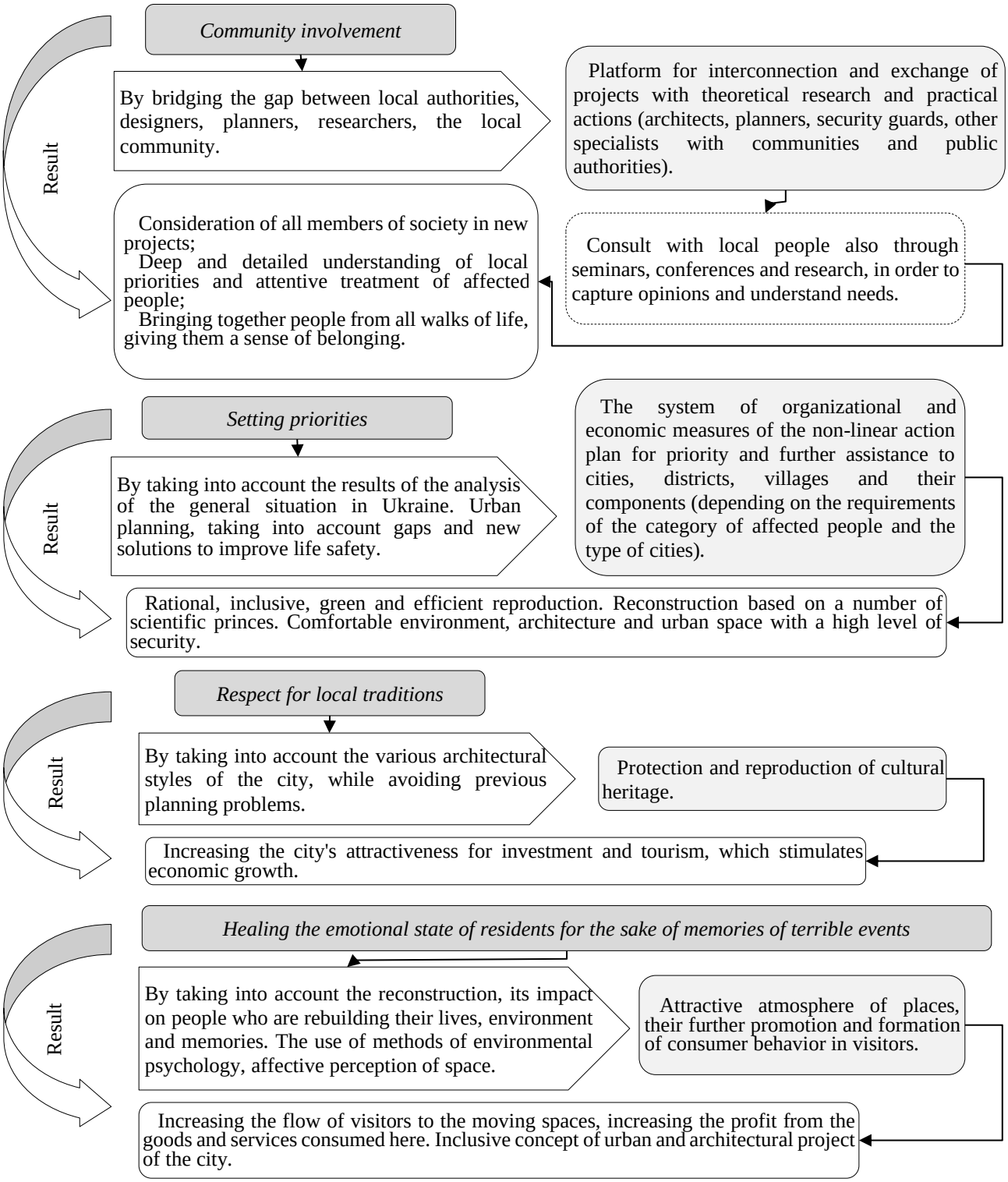

Fig. 1. Conceptual aspects of post-war revival of cities (villages, settlements) of Ukraine

Source: authorial development using (Azzouz, 2017, Glasberg, 2020, CNRS, 2022, Ambiances, Architectures, Urbanités, 2022, Thibaud, 2012, Spitzer, 1942, Mackrodt, 2019, Ahmad, Hertzog & Masson, 2017, CRESSON, 2022).

The principle of determining the needs of the population. An important aspect is to take into account the reconstruction, its impact on people who have migrated and rebuild their lives, environment and memories in new places. Because the most important social problem of post-war resettlement is migration and demographic change in urban areas of post-war cities. Voluntary and forced migration occurs during wars due to the risks of occupation and mass destruction of cities.

Migration appears as a social problem with a number of inseparable problems of post-war resettlement. Post-war repatriation and demobilization procedures are often cumbersome. The postwar period involves rebuilding, which takes place in risky environments where peace and security return slowly, according to Pedersen, (2003), Mirisaee, & Ibrahim, & Faizah, (2015).

The post-war ordering of the urban space of cities requires determining the needs of the population of the following categories: 1) the most affected (citizens who were displaced due to the mass destruction of their homes); 2) victims (citizens displaced due to primary damage to housing, destruction or general insecurity and deterioration of urban infrastructure); 3) less affected (citizens suffered less damage to housing and private property). Another classification is given to Rabani, (1997): 1) emigrants who are looking forward to return; 2) emigrants who do not return home; 3) people from other parts of the country or region who come to the post-war city to find new opportunities.

The planning process should take into account information such as the average number of families, space requirements, social, cultural aspects, the desired level of external influence, the benefits of spatial configuration, spatial distribution, security, and so on. It is possible to generalize to the following aspects: functional, design, cultural, social, basic and secondary requirements, preferences and recommendations (Saeed, Almukhtar, Abanda & Tah, 2022, Johnson & Olshansky, 2017). Relocation depends on social behavior and cultural customs, it should be studied referring to the origins of the city, to have the character of voluntariness. To create preconditions for a new rooting and a sense of home, land, stability and opportunities, a sense of community, as well as a place with a certain "atmosphere" (Bădescu, 2015). By linking spatial urban projects to socio-economic aspects, urban creators can help build community and a sense of belonging for all residents.

The principle of priority. There is a requirement in a well-thought-out interconnected and complementary system of organizational and economic measures of the action plan for priority and further assistance to cities, districts, villages and their components. For example,

in Bosnia after the war, people rebuilt a 400-year-old bridge before repairing their own roofs. In Nepal, renovations of the country's historic sites have brought people together after the devastating 2015 earthquake.

The principle of innovative inclusiveness. Reconstruction should reduce the consequences of future disasters by improving the quality of construction, avoiding dangerous places and raising community awareness. One of the solutions to this issue is to create a platform for networking and exchange of theoretical and practical research and projects of architects, planners, security guards, other professionals with communities and public authorities working on reconstruction in cities affected by war or other forms of violence and riots. This platform can become the basis of the recovery management process, as the organization of complex stages in the organization, coordination and communication of actors.

The principle of emotional and spiritual healing. Use methods of environmental psychology, in particular to implement and improve the tool for mapping the spatial definition of violence and its visibility in the city in the context of systematic emotional and spiritual healing from the horrific events in the urban landscape (Ahmad, Hertzog, & Masson, 2017, CRESSON, 2022).

The principle of ambience. Risks should always be kept in mind. In urban planning, there is an assumption that the future will be better than today. The development of the city is taking place, but the priority is still the safety of life. Reconstruction should be based on ambience, comfortable and attractive environment, namely architecture and urban space with a high level of security (taking into account the experience of the Joint Research Unit CNRS Ambiance, Architectures, Urbanités of the French Ministry of Culture and Communications (CRENAU and CRESSON) human sciences and social sciences of the CNRS (Ambiances, Architectures, Urbanités, 2022, Thibaud, 2012, Spitzer, 1942).

The principle of the atmosphere. Take into account the role of modern methods of observation of cities by visitors, such as video, visual ethnography, photo documentation, to capture the situation and the presence of atmospheric (affective) perception of the environment (opportunities for life in space), its attractiveness and potential environmental (Mackrodt, 2019, Havik, 2019).

Sensual and affective perception forms the basis of new solutions for the future world, this is the power of architectural aesthetics (Andersson, 2014). Architectural solutions inspire emotional potential in the physical environment, forming the basis for the perception of the

atmosphere of the city. An important role is played by specialists in the field of marketing and management, who through the symbols and meanings of the territory encourage the interaction of individuals in one space (d'Hauteserre, 2015). Accordingly, the basis of an attractive atmosphere of places for their further promotion and formation of consumer behavior in visitors (Spence, Puccinelli, Grewal, Roggeveen, 2014, Currie, 2017, Torgue, 2013, Forrest, 2013). This leads to an increase in the flow of visitors to the moving spaces, and an increase in profits from the goods and services consumed here. This is especially true of cultural heritage, both national and individual for each city.

Atmosphere determines the state of resonance and identification (sensorimotor, emotional and cognitive) between the individual and the surrounding built space and the activities that take place in it as (Canepa, Scelsi, Fassio, Avanzino, Lagravinese & Chiorri, 2019):

– aesthetic and decorative quality;

– special identity of the place "spirit of the place";

– collective imaginary "spirit of the era" (carrier of community values: social, ideological, political, religious);

– constitutive nature (identity that can give a clear and unambiguous appearance to a particular space, attracting emotional, sentimental, social, ideological, moral or spiritual nuance);

– perceptual experience (perceptual tension between the architectural features of the place and the subjective sensitivity of the individual immersed in this spatial area);

– mood (emotional tone radiated by the environment and tuned to the temporary state of mind or feelings of those who are in this space).

Sensory experience (sensory perception) of the inhabitants of the spatial environment gives an understanding of the process of development or inhibition of opportunities for interaction (natural, social and built environment). The use of this planning method has led to the improvement of urban space in Copenhagen, New York and other cities (Lebois, Laburte, 2018). This direction of urban renewal expands the experience of social relations and leads to a more inclusive concept of urban and architectural project of the city.

The principle of restoration of objects of protection. Cultural heritage should be considered a priority, but it is often lacking in local and international strategies and action plans. The World Bank's Urban Disaster Risk, Sustainability and Global Land Risk

Management noted that the process of community consolidation and urban reconciliation actually depended on the identification of cultural monuments (World Bank, 2022, Biron, 2019).

When it comes to future security, it is important to understand that there are many famous UNESCO World Heritage sites in our country that need to be saved from a possible threat. There are officially seven monuments in Ukraine. It is appropriate to monitor and create a database of cultural values and take possible steps to ensure the protection of more of them. The security of urban space, architecture and cultural monuments is a source of social mobility, cohesion and economic development. The 2030 United Nations Sustainable Development Agenda recognizes the integral role of culture in achieving sustainable development goals such as education, environmental sustainability and gender equality (Sisson, 2022). After receiving World Heritage status, cities have the opportunity to gain national and international attention, as well as many initiatives and funding to support the city's rehabilitation project, which will bring impressive results (Mokayed, 2021). Large investments in culture at the beginning of the reconstruction process will eventually pay off, increasing the city's attractiveness for investment and tourism, which stimulates economic growth.

Protecting the World Heritage is a path to peace and an illustration of the experience of certain elements of society of the past as part of a complex of interesting and inclusive processes (International Peace Institute, 2022, Bou Akar, 2018, Glasberg, 2020, Misra, 2019, Aldrich, 2020). At the same time, the focus of local authorities on changing the socio-cultural narrative gives rise to the concept of public culture as a way to promote collective investment in the future of the city, especially among communities that were previously physically and socially excluded. Encouraging art in parallel with physical improvement in the city's communities, combining the historic and the safe with the new forms cities with contrasting architecture that merges with existing and new planning.

The city is formed and managed as a special social space, and the development of the city, in turn, is a complex historical and cultural, psycho-emotional, environmentally friendly and socio-economic phenomenon. The specificity of urban research is the application of an interdisciplinary approach that combines the results of different disciplines, unrelated to each other, in solving problems of urban development.

The interdisciplinary approach considers the city as a multifaceted process that includes a number of planes: from horizontal (modern architecture, design, visual images and

feelings of citizens, political, economic, environmental spaces), to vertical (development of processes in historical retrospect).

Within the Los Angeles School of Urban Sociology (Davis, Die, Flasti, Soju & others) there are eight fundamental differences, including the polycentric vision of the city, the emphasis on the periphery rather than the business center, attention to social and governmental influences on the development of the city.

One of the approaches in this area is the study of urban space with SPACE (D): through methods and approaches of studying society (S-sociology), politic (P-politics), architecture (A-architecture), urban culture (C-culture), city economics (E-economics), city data (D-data) (Popova, Ponomareva, Malykhin, Smahina, Shtompel, Halych, Yermashov, Yermyshyna & Aver 'yanov, 2014).

Due to this, a new approach to the study of the city, taking into account its multifunctionality, the constant combination of economic, administrative and cultural functions. In my opinion, it is necessary to add the letter EE at the beginning, which emphasizes the need to study urban space in the context of environmental characteristics (E-ecology) and the formation of models of the territory as a basis for impressions and experience (E-experience). The difference between urban space is the pattern how and in what way people form cities, in turn, cities create people.

Cities and territories of cities as a complex system need a perfect management process, due to current trends and socio-economic and environmental factors of urban settlement development. The city is studied according to 34 criteria and their groups, according to which the management process takes place. Among the groups are: demographic, organizational and legal, economic, land and urban planning, infrastructure, environmental, heuristic. Current trends and factors of city management are shown in Fig. 2.

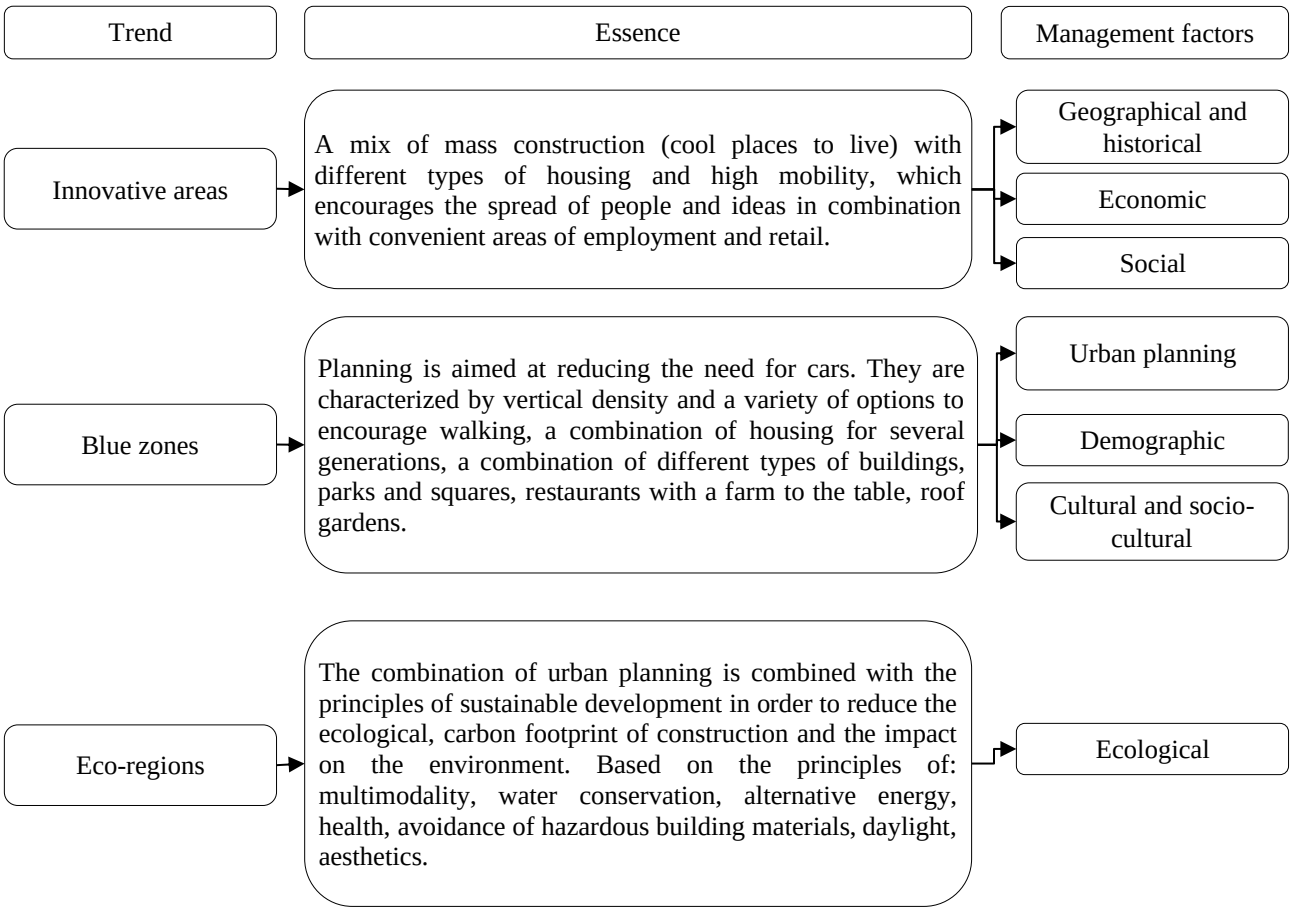

Fig. 2. Current trends and factors in the development of cities and urban settlements

Source: authorial development using (BDCNETWORK, 2022, Halahurych, 2016).

Together, they form the branding of cities and territories, representing the idea of the city, illustrating its idea, value and design for competitiveness based on the recognition of unique qualities of the territory, confirmed by practice (Halahurych, 2016). However, the value of the brand is the synergy of its unique properties and personal perception of the consumer, which correlates with the perception of their own individuality and position in society, expressed in the emotional effect of the atmosphere.

This necessitates the development of anthropocentric direction as one of the important emphases for the formation and management of urban areas. The main control points of the elements of the concept of branding management: price, atmosphere, people, processes, place (Yurchak, 2015).

Environmental factors. Military action, in itself, is one of the most important threats to the environment. In the process of hostilities, the landscape and biodiversity are inverted. The existing spatial impacts of the development of military processes on the landscape are as follows:

– reduction and fragmentation of natural areas of existence of living organisms and the emergence of significant barrier effects that impede the movement of organisms and ecological relationships [4];

– chemical, light and noise pollution increases;

– loss or reduction of habitat of species and / or valuable ecosystems (natural or semi-natural);

– growing isolation of landscape fragments (Rojas, De la Barrera, Aránguiz, Munizaga & Pino, 2017).

There is a potential threat to natural and climatic conditions in cities. These are heat stress, types of disturbance / reduction of green areas, quantitative / qualitative problems of drinking water, heat island, etc. This requires adding an environmental component to the worldview of urban development, namely eco-centrism. However, with reasonable management of this process and the city with the transformation of the artificial environment into the natural one, high-quality development of urban systems can be achieved.

Demographic factors such as population reproduction, migration, structure and location play an important role. Economic factors of urbanization determine the structure of employment, sectoral and territorial economic development, concentration of production. No less important factors in the development of urban processes are urban planning, namely the rational use of urban areas, and separately – their continuous and safe expansion, practicality. One of the important, in the formation of urban life and a full-fledged citizen, is a group of social factors. Cultural or socio-cultural factors of urban processes, respectively, associated with the formation of the cultural environment of the city, the impact on changes in behavior, psychological structure of the individual.

All this directly has a significant impact on the spatial forms of urban development and creates a special spirit (Merzhvynska, 2019). The city is a concentration of opportunities for the distribution of products, ideas and human resources between different types of spaces.

The development and management of urban areas today aims to pursue the Goals of Sustainable Development, namely the 11th goal and current trends in economic development - inclusiveness. Urban inclusion is the restoration of urban spaces to make them accessible in

[4] Ecological connectivity is a process that represents the ecological functionality of a landscape in the form of the movement of biodiversity in the soil cover or obstacles to the movement of living organisms in their habitats due to landscape fragmentation. The importance of maintaining or enhancing environmental connectivity in megacities plays an important role in environmentally sound land use development.

terms of environmental, cultural, social, political and educational proposals and activities not previously defined.

This is achieved by providing people at risk of social exclusion or poverty with full participation in public life and an adequate standard of living. At the same time, thanks to the real and sustainable use of economic opportunities that allow the inhabitants of these territories to intensify socio-cultural and psychological development and effectively use their powers as citizens. Living space is a major factor in quality of life and well-being. Space plays a special role, which acquires human, technical, cultural and psychological dimensions and influences the organization of settlements, providing residents with new ways of using it and behavior. Basic urban services must be implemented in an ecologically adapted way and the inclusion of new green areas.

Using data from the Landsat satellite archive and the Danish Civil Registration System, green areas in urban areas of about a million Danes were tracked and correlated with their mental health results. Researchers found that people who grew up with the least green space nearby had a 55 percent increased risk of developing mental disorders such as depression, anxiety and drug abuse in later years. Green space protects against mood disorders, depression, neurotic behavior and stress. The impact of greenery also depends on the time spent in green areas and their scale. Natural landscapes activate the parasympathetic nervous system faster – a system that helps calm down and recover from stressful events (Engemann, 2019).

Military actions have a very negative impact on the living conditions of the population in the context of environmental security, availability of economic resources, socio-psychological consequences. This calls for measures to ensure the social and economic quality of life of urban residents and to improve the environmental management of cities. The city needs to be integral, harmonious, balanced, to be a complete gestalt.

The consequences of hostilities related to human health, the environment and the economic situation determine the need for a science-based policy to generate new models of urban landscapes and their management. Environmental conditions lead to various neurobiological effects that affect many sensory and motor systems, social interactions, economic behavior and decisions.

When it comes to analyzing and comparing a set of cities by different characteristics that reflect their economic potential or quality of life, and the social problems they face, it is common to normalize the values of variables in a given city in proportion to the demographic

size of the city. However, following this procedure, the presence of agglomeration phenomena, which are the result of the development of various interactions between and which are nonlinearly related to change, are ignored.

Urban areas as an interdisciplinary object of research, namely their development, are characterized primarily by nonlinear development. The slightest changes in such a system give rise to a significant difference in the obtained models. It is characteristic of such development that momentary influences can act in such a way as to transform the whole system. Conventional linear systems change very smoothly due to small changes. This sensitivity stems from the fact that even a slight increase in temperature, wind speed or air pressure creates cycles in the system and can eventually have a big impact.

In the process of research it can be determined that the management of urban areas in the context of post-war reconstruction requires the use of new approaches (Pisano, 2020, Mazur-Belzyt, 2020, Pleshkanovska, 2020, Europa, 2020). Approaches to the management of urban areas in the current trends of urban development should be based on:

– anthropoecological centrism: relevance, planning and consistency in the formation of the territory that meets the socio-ecological, economic and emotional needs of man and the requirements of the environment (SEEE);

– endogenous: urban development strategies and tools for urban planning and financing should be considered as guidelines for justifying a specific local situation. This will provide endogenous urban transformation from neighborhoods to wider functional areas.

– chaos-experiments: urban planning, characterized by variability and individuality of human perception. This requires the use of chaos experiment as a nonlinear approach to the formation, contemplation, improvement and maintenance of the functioning of the atmosphere of the urban area as a productive system;

– densities: according to which environmental investments in urban infrastructure should be made in accordance with the level of destruction of territories;

– ecological certainty: certainty of ecological urban zones, rational use of natural resources and application and further development of ideology of environmental protection.

Conclusions

Post-war reconstruction of Ukrainian cities should be based on a certain scientific concept and principles. Particular attention needs to be paid to coastal (port) cities as a basis

for export potential and assistance to both Ukrainian cities and other countries. Management of cities requires new approaches as anthropoecological centrism, endogenous, chaos-experiments, densities, ecological certainity for creating a new model of the territory taking into account the socio-economic-ecological and socio-psychological potential of the territory and its users. New models of the territory form the appropriate "atmosphere" of the city, which is a nonlinear system of inevitable interaction of ecosystems, economic and socio-psychological relations. The atmosphere is characterized by emotional response, unpredictability, behavior, information, coordination and perception of its participants. Given these interactions, it is possible to make a comprehensive analysis and avoid the idea of the city as a separate area. The study of these issues is important for building proposals for post-war urban planning and management, including urban land use. Thus, the processes of urban and architectural construction from their inception to launch have a strong chaotic component that changes the traditional way of governing the city.

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Transformational Changes in the Trade Cooperation of Ukraine in the Context of the Development of International Economic Relations

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ABSTRACT

The study examines the globalization of the world economy, which is intensifying with the openness of national markets and economic interdependence. The tasks of the modern foreign trade policy of Ukraine, which are to build strategic partnerships with integration associations and individual countries, cooperation with which is important for the development of the national economy. It is determined that international trade provides the material basis for international economic relations, thus leading to the growing integration of national economies into the global economy, the formation of which follows directly from the further deepening of the international division of labor. The macroeconomic regularities of structural changes in the international sphere of services, as well as the dynamics of development of the services sector in the world economy are determined. The foreign trade relations between different countries have been studied, and it should also be noted that the volume of trade turnover directly affects the level of economic development of the state as a whole and cooperation in other areas and expanding the country's influence on the world stage. It is determined that trade and economic relations are the material basis of international economic integration, which usually begins with the liberalization of mutual trade, removing restrictions on the movement of goods, services, capital, labor and gradually under appropriate conditions and interests of partner countries leads to a single economic, legal, information space within the region. It is established that international trade is a paradigm of development of trade and economic relations of countries that cover the full range of areas of cooperation and are implemented through a number of forms, each of which is determined by the number of participants in various interactions - bilateral and multilateral relations.

Keywords: *international trade in services, trade cooperation, globalization, trade and economic relations.*

Introduction

In the context of the globalization process of the world economy, the openness of national markets and economic interdependence of countries is increasing; the scale of international exchange of goods, services and capital is growing, international flows of financial assets and information are gaining new characteristics.

The main drivers of such development of the international market of services at the present stage are the availability of quality human capital, investment in intangible assets, effective internal regulation, development of information and communication infrastructure, quality of institutional environment, national policy in international trade in services

(Yankovyi et al., 2020). Also a characteristic feature of the current stage of development of international exchange is the outpacing growth of trade in services, due to innovation and technological development, intellectualization of labor, informatization of social and industrial relations. For the continuous expansion of the range of service activities, changes in the volume and structure of international flows of services is especially important to study the factors of structural changes in international trade in services in the development of the world economy.

The main task of Ukraine's modern foreign trade policy is to build strategic partnerships with integration associations and individual countries, cooperation with which is important for the development of the national economy. For example, the United States, the East and West. This choice is primarily due to the exceptional role of such victims in the world economy and politics.

Problems of research on the formation and development of the international market of services, globalization of economic processes, methodological aspects of regulating international trade in services and the formation of strategic partnership relations are reflected in the works of many famous scientists.

The study of the main factors of structural changes that occur in international trade in services in the development of the world economy considered in their own research the following domestic and foreign scientists: Koval (2008), Morgulets (2010), Rumyantsev (2003), Protsenko (2015), Fink (2008), Amiti (2009), Francois (2009).

At the heart of the production of new concepts are attempts by economists of different generations to explain the peculiarities of the development of bilateral trade and economic cooperation. In particular, representatives of the mercantilist theory, T. Maine, A. Montchretien, W. Petty (Petty, Smith, Ricardo, 1993) (XV-XVII centuries), argued the need for trade between neighboring countries in terms of maintaining an active trade balance. Representatives of the classical theory A. Smith and D. Ricardo (Petty, Smith, Ricardo, 1993) (XVIII-XIX centuries) were convinced that neighboring countries should specialize in those goods in the production of which they have absolute and relative advantages, and the necessary prerequisite for trade between them will be free trade. Instead, the founders of neoclassical theory E. Heckscher and B. Olin (Olin, 1993) (20-60s of the XX century) insisted that in trade between the two countries should play a decisive role in their combination of factors of production. In the theory of competitive advantage proposed by M. Porter (90s of the XX century), bilateral or multilateral cooperation was considered as one that maximizes

the clustering of enterprises in the border area (Porter, 1997). International trade and economic cooperation is the whole volume of trade, production and economic, financial ties and relations in the field of trade in goods and services beyond national borders, labor migration. Defining this definition broader than international trade, the author does not find fundamental differences between them (Ministry of Economic Development, Trade and Agriculture, 2022).

The purpose of this study is to summarize scientific positions and in-depth consideration of the main factors of structural changes in international trade in services and trade cooperation of Ukraine in the development of international economic relations.

Methods

The theoretical basis of the study are the fundamental provisions of economic theory, theory of international trade, systems theory, research results of domestic and foreign scientists on the development of international economic relations and international trade relations, as well as general and special methods of learning trade and economic relations. agricultural sector. The methodological basis is the research of leading domestic and foreign scientists on the problems of international trade and bilateral cooperation. In the process of research were used: historical and logical method – to learn about economic phenomena and processes that are in constant development, taking into account the evolutionary interdependencies and trends of historical convergence of national economies of different countries; method of induction and deduction - to study the evolution of scholars' views on international trade by representatives of different schools, substantiation of mechanisms and tools of the system of regulation of foreign trade in goods, which form the prerequisites for deepening international cooperation; methods of quantitative analysis of economic indicators - to study the dynamics and structure of trade cooperation of Ukraine in the development of international economic relations; morphological analysis - to substantiate the content of the concepts of «international economic relations», «international trade relations» and «international trade and economic relations»; generalization, structural analysis, grouping, decomposition and formalization - to form a logical-structural scheme of the institutional environment of international trade and economic relations of Ukraine in the development of international economic relations, to justify the sequence of stages of the methodological approach to determine the level of international trade and economic relations, to group the factors influencing foreign trade on the development of trade and economic relations.

Results

Trade and economic relations of countries occupy a significant place in the system of international economic relations, not only as important factors in the economic development of any country in the world, but also as those that actively affect people's daily lives and activities around the world. International economic relations is a set of relations that arise between actors from different countries regarding the production of material and spiritual goods and their appropriation in all spheres of social reproduction (direct production, distribution, exchange and consumption) (Bondar, Leginkova, 2016).

Forms of international economic relations are closely linked, affect each other, creating additional incentives for mutual development. Thus, trade creates the conditions for international investment, and international capital movements, in turn, stimulate trade relations and labor migration. However, the main and central link in world economic relations has always been and is international trade. Modern international trade as an exchange of goods and services is the material basis of other forms of international economic relations, which ensures the growing integration of the world economy (Tarasova, 2015, Golikova, 2015, Filipenko, 2007).

International trade provides the material basis for international economic relations, thus leading to the growing integration of national economies into the global economy, the formation of which follows directly from the further deepening of the international division of labor. At the same time, it is proved that the more similar the countries are in terms of resources and technologies, the greater the share between them will be occupied by intra-industry trade, which in the future will be a characteristic criterion for the country's entry into world markets.

In today's open economy, the further transformation of the world economy is determined by the dominance of three global trends: regionalization, liberalization and integration. At the same time, liberalization in modern international economic relations plays a dual role, because, on the one hand, it is an important process that accompanies globalization, and on the other - is a necessary basis for economic integration.

A characteristic feature of today is increasingly not confrontation, but the deepening of international cooperation based on the coordination of economic interests. In view of this, liberalization can be understood as the process of opening the national market through the reduction or elimination of tariff and non-tariff barriers to trade, standardization of customs procedures, improvement of trade infrastructure. Instead, economic integration is more related

to the international division of labor, the formation of a single supranational economic environment, the emergence of common agreed mechanisms of economic regulation. The institutional basis of modern economic liberalization are international organizations, agencies, commissions, such as the United Nations Conference on Trade and Development (UNCTAD), the International Trade Center (ITC), the International Chamber of Commerce (ICC). At the regional level, the reduction of trade barriers is achieved through bilateral preferential agreements and integration associations, and at the global level - through the WTO system. Countries, taking on the responsibility of giving priority to the use of international standards, technical regulations and conformity assessment procedures, will certainly take care of modernizing their economies by building their own export potential.

Trends of globalization and integration are gaining momentum, more and more countries are actively engaged in foreign trade and economic activities, which is reflected in stable growth of export and import activities, international services market, increased volume and geographical diversification of labor migration, active capital expansion. that are developing. Another manifestation of integration is the development of international regional integration associations, which include NAFTA, SCO, BRICS and the EU. The geographical and cultural proximity of the European Union, taking into account the current state of relations with Ukraine's northern neighbor, necessitates further integration of our state into this union, which is the most important geopolitical vector of our state. The development of trade and economic relations with the states of this union is important for the successful further integration of Ukraine into the European community, which is possible by increasing the participation of domestic producers in world trade with the appropriate support from state institutions. Each branch of the domestic economy plays a role in this process, which requires the development of methodological and methodological support to increase the involvement of the enterprise, taking into account the specifics of their activities.

Macroeconomic patterns of structural change in generalized form include a number of changes in national economic systems and the world economy in general. The share and role of the branches of material production both in gross domestic product and in the structure of employment is sharply reduced. There is an increase in labor productivity in industry, which leads to a reduction in the number of people employed in the fields of material production, as well as a shift in favor of the services sector, along with rising living standards changes the structure of industrial and personal consumption. Along with the decrease in the relative role of material production there is an accelerated growth and rapid development of the market of

services - educational, medical, financial, tourism, infrastructure, business, etc. (Morgulets, 2010).

It should be noted that the most important pattern of evolution of the service sector is that it develops not in isolation from material production, but in the integration of these activities, and the depth of integration depends on the efficiency of modern economy. The dynamics of services is determined by a number of long-term fundamental factors of economic nature, in particular, the formation of independent units in the social division of labor, specializing in the production of consumer services, increasing the share of public spending on services as part of consumer spending. Demand for production services grew even more dynamically, and costs of this kind became a major item of total business costs in all industries. Traditional types of costs for raw materials, transport and communication everywhere are significantly supplemented by costs for marketing, advertising, management, information and computer services, consulting in various fields, insurance, public relations services, etc.

Large-scale structural and technological restructuring of production in developed countries has had a profound and multifaceted impact on the development of competition in the service sector. In the crisis situation, the needs of industrial companies in high-quality business services, which contribute to solving many problems of restructuring, sales, organizational and managerial, structural, implementation of technological innovations and efficiency, have increased sharply. It is important to note that after the global financial crisis in the services sector, as a possible source of economic growth and an additional factor in the formation of competitive advantages, countries began to focus even more on foreign analysts. In modern conditions, the service sector forms the core of the post-industrial economy and in many respects determines its main macroeconomic parameters and modern sources of competitiveness. In most countries, the volume of production in the service sector is increasing, the share in the structure of GDP is growing, the number of employees is growing, and international trade in services is developing. Services have become the main sector of economic activity and a source of employment in the world economy. Thus, we can identify a number of structural factors and factors of transformation of the international market of services at the present stage (Table 1).

Table 1. Prerequisites and factors of transformation of the international market of services

Prerequisites for international trade	The main factors of growth of the international market	Factors to promote the development of services
Availability of quality human capital	Increasing the role of knowledge and business skills as a source of income	Business, management, professional and educational services
Investments in intangible assets	Privatization outsourcing	Financial, business services
Efficiency of internal regulation	Urban growth and urbanization	All types of services
Development of information and communication infrastructure	Development of information and communication technologies	Information, telecommunication, business services
Quality of the institutional environment	Application of innovations in the services sector, reduction of services due to the effect of economies of scale, better understanding of customer needs, application of research results	Transport, business, telecommunications, travel services
National policy in the field of international trade in services	Growing share of services of multinational origin	All types of services

Source: compiled on the basis of (Morgulets, 2010)

It should be noted that the development of services, especially infrastructure and information and communication, makes a significant contribution to productivity growth throughout the economy, as services are important components of the production of other goods and services. Thus, today the economic development of national economies increasingly depends on access to high-quality services, such as information and telecommunications, transport, financial and other services.

Globalization has diverse and ambiguous consequences, which primarily affect the financial sector, and their positive or negative vector largely depends on the level of national economy, the country's position in the world economy, its participation in internationalization and transnationalization. No country can stay away from these processes because of their direct connection with the peculiarities of strengthening the international division of labor, the introduction of post-industrial production technologies, information transformation, socialization of economic processes, democratization of political institutions and more. In this regard, the state of international trade and economic relations has a significant impact on the conditions and level of competitiveness of any country.

Given the importance of increasing the level of competitiveness of any country and in order to thoroughly study trade and economic relations between countries, justify attractive

trade positions in the agricultural sector and identify promising export-import operations between countries, it is necessary to assess the level of international trade and economic relations. In this context, on the basis of the generalization made in the first section, a methodological approach to determining the level of development of international trade and economic relations in the agricultural sector, the scheme of which is presented in Fig. 1.

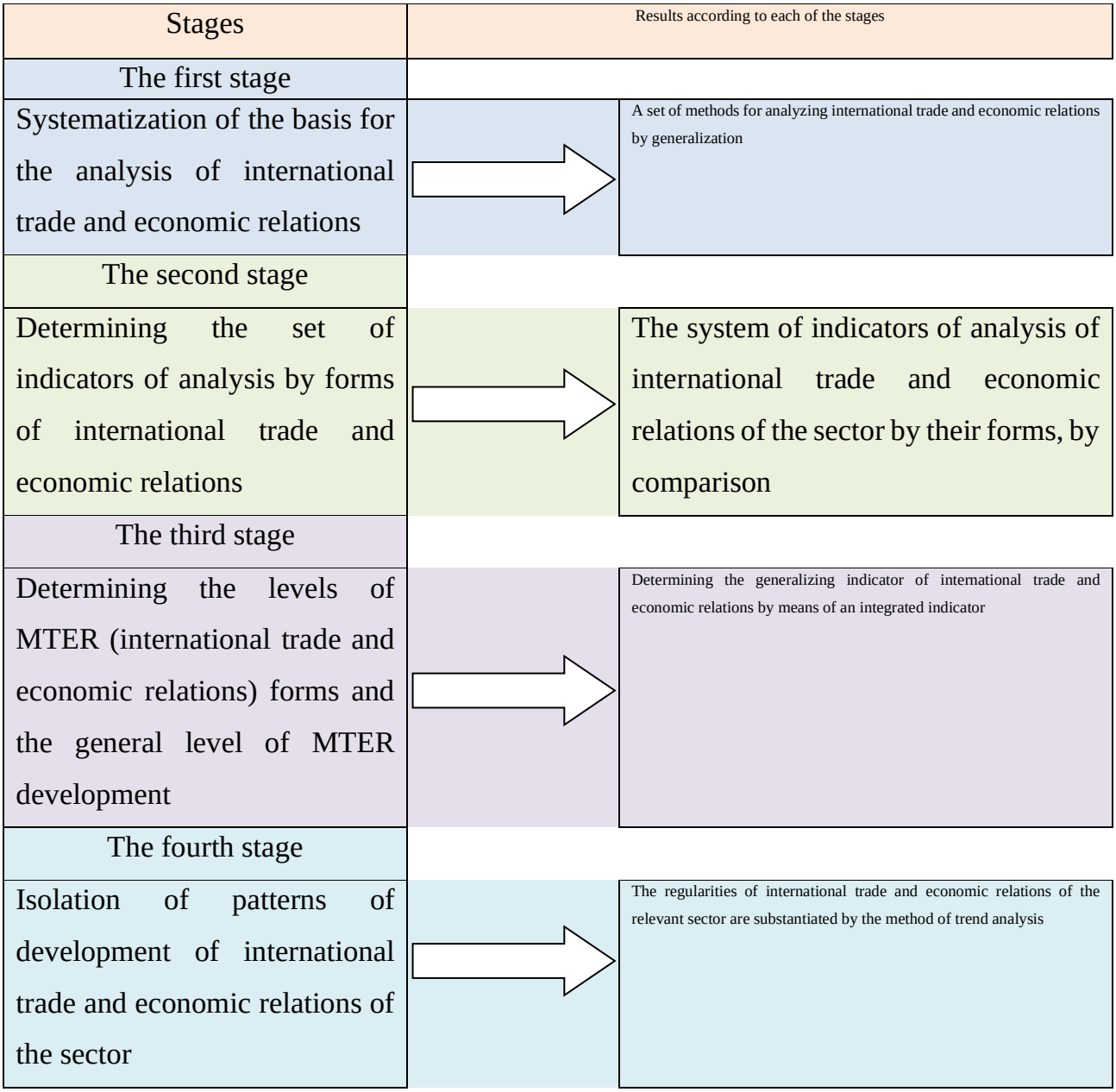

Fig. 1 The main stages in determining the level of development of international trade and economic relations

Source: prepared by the authors

Thus, the stages of implementation of the methodological approach to determining the level of development of international trade and economic relations in the sector is: general analysis of the current state of trade and economic relations between countries in the

agricultural sector, which will highlight the factors of international trade and economic relations and justify a set of indicators for their evaluation; determination of integrated indicators according to the forms of international trade and economic relations and determination of the generalized indicator of ITEC development.

In the study of trade and economic relations between countries, an important component is the assessment and analysis of levels of socio-economic development of member states. Using the method of comparative analysis allowed to compare the levels of socio-economic development of countries in the context of integration of countries to compare the main macroeconomic indicators of socio-economic development with countries of different continents, which allowed to conclude the country's compliance with membership in the international community. In the context of the study of direct bilateral trade relations, in our opinion, it is appropriate to use the ratio of intra-industry trade or the Grubel-Lloyd's ratio. The formula for calculating the intra-industry trade index for the case of two countries and one industry is as follows (Tarasova, 2015):

$$GL = 1 - \frac{X-M}{X+M} \quad (1)$$

Where: X - export of goods, M - import of goods

The Grubel-Lloyd's index takes the value of 1 in the case of equality of exports and imports, ideal intra-industry trade, and 0 - in the case of only exports or only imports. The closer the value of the index to 1, the greater the intersection of sectoral trade flows, which means an increase in the quality of intra-industry trade. This method allowed to analyze in more detail the structure of bilateral trade relations between different countries.

The main indicator of the development of the world market of services in recent years has been the growing importance of developing countries in the production, export and import of services. Over the past two decades, some developing countries have seen a significant increase in revenues from exports of services, the number of employees in the sector and foreign exchange earnings from exports of services. The growth of trade in services allows to increase production capacity and develop trade and transport infrastructure. Low-cost and high-quality services have a positive effect on the economy as a whole.

In some developing countries, the services sector is in its infancy, and in some there are already significant successes in this area, they have managed to become significant exporters of tourism, construction, transport, audiovisual, computer, information, business and professional services. In addition, developing countries export not only traditional

services such as tourism, but also modern services, including high value-added services, knowledge-intensive services such as computer and information services and other business services. In general, among developing countries, Asian countries provide about 75% of trade in services, countries in Africa, Latin America and the Caribbean, respectively, 10% and 15% (Protsenko, 2015).

Along with the liberalization of trade in goods, there is a simplification for international trade in services. Regional trade agreements are an effective tool for such liberalization, usually when the agreement leads to successful and mutually beneficial trade in goods and simplification of conditions for trade in services. Trade agreements play an important role in the context of the development of competition in trade in general and the liberalization of trade in services in particular. First, they promote liberalization when there are strong interests that hinder liberalization and block initiatives to open access or hinder the creation of the necessary legal framework. Second, trade agreements provide a more stable basis because they are international agreements and cannot be changed unilaterally.

It should also be noted that countries at similar levels of socio-economic development, close geographical location and close cultural ties, easier simplification of trade in services than countries that differ in these characteristics. Currently, increasing exports of services, attracting investment in this sector, simplifying trade conditions are extremely important factors of economic growth and development (World Trade Organization, 2022).

Today, most developing countries successfully export their services to various countries around the world, including developed countries. India has made significant progress in this area, with exports of software development, management and business process optimization services accounting for about 1/3 of its total exports. Brazil, Costa Rica and Uruguay export professional and information technology services, Mexico exports telecommunications and distribution services, Chile - distribution and transport services, the Philippines, the Philippines, Thailand and India, and some countries in the Middle East, North Africa, Latin America and the Caribbean are now successful in exporting medical services.

Some developing countries are also successfully exporting capital-intensive services, which are quite difficult to manage (construction companies from these countries (for example, from China) are among the 225 leading international construction companies in the world). Firms from developing countries are involved in international trade in environmental, financial and telecommunications services. There are some differences in international trade in services for countries from different regions of the world. The countries of South Asia are

mainly engaged in the provision of services in the field of information and communication technologies. East Asian countries export services closely related to the export of industrial goods (distribution services), although the countries of the region have opportunities to diversify and use new activities not related to trade in goods.

In Latin America, exports are more related to the supply of services by attracting direct investment to other countries in the region (for example, 61% of Chile's foreign investment goes to the services sector and energy in neighboring countries). The target markets for South Asian services are mainly in developed countries, Latin American countries export to countries located in the same region. The countries of the Middle East and North Africa usually export their services to Europe, and service providers from South Africa are increasingly investing in the countries of their region (Rumyantsev, 2003).

The growth of international trade in services in recent decades has been facilitated by a number of factors, including significant advances in information and communication technologies, increased international labor mobility and some other socio-economic factors (eg demographic change, changes in living standards, etc.). The experience of some developing countries (India, the Philippines, and some others) has shown that the provision of professional services can promote export growth and economic development, become a source of wealth. However, most developing countries face significant challenges in realizing the potential of service production as a source of economic growth.

It should be noted that a significant part of trade in services remains invisible and is considered as trade in goods (for example, in the manufacture of passenger cars are used transport services, which are also indirectly sold when cars cross the border). The share of services in total exports of developed countries reaches 50%, which is much higher than in developing countries. The share of services in the export of manufacturing products is 34% in developed countries and 26% in developing countries (Rumyantsev, 2003). In agriculture, these figures are not so high. The high share of services in the export of goods indicates the importance of efficient operation of the services sector.

The growing role of developing countries in the world economy poses a certain threat to developed countries. Thus, offshoring can lead to job cuts (including high-paying ones) in the economies of developed countries. These assumptions are based on the fact that the share of services employed in market industries (those traded internationally) is quite high. A study conducted in the United States showed that 40% of all employees in the country work in enterprises that produce products for the market. In some important service areas, such as

health care and public administration, a small proportion of employees are employed. However, as the services sector as a whole is larger than the manufacturing industry, it has the potential to have more employees in international trade. In addition, some companies that provide intermediate services in non-market industries may, unlike the industry itself, produce marketable products. Compared to non-market industries, market services employ a relatively more highly educated and highly paid workforce. Data on the sectoral structure of employment in the United States point to the fact that offshoring services has a negative impact on employment in various manufacturing and services sectors, but this effect is offset when viewed by industry and the services sector as a whole. This indicates that workers who lose their jobs in one industry move to another, growing industry. Similar data for the United Kingdom indicate that job losses due to outsourcing are usually offset by new jobs (Cabinet of Ministers of Ukraine 2021).

According to a UNCTAD study (Filipenko, 2007), offshoring of services changes the structure of employment in developed countries in favor of a highly skilled workforce as production functions in the non-skilled services sector move to developing countries. However, offshoring of services, in general, does not have a significant impact on the level of employment in the services sector of developed countries, the negative effect of offshoring is offset by an indirect positive effect for employees in other sectors or with different levels of skills.

In the last two decades, the service sector has grown most dynamically in South Asia. The most promising industries in terms of employment in the region are construction, tourism, retail, healthcare and outsourcing of IT-related business services. In terms of employment dynamics, the services sector differs favorably from other sectors of the economy, ie the growth of the services sector has contributed to increased employment in this sector.

The results of studies conducted by UNCTAD (United Nations Conference on Trade and Development (UNCTAD) (Filipenko, 2008) suggest that in comparison with agriculture and industry, the link between trade expansion and employment growth in In addition, foreign direct investment in the services sector creates fewer jobs than in other sectors, with data from Japan, Germany and the United States showing that foreign direct investment is in the services sector of other countries. At the same time, foreign direct investment contributes to job creation in host countries and their impact on employment increases with the export orientation of the host country's services sector.

The development of offshoring and the market nature of many functions and jobs in the service sector open up opportunities for expanding productive employment in developing countries. Jobs in the service sector are often higher paid, and increased productivity and efficiency in services will have a positive impact on employment in other sectors. Due to the scale of the process and its indirect consequences, it is difficult to accurately predict whether job creation in developing countries will be accompanied by a reduction in employment in countries whose companies use offshoring services. At the same time, a significant gap in training, underdeveloped infrastructure and high barriers to market entry do not allow many developing countries to take full advantage of the liberalization of trade in services and offshoring (Golikova, Dovgal, 2015).

Given the above-mentioned transformations of international trade in services, and the growing role of developing countries in it, it is important for the domestic economy to study the experience of countries with economies in transition.

At the beginning of the transition period in Eastern Europe and Central Asia, the service sector in transition economies showed an extremely low level of development. Although countries with economies in transition have made significant progress since 1989 in improving service productivity, according to the European Bank for Reconstruction and Development's (EBRD) Transition Indicators, the average level of service development in these countries remains well below that of industrialized countries. However, the EBRD's Transition Indicators provide a very diverse picture of liberalization in transition economies. With some exceptions, the following pattern is observed in these countries: the countries that have joined both the WTO and the European Union, such as Hungary, Poland, the Czech Republic and the Baltic countries, show the highest degree of liberalization and in many respects lag behind the leading industrial countries. with a market economy; in the countries that have joined the WTO, but not in the European Union, such as Ukraine, Armenia, Moldova, Georgia, there is an average level of liberalization of services in the region; in countries that have not yet joined the WTO, such as Uzbekistan, Tajikistan, Azerbaijan and Turkmenistan, there is limited liberalization of services (Cabinet of Ministers of Ukraine 2021).

From the above we can conclude that the efficiency and competitiveness of the services sector is an important prerequisite for overall competitiveness and economic growth, as services are extremely important for any economic activity, including industrial production. Thus, we can conclude that the impetus for the dynamic development of the service sector

was several factors, namely: the transition from a post-industrial society to a consumer society with an obvious reorientation to the diverse and growing needs of consumers. The development of information and communication technologies and scientific and technological progress, it contributed to the creation of modern information and telecommunications technologies, universal in nature. New technologies have not only spread to the service sector, but have become the basis for the production of many types of intangible products, significantly reduced time and space, become a key factor in information transfer speed, decision making, cooperation and trade opportunities and new competitive advantages.

At the same time, it should be noted that current trends in the international services market indicate further complication of the technological level and sectoral structure of services, improving product quality and diversity, advanced development of knowledge-intensive industries, further increasing the role of services as a factor influencing efficiency and competitiveness. farms and quality of life.

The development of international trade and economic relations is a unique opportunity to strengthen the competitive advantages of the country, regions and individual enterprises, expanding their presence in world markets.

The structure of the institutional environment is determined by the variety of types of institutions that determine the conditions for the functioning and development of economic entities. The leading role in regulating international trade in goods and services belongs to global institutions and national regulatory systems.

The corporate level (TNCs) also has a significant impact on the state of the market. Therefore, in the context of globalization of the world economy, in which international multinational corporations are beginning to play a leading role, the institutional model of the state is influenced by external factors. This forces national economies to integrate into the system of formal institutions - international economic relations, including ratification of conventions of international law and regulations in their territories (Yakubenko, 2004).

There are a sufficient number of international institutions at the global level. Thus, the WTO was created to remove restrictions on international trade and regulate trade and political relations of member states. The WTO Committee on Agriculture and Agriculture considers issues related to the implementation of commitments on domestic support for agriculture, export subsidies, tariff and other quotas, special agricultural safeguards, and so on.

It should be noted that Ukraine's membership in the WTO has become a significant stimulus to reform the national trade regime, has allowed to expand markets for agricultural

exports. On the other hand, the liberalization of import tariffs has significantly affected the increase in imports to Ukraine of certain groups of agricultural products. Within the framework of the WTO, the main multilateral documents regulating the development of international trade and economic relations in the agricultural sector include: the Agreement on Agriculture (AA - Agreement on Agriculture), the Agreement on Trade-Related Investment Measures (TRIMS - Agreement on Trade-Related Investment Measures, Agreement on Subsidies and Countervailing Measures (ASCM), Agreement on Technical Barriers to Trade (TBTA), Agreement on Import Licensing Procedures AILP - The Agreement on Import Licensing Procedures). It should also be noted that the WTO Trade Agreements with a limited number of participants signed in Ukraine are the International Agreement on Trade in Dairy Products and the International Agreement on Trade in Beef (Koval, 2008).

The best-known international organizations at the United Nations involved in the development of international trade and economic relations include the FAO (Food and Agriculture Organization of the United Nations), UNCTAD (United Nations Conference on Trade and Development), UNIDO United Nations Industrial Development Organization.

It should be emphasized that UNCTAD addresses certain economic aspects of the development of international trade in agricultural goods, and UNIDO deals with assistance to developing countries in the use of international trade for economic growth. The OECD (Organization for Economic Co-operation and Development) is an influential international organization for the development of international economic relations. The Government of Ukraine has effectively cooperated with the OECD in the implementation of the Eurasian Competitiveness Program, and in fact the project «Sector Competitiveness Strategy for Ukraine». Regular peer reviews of the OECD, which are of practical importance due to the recommendatory nature of the conclusions, also contributed to the deepening of cooperation. Thus, the review of agricultural policy, including in the fields of agriculture and green economy, remains a priority area of cooperation between the OECD and Ukraine (Amiti, 2009):

- fight against corruption - bringing Ukraine closer to OECD anti-corruption standards, implementing OECD recommendations on preventing corruption, implementing the measures of the Istanbul Action Plan;

- public administration and governance - support for public administration reforms, improving the quality of taxation and internal resources management, deepening regulatory

reform, improving the quality of public finance management, supporting the greening of Ukraine's economy and developing control over water use, education;

- economic policy - development of competition, reform of state enterprises, support for investment and competitiveness, development of small and medium enterprises (SMEs) and innovation, support and promotion of exports, improving sectoral productivity of the economy, improving the quality of statistics.

The European Free Trade Association (EFTA) is an intergovernmental organization that promotes free trade and economic integration in Europe. Its activities are almost entirely focused on ensuring the functioning of the European Economic Area. Given that the creation of free trade zones has become a popular trend in international trade in recent decades, the Government of Ukraine and the EFTA concluded a Free Trade Agreement, which entered into force in June 2012, which contributed not only to international trade in goods, including agricultural, between countries, but also strengthening economic ties.

An important role in the development of international trade and economic relations is played by non-profit organizations, among which are (Fink, 2008):

- FiBL (Research Institute for Organic Agriculture), which promotes research and projects that help farmers increase productivity, taking into account environmental impacts. The result of cooperation is the implementation of the project «Development of the organic market in Ukraine»;

- IISD (International Institute for Sustainable Development), which is a non-governmental organization that promotes environmental sustainability through the latest research and partnerships (Kvach et al., 2020).

Thus, international trade and economic relations today exist due to the general focus of countries on the creation and maintenance of various institutions that form trade and economic ties between countries. Such institutes create favorable conditions for trade between countries, as it is the institutes that act as mediators in concluding agreements between countries, conduct research and summarize statistics in the form of reports that can be used by all countries. International trade and economic organizations can influence the expectations of cooperating countries and the behavior of the parties. Multilateral institutions can also promote peaceful relations between its members by creating favorable conditions for mutually beneficial cooperation in the form of trade. Such international relations are generally aimed at strengthening the effective development of Ukraine's economy, improving the socio-economic conditions of its operation, increasing employment and more.

Conclusions

Thus, foreign trade relations between countries, the volume of trade directly affect the level of economic development of the state as a whole, and cooperation in other areas and expanding the country's influence on the world stage. It should be noted that the Government of Ukraine in order to increase export opportunities of domestic producers and protect the economic interests of the state in foreign markets conducts effective work aimed at realizing the benefits of Ukraine's WTO membership and pursues active foreign trade policy through our country's participation in multilateral trade negotiations.

Thus, the international market of services, today, is a particularly important area of the modern economy and, at the same time, a source of increasing the competitiveness of national economies. Given the current trends in the world economy, it is important to note not only the dynamic development of services, as was the case in the late twentieth century, but also the corresponding changes in its nature and structure. In the context of globalization of the world economy in the international services market there are new factors that change the perception of the mechanism of its functioning, and therefore further development of the international services market is impossible without improving the mechanism of its regulation. The main reason for the rapid development of services in modern economic realities are profound changes in the system of social needs: the complexity of machinery, technology, production structure, increasing living standards and social activity, improving educational and cultural level. These trends are universal and common to all countries, but they are implemented as the formation and development of domestic conditions that are directly dependent on the level of economic development of the country, resulting in the peculiarities of the world services market, both subject and national.

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Modernization of Transport Infrastructure in the Context of Sustainable Development of the National Economy: European Practice and Ukrainian Realities

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ABSTRACT

The article, based on the methods of grouping and classification, conditionally systematizes the approaches to the interpretation of transport infrastructure, which are proposed by various scientific schools. The main properties of transport infrastructure include the following: its development affects certain areas that are associated with it; from the point of view of the economy it has a positive value, and in the ecological plan – negative; the creation of infrastructure has a high cost – as a rule, funds are allocated from the budgets of different levels; recently, the mechanism of international-private-public partnership has become increasingly important; implementation of infrastructure projects takes a long time. Changes in the logistics efficiency index in Germany, Poland, Slovenia, and the Czech Republic, which were observed in the period 2007-2018, were revealed. The analysis of dynamics of volumes of transportation of cargoes and cargo turnover by types of transport for 2000-2019 is executed. The priority directions of modernization of transport infrastructure in the EU countries till 2030 are considered. The urgency of the problem of modernization of transport infrastructure in the context of sustainable development and recovery of the national economy of Ukraine at the present stage is proved. The key ways of modernization of transport infrastructure are identified, which include green transformation (decarbonization, introduction of green logistics and green investment as a non-traditional source of funding for infrastructure projects), innovative technologies, public-private partnership, clustering, digitalization, and digitalization.

Keywords: *national economy, transport and logistics system, transport infrastructure, digitalization, clustering, green transformation, public-private partnership, sustainable development.*

Introduction

At the present stage, the strategic priority of the national economies of most European countries is the transformation of transport and logistics systems and modernization of transport infrastructure on the basis of digitalization, multimodality, greening, and public-private partnership within the Trans-European Transport Network. This is in line with the basic provisions of the European Union's transport policy, which, in turn, will ensure balanced sustainable development, increase investment attractiveness, and global competitiveness.

Problems of modernization of transport infrastructure, improving the efficiency of transit potential, and their role, and importance in the formation of transport and logistics systems of

different levels in the context of sustainable development are of constant interest to scientists and practitioners. A significant number of scientific works of foreign scientists are devoted to these issues, including: Button (2010); Dalton, de la Pena, Vassallo, Acciaro (2017); Ferrari et al. (2018); Kopiec et al. (2019); Dźwigoł et al. (2020); Kwilinski (2018); Ishikura (2020); Wang et al. (2020); de Soyres, Mulabdic, Ruta (2020); Broniewicz, Ogrodnik (2020); Sykes, Bell, Dissanayake (2020); Teklemariam, Shen (2020); Kumar, Sekhar, Parida (2020); Cheng, Yan, Gao (2020); Rajagopal, Zhang (2020); Liu, Zhang, Xu (2020).

The study of issues related to the development of scientific approaches (system, integrated, logistics, etc.) in the theory of supply chain management and organization of logistics processes are: Beresford, Pettit, Whittaker (2005); Gunasekaran (2005); Huemer (2006); Blaik (2010); Kotler, Keller (2014); Murphy, Wood (2017); Bowersox, Closs (2017). Theoretical and methodological provisions and practical recommendations for the formation of transport and logistics clusters are reflected in the work of scientists, in particular: Zrobek (2011); Szuster (2012); Kruczek, Zebrucki (2014); Frankowska (2015); Dmukhovski (2019).

Much attention is paid by Ukrainian scientists Hryhorak (2017); Hutsalyuk, Bondar (2021a; 2021b); Ivanov, Kharazishvili (2017); Nykyforuk et al. (2019); Ilchenko, Karpenko (2017) are devoted to the development of theoretical and methodological and applied principles of forming a management system for balanced development of the market of logistics services as part of the national logistics system; identification of areas for improving the efficiency of transport and logistics activities, priorities for the development of the transport sector in Ukraine, key tasks for the modernization of transport infrastructure; evaluation of indicators of innovative development of the transport system of Ukraine to substantiate strategic guidelines; development of a functional scheme of digital transformation of the transport sector in Ukraine; substantiation of conceptual provisions of the strategy of development of the transport system of Ukraine and measures of the state policy of its realization.

However, previously unresolved parts of the problem are disregarded in existing structural and substantive studies of the essence of transport infrastructure current trends in transport and logistics services, features of European and global transport and logistics systems, changes in the paradigm of logistics management, and modernization of the national economy.

In view of this, the purpose of this work is to generalize and systematize existing approaches to defining the essence and content of the concept of "transport infrastructure";

author's interpretation of this economic category from the standpoint of transformation of the national economy, the rapid spread of network, digital, green economy in the context of the concept of sustainable development; research of the best European practice of modernization of transport infrastructure; determining the directions of modernization of transport infrastructure as a key task for the development of the national economy of Ukraine.

Methods

The theoretical basis of the study is the scientific works of foreign and Ukrainian scientists in the national economy, transport logistics, strategic management, digital marketing, information technology, green economy, and sustainable development.

The research was conducted using general scientific methods: analysis and synthesis – to summarize existing theoretical approaches and provisions, scientific developments on the development of transport infrastructure, clarification of terminology; classifications – to systematize scientific approaches to the definition of "infrastructure" and "transport infrastructure", proposed by various economic schools; statistical analysis and comparison – to analyze the results of expert surveys on the need to modernize transport infrastructure in the European Union; statistical analysis of the dynamics of indicators of transport development in some European countries and Ukraine; structural and logical generalization – to identify barriers that hinder the functioning of transport infrastructure in terms of sustainable development; identification of strategic directions for the modernization of transport infrastructure in the EU and Ukraine.

The volumes of freight traffic and freight turnover of various modes of transport in the surveyed European countries are taken from official sources of the United Nations Economic Commission for Europe. The Logistics Performance Index is available on the official website The International Bank for Reconstruction and Development, The World Bank. The main indicators of the development of the logistics services market (GDP, logistics costs, revenues of the 3PL sector) are posted on the official website Armstrong & Associates, Inc.

Results

Transport infrastructure: essence, content and role in ensuring the sustainable development of the national economy

Analysis of the scientific literature shows that there are ambiguous and diverse approaches of foreign and domestic researchers to the definition of infrastructure as an economic category. For the most part, the term “infrastructure” means: the main element of a market economy; component of the economic system and subsystem; factor of economic intensification; working and material production conditions; base for industry development; social market institute; a set of material and technical facilities and means; a set of institutes, institutions, organizations, technologies, norms, systems; a set of general conditions that ensure the development of entrepreneurship; economic relations in the process of activity of various objects of production and non-production nature; system of general conditions of market development in order to create a favorable economic climate for the functioning of capital; a system of interacting agents in the sphere of circulation, providing trade and economic links between production and consumption; a set of activities that promote the sale of goods on the market and the formation of new demand for goods and services; a set of activities that ensure the movement of flows of goods from producers to consumers, etc.

Thus, the formulation of the term “infrastructure” can be conditionally systematized into the following groups: system; complex of economic activities; part of the economy; appropriate conditions (institutional, economic, social, environmental); a mechanism; component of the environment.

From the point of view of researchers, the definitions of this economic category are classified according to the main approaches: theoretical and economic, institutional, resource, sectoral (sectoral), structural and functional, and systemic. Based on the analysis of these approaches, it can be argued that they are all reasonable and relevant because the very concept of “infrastructure” is complex and multifaceted. Their application depends on the objectives of the study – the optimal integrated infrastructure model should reflect and take into account all these aspects, as the separate use of any of them significantly narrows the researcher's understanding of the nature of the infrastructure. But it is advisable to apply an integrated approach because it can study the nature and content of the concept of “infrastructure”, take into account scientific achievements and practical experience in the formation of hierarchical infrastructure, and monitor the processes of its evolutionary development, operation and modernization.

Differences in the interpretation of "infrastructure" are explained not only by the variety of approaches but also by the concepts in their composition. There are five main concepts in the economic literature: overhead, institutional, marketing, distribution, and logistics. The study (Petrova, Trushkina, 2017; Zaloznova, Trushkina, 2018; Liashenko, Trushkina, Shevchenko, 2020; Tsvirko, Trushkina, 2022; Trushkina, 2022) found that to date, scientists have not developed a unified approach to understanding the essence of transport infrastructure. This is due to the fact that currently formed many scientific schools, which have specific approaches to the formulation of terminology.

Most scholars interpret the transport infrastructure as a transport network, which considers the connecting element between production and consumption, which includes communications of all modes of transport, as well as facilities that serve them. Button (2010) defines transport infrastructure as a fixed component of the transport system; Dalton et al. (2017) – an integral part of the overall European transport system regardless of the mode of transport; fixed assets and systems that serve operators and users; Ferrari et al. (2018) – the degree of accessibility of places and regions, thus contributing to their differentiation in the decision-making process for the localization of firms and households.

Vorontsova (2009) identifies the terms "transport infrastructure" and "transport system". Rozhkov (2010) considers the concept of "transport infrastructure" as a synonym for the category of "transport complex". According to Smokova (2019), this is not justified, as the transport infrastructure is only part of the transport industry, namely its technological structure. The researcher introduces the concept of "transport and logistics infrastructure" and proposes to consider it from the standpoint of promoting material and related flows and in close connection with the elements of transport, warehousing, and logistics infrastructure, combining these subsystems into a single system. This term is defined as a set of logistical systems (facilities) that provide basic functions in various fields and industries, and a set of subsystems that provide access to economic agents for various goods, resources (assets), or certain services.

Topchiyev and Nefodova (2013) have a broad understanding of transport infrastructure and proposed their study in the following main areas: research of individual transport enterprises and facilities (stations, ports, nodes); analysis of transport complexes; study of transport networks and communications. That is, scientists consider the transport infrastructure not only practically identical to the transport system but also considers the transport complex as an integral part of the transport infrastructure.

Stepanenko (2019) formulated a comprehensive definition of transport infrastructure as a set of all modes of transport and transport structures, the operation of which is aimed at creating favorable conditions for all sectors of the economy and the functioning of organizational and economic conditions, ie a set of logistical transport systems designed to ensure economic and non-economic human activities. Zablodska et al. (2016) propose to define the concept of "transport infrastructure" as a component of the transport system of the region. That is, as a set of transport routes, nodes, facilities for the maintenance of passenger and freight transport, and maintenance and repair facilities that ensure the functioning of all modes of transport in the transport system of the region.

A number of scientists understand the transport infrastructure of the transport system of all modes of transport. At the same time, Zhovtyak (2011) provides a definition of the transport infrastructure of the region. Kryvoruchko (2019) notes that the transport infrastructure performs the following functions: providing, productive, national security, regulatory, stimulating, social, and foreign economic. Karyy and Podvalna (2017) define transport and logistics infrastructure as a set of infrastructures that provide logistics activities, highlighting the following components: road transport infrastructure, warehousing, telecommunications, pipeline, railway, river, and sea transport infrastructure, infrastructure aviation transport.

Ishchenko (2018) uses the term "infrastructure of transport and logistics activities of the region", meaning a complex system of technical, organizational, economic, and information and communication support for the implementation of transport and logistics services concentrated in the region. From the scientific point of view of Kharchenko (2020) the concept of "transport and logistics infrastructure" is a set of subjects and objects of transport and logistics activities, including transport, communication, warehousing, and other elements that ensure organizational and economic interaction of economic entities projects in the logistics process. Transport and logistics infrastructure is interpreted as a set of objects and subjects of transport and logistics infrastructure, including material, financial and information flows, which perform the functions of transportation, storage, distribution of goods, as well as information and legal support of goods flows.

Lavrenyuk (Ihnatova) (2018) systematized the existing definitions of transport infrastructure according to the following approaches: organizational and legal (transport infrastructure is interpreted as a set of enterprises, institutions, and organizations that ensure effective interaction between the main subjects of industrial relations – seller and buyer); activity

(consideration of transport infrastructure is to see it as a specific activity for the production of transport services); institutional (study of transport infrastructure is to identify the general patterns of its development, existing both in a developed national economy and in the period of formation of new (post-crisis) relations); logistics (consideration of the functioning of transport infrastructure as an adaptive feedback system); security-oriented (consideration of transport infrastructure from the point of view of the source of opportunities to strengthen economic security and a tool for neutralizing threats). Stepanenko (2019) proposes to classify all definitions of the essence of the concept of "transport infrastructure" according to structural, systemic, functional, process, and organizational approaches. At the same time, in his opinion, the structural approach emphasizes the decomposition of this economic category.

The systems approach emphasizes that transport infrastructure is a set of interconnected subsystems that aim to achieve a common goal. The functional approach emphasizes the ability to implement the main function of the object – movement. The process approach pays attention to the process of creation and operation of transport infrastructure. The organizational approach emphasizes that the activities of transport infrastructure actors affect its functioning.

Thus, the study found that there is no single scientific point of view on the concept of transport infrastructure. Some scholars consider this economic category as part of the transport system; others – as an element of market infrastructure; third – as a transport network; some researchers argue that this is a certain type of economic activity, economic relations in the transport sector (Figure 1).

As a result of generalization of the existing scientific developments on the conceptual apparatus the author's approach to the definition of essence and maintenance of the term "transport infrastructure" which is considered as:

- the key component of the transport and logistics system of different levels (national, regional, local);
- a set of the transport networks, which includes transport communications, terminals, logistics centers, and other facilities, devices, and equipment that provide transport for the delivery of goods and passenger service within a certain territory (country, economic region, region, territorial community);
- a set of economic relations that arise in the process of ensuring the sustainable development of transport and logistics systems within the national economy.

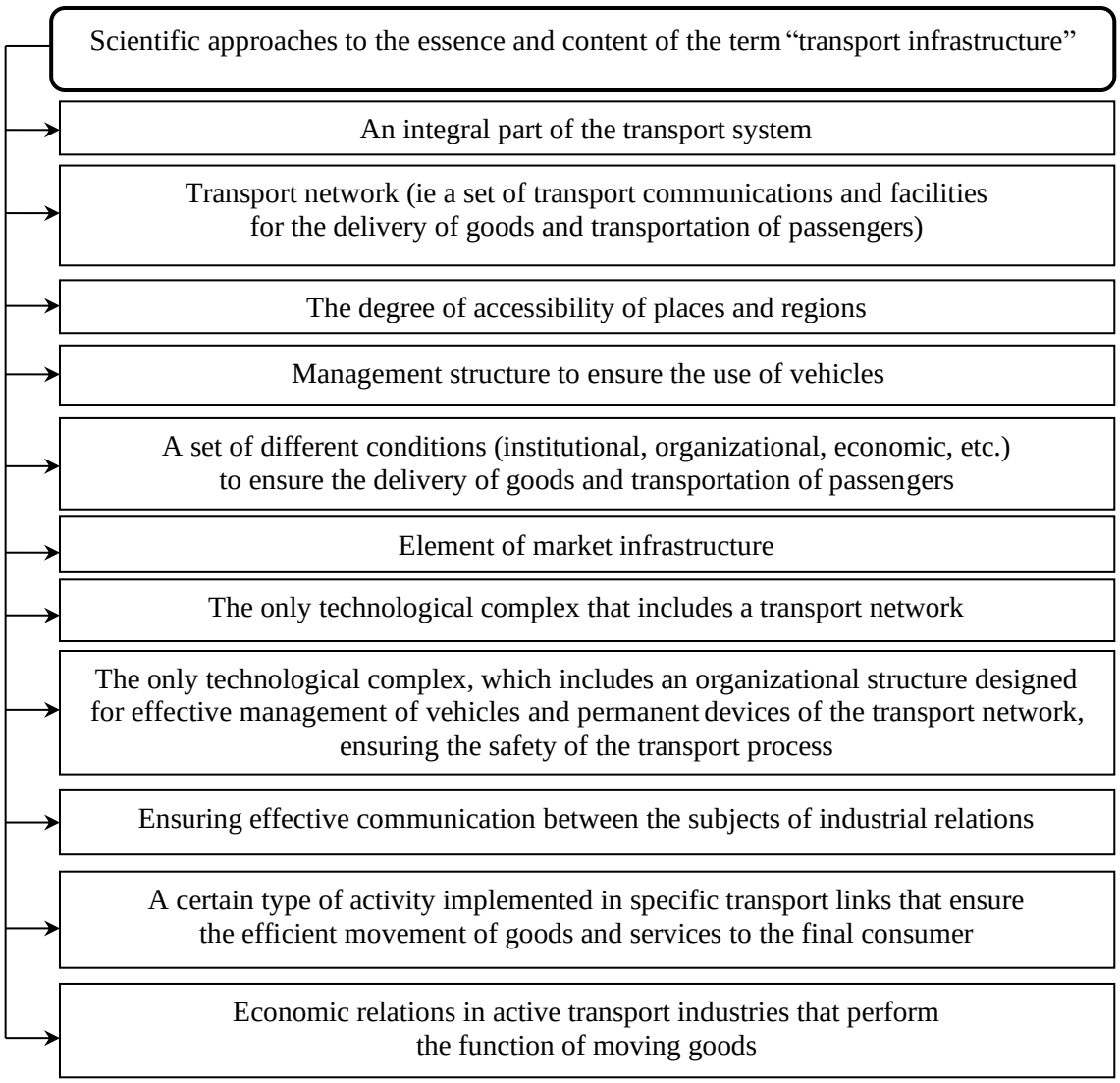

Fig. 1. Systematization of scientific approaches to the definition the term "transport infrastructure"

Source: built by the authors.

European experience of modernization of transport infrastructure as an important component of transport policy

The goal of the government of European countries is to improve the future position on the basis of sustainable development and the concept of "green" growth. To this end, for example in the Czech Republic, the Innovation Strategy for 2019-2030 and the Development Strategy for 2021-2027 have been developed and adopted, which identify promising areas of the national economy. These include the IT sector; research, innovation, development; education; digital economy; financial, transport, and energy sectors; low-carbon economy, and efficient resource management.

The strategic task of the Polish national economy is to create appropriate institutional conditions for the formation and functioning of transport infrastructure. This issue needs to

be addressed in the framework of the Trans-European Transport Network (TEN-T) policy. Its essence is to create infrastructure facilities that allow you to move freely, comfortably, and logistically within the territory of EU member states. Moreover, it contains environmental requirements aimed at promoting sustainable development and climate conservation. The implementation of transport policy in European countries will help increase the efficiency of their transit potential; optimize traffic flows using digital technologies; minimize logistics costs; rational organization of logistics activities on the basis of clustering in the context of balanced sustainable development; strengthen competitive positions in the European and world markets of transport and logistics services.

It should be noted that the quality of infrastructure as an indicator of the Logistics Efficiency Index is assessed using a methodology developed by the World Bank. According to the research of the World Bank for 2007-2018, there is a positively stable trend in the positions of the surveyed European countries in the ranking of the main indicators that characterize the efficiency of logistics (Table 1).

Table 1. The place of the surveyed EU countries in the ranking of logistics efficiency

Indicators	Countries/Years							
	Germany		Poland		Slovenia		Czech Republic	
	2007	2018	2007	2018	2007	2018	2007	2018
Customs	4	1	38	33	40	24	36	30
Infrastructure	3	1	51	35	29	31	36	26
Organization of international freight	4	4	52	12	36	47	43	10
Competence and quality of logistics services	3	1	38	29	36	50	42	20
Supply tracking	5	2	40	31	52	40	35	24
Timeliness	8	3	40	23	33	38	42	16
The Logistics Performance Index	3	1	40	28	37	35	38	22

Source: compiled on the basis (Arvis, J.-F. et al. (2018). Connecting to Compete 2018. Trade Logistics in the Global Economy. The Logistics Performance Index and Its Indicators).

For example, the overall rating of the Czech Republic improved by 16 points. This is due to the improvement of the Czech Republic's position on the indicators “Ease of organization of international freight” by 33 points; “Timeliness of deliveries” - by 26; “Competence and quality of logistics services” – by 22; “Supply Tracking” – 11; “Efficiency of customs work” – by 6 points.

At the same time, the Czech Republic has improved its position on the indicator “Quality of infrastructure” in the ranking of logistics efficiency. Thus, according to this

indicator, the rank of the Czech Republic increased by 10 positions: in 2007 the country ranked 36th among 150 countries, and in 2018 – it is 26th among 160. The worst situation was observed in 2012 when the Czech Republic in terms of infrastructure quality ranked 50th among 155 countries. Germany has the highest logistics efficiency index. By almost all indicators, Germany is the leader. Poland also improved its position in the rankings. Thus, according to the logistics efficiency index, Poland rose by 12 points from 2007-2018. This was due to an increase in the rank of all indicators: "Ease of organization of international freight" by 40 points; "Timeliness of deliveries" – by 17; "Quality of infrastructure" – by 16; "Competence and quality of logistics services provided" and "Supply Tracking" – by 9; "Customs efficiency" – by 5 points. At the same time, in Slovenia, the positions on the indicator "Competence and quality of provided logistics services" deteriorated – a decrease of 14 points; "Organization of international cargo transportation" – by 11; "Timeliness of deliveries" – by 5; "Quality of infrastructure" – 2 points.

According to Armstrong & Associates, Inc., the share of logistics spending in the Czech Republic's GDP in 2020 was 8.9% (a global average – of 10.8%). During this period, the share of 3PL sector revenues in the country was 11.2% of logistics costs (global average – 10.6%). In 2020, the share of the Czech Republic's GDP was 0.29% of global GDP, logistics costs – 0.24% of their total volume in the world, and 3PL sector revenues – 0.25% of global GDP. The share of logistics costs in Germany was 3.4% of their total in the world, and in Poland – 0.7%. The share of 3PL sector revenues in Germany was 3.4% of the world, and in Poland – 0.63% (Table 2).

Table 2. The main indicators of the development of the logistics services market in 2020

Country	Indicators				
	GDP, *billion dollars USA*	Logistics costs		3PL sector revenue	
		billion dollars USA	share in GDP, *%*	*billion dollars USA*	share in logistics costs, *%*
Germany	3803.0	308.5	8.1	32.4	10.5
Poland	594.2	60.3	10.1	6.1	10.1
Czech Republic	241.5	21.5	8.9	2.4	11.2
In the world	84574.8	9092.1	10.8	961.8	10.6

Source: International Monetary Fund, Australian Logistics Council, NESDB, Vietnam Business Forum, Logistics Viewpoints and Indonesia Investment, and Armstrong & Associates, Inc. Databases.

According to the analysis of the statistical database of the United Nations Economic Commission for Europe, the volume of road transport by road in the Czech Republic increased

by 21.6% from 2000-2019, and rail – by 0.6%. Volumes of cargo transportation by river transport decreased by 55.2%. A similar situation is observed in Germany, Poland, and Slovenia (Table 3).

Table 3. Dynamics of freight traffic by different modes of transport, *thousand tons*

Types of transport	Countries/Years							
	Germany		Poland		Slovenia		Czech Republic	
	2000	2019	2000	2019	2000	2019	2000	2019
Railway	282861	367190	185334	233744	13667	21902	98255	98804
Automobile	3005104	3208197	1083071	1506450	57910	85406	414725	504099
River	242225	205066	10433	2779	-	-	1739	779

Source: compiled on the basis of information materials from the statistical database of the United Nations Economic Commission for Europe.

Based on statistical analysis, it was found that the turnover of road transport in the Czech Republic increased insignificantly – by only 0.06%, and river, by contrast, decreased by 84.1%, rail – by 7.5%. Freight turnover of rail and road transport in Germany and Poland increased, and river – decreased (*Table 4*).

However, if in the future the European government does not invest in the development of river transport, stimulate small and medium-sized businesses in this sector, implement public-private partnerships and seek non-traditional sources of funding (venture capital, crowdfunding, etc.), then there will be a tendency to reduce the volume of cargo transportation. For example, river transport in the Czech Republic is projected to decline by 46% in 2019-2022 and by 70.9% in 2019-2025. Although river transport is recognized in most European countries as an attractive mode of transport from an economic and environmental point of view.

Table 4. Dynamics of cargo turnover of different modes of transport, *million tkm*

Types of transport	Countries/Years							
	Germany		Poland		Slovenia		Czech Republic	
	2000	2019	2000	2019	2000	2019	2000	2019
Railway	75884	122805	54015	54584	2596	5292	17496	16180
Automobile	280699	311869	72842	348952	6654	22225	39036	39059
River	66465	50919	1173	84	-	-	88	14

Source: compiled on the basis of information materials from the statistical database of the United Nations Economic Commission for Europe.

It should be noted that the UN is currently considering ways to reduce the negative impact of freight on the environment. One of them, according to the UN Economic

Commission for Europe, maybe the diversification of inland waterway transport. The increase in river freight transport is due to the main provisions of the Paris Agreement in the framework of the UN Framework Convention on Climate Change to regulatory measures to reduce carbon emissions in the world. The UN invites countries to pay more attention to the development of water transport.

According to the European Economic Commission, in the last decade there has been a tendency to increase the size of ships while reducing their number. Modernization of port infrastructure and expansion of the network of freight routes will create new jobs, and ensure sustainable development of the transport sector. This corresponds to the main provisions of the EU transport policy, the key direction of which is the reduction of carbon dioxide emissions from the functioning of the transport sector. This can be achieved through the implementation of a set of measures aimed at: reduction by 2030 of the number of cars to 50% on traditional fuels within urban areas; complete abandonment of their use by 2050; ensuring by 2030 the complete decarbonization of urban logistics in major urban centers; increase by 2050 the share of consumption of low-carbon environmentally friendly fuels in aviation to 40%;ensuring that by 2050 the EU will reduce its carbon dioxide emissions from marine fuels by 40% (possibly by 50%).

According to the Ministry of Infrastructure and Development of the Republic of Poland, over the past 10 years, the amount of funding for infrastructure development in the country from various EU funds amounted to more than 34 billion euros. In Poland, planning at the national level takes into account the long-term perspective. The main document is the Transport Development Strategy until 2020 (with a perspective until 2030). This strategic document set out the operational objectives that were implemented in 2014-2020 for the development of road, rail, sea, and inland waterway transport with the use of EU funds. By 2023, it is planned to master 88% of the total budget, of which 33% relates to the implementation of the TEN-T infrastructure policy. This will allow achieving European indicators. For example, reduce the average travel time between voivodship centers by 15% (about 40 minutes) and increase road safety. At the same time, there is a negative trend in the development of the transport and logistics system in Poland. Thus, experts note an imbalance in the development of road and railway infrastructure.

The main part of investments is directed to the road sector, and the share of funding for the development of railway infrastructure is declining.

In this regard, Polish practitioners expressed their views at the European Economic Congress in Katowice in September 2020 on the inefficient functioning of the country's integrated transport system. One of the main goals of the transport development strategy in Poland, updated in 2019, is to strengthen the role of railways in the integrated transport network. However, in practice, the share of freight transport by rail is declining annually in total, and the size of investment in railway infrastructure is significantly inferior to investments in the development of the road network. For example, investments in railway infrastructure development amounted to PLN 73 billion (approximately USD 18.6 billion) from 2000 to 2019, while PLN 203 billion (USD 51.7 billion) in major roads. The key shortcomings include a significant degree of depreciation of the railway infrastructure, numerous bottlenecks in the network, lack of integration with other modes of transport, and the government's efforts to shift road transport to more environmentally friendly modes, including rail.

The formation and operation of the transport and logistics network in the Czech Republic should be carried out on the basis of the strategic document “Development of transport infrastructure until 2050”, which aims to create conditions for the further economic development of the country and its regions. The normative document formulates proposals for a transport solution, especially for the road network, as well as in the context of the road and railway network until 2050, including the expected trends in transport using modern innovative and digital technologies. The draft decision on the development of road infrastructure will be one of the bases for updating the strategy of the Government of the Czech Republic on the functioning of the transport sector. At the same time, one of the main priorities of the Czech Republic is international cooperation in the direction of modernization of transport infrastructure, which will take place in the framework of the Eastern Partnership program.

The key condition for improving the efficiency of the European transport and logistics system is an investment and financial support for its development. Various funding funds have been set up for this purpose. To date, the European Connection Fund (CEF) has supported more than 690 EU-funded transport projects worth 23 billion euros. This corresponds to a total investment of 48.3 billion euros in EU transport infrastructure (grants from the ESF together with other sources of funding). Such funding is mainly focused on sustainable transport projects, as well as on innovation and the use of new transport management technologies and systems to increase safety and interoperability.

The budget of the TSF's long-term program for the period 2021-2027 for the development of transport infrastructure is 30.6 billion euros, including total funding of 12.8 billion euros and a solidarity fund of 11.3 billion euros. The Integration Fund (FIF) is allocating 63.4 billion euros to activities related to the development of trans-European transport networks. The European Fund for Strategic Investments (EFSI) has approved 67 projects in the field of transport. The investment is 27 billion euros. This is more than 11% of the total investment in infrastructure and innovation financing. In addition, 6 EFSI-funded programs worth 2.6 billion euros have been pre-approved. According to experts, in order to complete the construction of the main infrastructure of TEN-T, it is necessary to invest in the amount of 500 billion euros in 2021-2030. Funding for the completion of the full transport network by 2050 is over 1.5 trillion euros.

In 2016, the Bundestag approved a plan to invest in the development of the transport network in the amount of 269.6 billion euros. This applies, first of all, to the repair and expansion of highways, railways, and waterways in the framework of the Federal Transport Development Plan until 2030. The priority is to support the existing system of roads – repair and replacement of transport infrastructure. The costs of this measure will amount to 141.6 billion euros or 52.5% of total investment.

It should be noted that the adopted plan is an effective investment program for the functioning of Germany's transport infrastructure. However, this strategic document does not take into account the need to expand public transport and is not environmentally friendly. This should be taken into account when amending the Federal Program for the Reconstruction of Transport Infrastructure in Germany, which should comply with the main provisions of the "Strategic Plan for a Single European Transport Area: Towards a competitive and resource-efficient transport system".

In order to increase the efficiency of transport logistics (especially river) and supply chain management, it is advisable to modernize the transport infrastructure as part of the national transport and logistics system of Germany. For example, in 2019 the government invested 17 billion euros in the development of transport infrastructure. In 2020, the total expenditures of the state budget amounted to 362 billion euros, of which 42.9 billion for the repair of transport infrastructure. This is 11.9% of the total expenditure part of the country's budget.

In 2020, following the signing of the LuFV III (Leistungs- und Finanzierungsvereinbarung) agreement with the German Ministry of Transport and Digital

Infrastructure (das Bundesministerium für Verkehr und Digitale Infrastruktur – BMVI) on productivity and funding targets for a total of 86.2 billion euros over the next German Railways (Deutsche Bahn AG – DB) has announced plans to invest 12.2 billion euros in infrastructure development. This is 1.5 billion euros more than the total amount allocated in 2019.

Therefore, at present in the surveyed European countries it is advisable to make changes and additions to the Strategic Plans for Transport Development until 2030. This document should define at the national level a vision based on the following principles:

– providing high-quality, accessible and integrated transport infrastructure that promotes social integration, combining less developed regions with excellent infrastructure, and ensures the international competitiveness of countries, using their logistical and geographical potential;

– providing competitive transport services that promote economic growth, optimal use of transport networks, balanced development of various transport services using a logistical approach and accelerating the integration of different modes of transport at national and European levels.

It should be noted that the priority is the organization of multimodal freight, which should be achieved through the operation and support of the construction of relevant logistics centers. The need for organizational changes to optimize the transport networks of certain modes of transport in terms of volume, functionality, accessibility and efficiency is important. This, in turn, will increase the level of competitiveness, attract additional investment in the transport sector, and increase international traffic through a long-term sustainable partnership between market participants in transport and logistics services.

Modernization of transport infrastructure in the context of sustainable development of the national economy of Ukraine: modern problems and ways to solve them

The Russian invasion of Ukraine has led to a significant destruction of transport infrastructure. According to experts from the Ministry of Infrastructure of Ukraine, almost 30% of infrastructure facilities have been destroyed or damaged. Virtually all components of the transport infrastructure have been affected – more than 300 bridges on national roads have been destroyed or damaged, 8000 km of roads need to be repaired or rebuilt, and dozens of railway bridges have been blown up.

The damage from the destruction of transport infrastructure is about 100 billion dollars USA. According to the calculations of the Institute of the Kyiv School of Economics, the

losses of the national transport infrastructure and housing stock reach more than 80 billion dollars USA.

All this testifies to the urgency of the problem of modernization of transport infrastructure in the context of the recovery of Ukraine's national economy. As a result of the research (Dzwigol, Kwilinski, Trushkina, 2021; Trushkina, 2022a; Trushkina, 2022b; Kryshtanovych S. et al., 2022), strategic directions of transport infrastructure modernization were identified, which include green transformation (decarbonization, introduction of green logistics mechanism and green investment as a non-traditional source of financial support for infrastructure projects), innovative technologies, public-private partnership, clustering digital logistics, digital transport technologies), etc.

It should be noted that in order to modernize the railway infrastructure, increase traffic both across the border and within the EU, and strengthen the potential for economic cooperation between Ukraine and Poland, a relevant Memorandum was signed. Within the framework of this document, it is planned to create a joint logistics enterprise, the activities of which should be aimed at increasing the volume of rail transportation of Ukrainian exports to the European Union and to world markets through Europe. This will widen the railways for the sale of products that cannot be delivered through blocked seaports.

Therefore, at present it is necessary to pay considerable attention:

– improving the regulatory and legal regulation of the development of the transport sector and the organization of logistics activities;

– development of the Strategy of complex development of the transport and logistics system on the basis of modernization of the transport infrastructure and creation of transport and logistics clusters;

– formation of optimal multimodal logistics chains and substantiation of the cluster model of the organization of logistics activities in economic regions; this is a conceptual approach that should provide for the creation and development of the transport and logistics cluster (TLC) as a mechanism for the sustainable operation of the transport and logistics system;

– development and implementation of an organizational and economic mechanism for managing the development of the transport and logistics system using the tools of digital logistics and “green” logistics;

– improving the mechanism of financial support for the development of transport and logistics systems through the use of financial instruments such as venture capital, crowdfunding, factoring, an international public-private partnership based on private investment, credit institutions, foreign investment resources, grants from international financial institutions.

The Public-Private Partnership in Infrastructure survey, conducted by the Center for Transport Strategies and Deloitte, shows that 85% of respondents (experts from international financial organizations (IFIs), shippers, and current port and railway operators control more than 90% of Ukraine's freight traffic) consider attracting private capital as a key goal of public-private partnership (PPP) for the development of large infrastructure projects. 77% of respondents consider PPP as an option when the state cannot implement the project on its own. Other project objectives include improving the quality of infrastructure (35%); reducing corruption (35%); improving the level and quality of infrastructure services (31%); reduction of project cost (19%); reducing the level of state risks and simplification of implementation (12%).

All participants in the transport services market recognize PPP as the best mechanism for financing projects. However, the respondents did not agree on the advantages of PPP compared to budget funding. Shippers, port operators and MFIs call the most significant factor in reducing the risks of inefficient and excessive spending of budget funds (58% of experts); railway operators – rapid implementation of transport infrastructure modernization plans (46%). At the same time, 35% of respondents say that PPP will be an important factor in increasing the investment attractiveness of the country. 46% of respondents consider the quality of constructed facilities and terms of implementation to be clear advantages. Also, business (50% of respondents) prefers PPP as the most transparent investment mechanism compared to the budget, but MFIs do not share this view.

It should be noted that 85% of respondents say that sea and river ports have the highest potential for PPP development in Ukraine. 65% of respondents see the development of PPP in the railway industry; 54% - in the field of road transport. And only 27% named airports and 8% - municipal transport.

The majority of respondents (92%) call concession the main form of partnership between the state and business: port operators and MFIs (100%), shippers (89%), and railway operators (83%). Despite the fact that the concession is recognized as a priority tool, for each infrastructure project the choice of cooperation mechanism should be individual: 50% of

respondents consider the optimal form of PPP joint activity; 44% - property lease; 35% - privatization of state property. At the same time, 23% of respondents agree that the management of state property is not the best example of PPP.

According to the results of the study "Improving the management of the port industry of Ukraine" conducted by the World Bank, for the management of the port industry in the regions it is advisable to implement the "port landlord" model used in some countries (e.g. Antwerp, Rotterdam, Singapore). This management model provides for the existence of a port administration that controls port property, which allows it to develop land-use policy and consistent planning, transferring access to the property to service providers and investors through contracts (concessions).

The Port Landlord model is based on the following principles: the port administration, which has ownership or otherwise controls the use of port areas, is responsible for the planning and integrated development of ports; private operators carry out stevedoring activities under a concession or lease agreement for assets and land with the port administration.

Implementation of the mechanism of the international-private-public partnership will contribute to the successful modernization of transport infrastructure and the provision of integrated multimodal logistics services; effective provision of connectivity between different modes of transport and their integration with cities and local communities; increasing the economic potential of transport and logistics infrastructure facilities to attract private investment; reducing the cost of organizing logistics activities.

Conclusions

As a result of the study, it was found that the situation in the surveyed countries of the European Union from the standpoint of the efficiency of transport infrastructure as an element of transport and logistics system requires radical institutional, organizational, investment, financial, socio-economic, digital, environmental transformation.

In this regard, governments need to develop and implement national transport development plans until 2030 on the basis of multimodality, digitalization and greening. The main goal of this strategic document should be to pursue a policy of stimulating and supporting the movement of products using environmentally friendly modes of transport (rail and river), as well as achieving a more flexible, sustainable and low-carbon economy.

In addition, in order to address environmental problems in the transport sector, it is advisable to develop and approve national programs for reconstruction and sustainable development, the main purpose of which should be to promote sustainable development in the aftermath of the COVID-19 pandemic crisis. To achieve this goal, a set of measures and reforms should be developed that will not only restore the potential for economic growth but also develop and increase it. At the same time, the plan should lay the foundations for the green transformation of the transport and logistics system in the context of the European Green Pact.

One of the key measures of the National Program for Reconstruction and Sustainable Development should be to reduce the carbon footprint of the transport sector by investing in the modernization and digitalization of this area. Among the main reforms that need to be implemented as a matter of priority are the following:

– updating the strategic base of the transport sector;

– integration of sustainable urban mobility into the strategic planning of regional and spatial development;

– application of a fundamentally new regional approach with direct involvement of local communities in the management of European funds and instruments;

– reforming the water transport sector;

– digitalization of railway transport by modernization of safety and energy efficiency systems on railways;

– implementation of a pilot scheme (“Green Mobility”) to support sustainable urban mobility through measures to develop environmentally friendly, safe, functional and energy-efficient transport systems.

Further research is planned to generalize conceptual approaches to the essence and content of the term “transport and logistics system”; to develop recommendations on the possibility of applying European practice on the modernization of transport infrastructure in the modern conditions of the regional economy of Ukraine.

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Influence of Organisational Culture Strength on Knowledge Acquisition and Transfer Process

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ABSTRACT

In this paper, we explore whether the type of strength of organizational culture influences the acquisition and transfer of knowledge. We designed a model of the influence of the organizational culture on the process of acquiring and transferring knowledge. Moreover, we empirically tested it within medium and large Slovenian organizations. The results of the primary research showed that a strong organizational culture prevails among Slovenian organizations and that the type of organizational culture strength has a positive effect on the process of acquiring and transferring knowledge in the studied medium and large Slovenian organizations.

Keywords*: organisational culture, knowledge management, knowledge transfer, business communication, human resource management.*

Introduction

The challenges of the modern business environment require organisations to constantly adapt and change. Organisations face these challenges and pressures in a variety of ways. Authors explored organization changes and find out the organizational culture was on the third place of the most frequent organizational changes that organization had to deal with in last three years (Sedej & Justinek 2017).

Decades ago, Author wrote that the basic economic resources on which organisations will face future challenges will not be capital, labour or labour force, but knowledge (Drucker 1994). Many other authors have also identified the knowledge of the individual and the organisation's knowledge as a fundamental source of competitive advantage (Malhotra, 2000; Murmann, 2003; Rothberg & Erickson, 2007; Apistola & Gottschalk, 2012; Liebowitz, 2012; etc.).

Organisations develop knowledge through the phases of acquiring, coding, storing, transferring, and using knowledge (Davenport & Prusak, 1998, p. 52─106); we are also talking about the knowledge cycle.

With the desire for the most successful knowledge cycle, organisations include knowledge management into their operations. Knowledge management represents tools, techniques, and strategies to retain, analyse, organize, improve, and share business expertise (Groff & Jones, 2012, p. 2).

How successful organisations will be in developing knowledge depends on several factors, among which researchers highlight the importance of organisational culture (De Long & Fahey, 2000; Babnik et al. 2013; Nooshinfard & Nemati-Anaraki, 2014; Abdelrahman & Papamichail, 2016; Winkler & Fyffe, 2016; Mlaker Kač & Čuček, 2020; etc.). Nooshinfard and Nemati-Anaraki (2014, p. 254) explain, that it is evident that knowledge sharing in organizations is a complex process, driven by diverse factors among others different dimensions of organizational culture.

Based on a review of professional literature, we concluded that there is relatively little empirical research being directly focused on exploring the influence of the type of organisational culture strength on the acquisition and transfer of knowledge. In the light of the foregoing, we decided to focus our research on the impact of the type of organisational culture strength on the process of acquiring and transferring knowledge. In order to realize the purpose of the research, in the theoretical part of the paper we first presented the theoretical foundations in the field of organisational culture strength and the acquisition and transfer of knowledge. In the second part of the paper, we answered the basic research question and tested the null and research assumption on the basis of empirical research among Slovenian medium and large companies. We end our paper with relevant conclusions and open problems for further research in the field of the research subject.

Theoretical background

Strength of organisational culture

In the existing literature, we can find many different definitions of the term organisational culture. Among them, one of the most frequently mentioned definitions is written by Schein (2017), who defines it as a set of implicit assumptions held by group members that explains how the group behaves and responds to its environment. Hofstede et. al. (2010, p. 5) define culture as “the collective programming of the mind that distinguishes the members of one group or category of people from others. Culture is the way in which a group of people solves problems (Trompenaars & Hampden, 1998, p. 6).

Deal and Kennedy (2000) defined organisational culture as the way things get done around here. Organisational culture is a complex and multidimensional construct that also needs to be measured, assessed and evaluated. Because of the above, the authors divided it into many types (Deal & Kennedy, 2000; Cameron & Quinn, 2011; Pascale, 1984; etc.), dimensions, assumptions, and components (Hofstede, 1991; Schein, 2017 etc.). In this paper, we focused on the typology of the organisational culture strength (Deal & Kennedy, 2000, Cameron & Quinn, 2011, Mlaker Kač & Čuček, 2020; etc.).

The question is which organisational culture is strong and what impact it has on individual segments of the organisation. A strong culture is a system of informal rules that spells out how people are to behave most of the time. A strong culture enables people to feel better about what they do, so they are more likely to work harder (Deal & Kennedy, 2000, p. 15–16). Employees behave in accordance with expectations and are able to identify with the values of the organisation (Lussier, 2008, p. 51). Nevertheless, it is important to understand according to Schein (2017, p 12) that organizational culture is incorporated in other, often greater cultures that have impact on its character.

For the most part, the authors associated a strong organisational culture with its efficiency and effectiveness (Kotter & Heskett, 1992; Sørensen, 2002, Cameron and Quinn, 2011 etc.). Since culture is such a vital element in the long-term effectiveness of organizations Cameron and Quinn (2011, 7) believe that people who are in charge for researching and managing organizational culture need to be able to measure all dimensions of culture, develop a strategy and implement it. On the other hand, Sedej and Mumel (2015, 16-18) believe internal communication need to be consistent with the strategy and culture of each organisation.

Nevertheless, Hesket & Kotter (1992, p. 21–25) emphasised that the results show that organisations with a strong organisational culture can also be commercially unsuccessful, and vice versa. To check whether a strong or weak organisational culture prevails in a particular organisation, there are various measurement instruments, which are usually aimed at measuring the homogeneity of the values of the employees in the organisation (Linstead, 2004, p. 101–103). One of the first to prepare and use a survey questionnaire to measure the strength of the organisational culture was Pascale (1984). The mentioned questionnaire was also used in this paper for primary data acquisition.

Knowledge management

Managers understand the value of knowledge as it can present crucial competitive advantage (Nooshinfard and Nemati-Anaraki, 2014, p. 254). Organisations possess different forms of knowledge, which scholars generally categorise into two major types; tacit and explicit knowledge (Prusak & Devenport, 2000; Nonaka, 2005; Collins, 2010; Dalkir, 2013; etc.). Tacit knowledge is difficult to articulate and difficult to put into words, text, or drawings. Explicit knowledge represents content that has been captured in some summarised or repackaged information to meet the needs of distinct individuals through profiling and personalisation value-added activities (Dalkir, 2013, p. 33–34). It is estimated that up to 95% of knowledge in organisations is in tacit form, and only 5% of knowledge is converted into explicit form (Geisler & Wickramasinghe, 2015, pp. 28–30). Organisations want to convert as much individual knowledge as possible into organisational knowledge.

Organisational knowledge is knowledge owned by the organisation (Massingham, 2019). Knowledge in the organisation must be handled appropriately, and for this purpose organisations use knowledge management. Knowledge management is introduced to help companies create, share and use knowledge effectively (Davenport & Prusak, 2000, p. 53). Wiig (1995, p. 4) defines knowledge management as a conceptual framework that encompasses all the activities and perspectives required to gain an overview of, create, deal with, and benefit from the corporation's knowledge assets, and their particular role in supporting the corporation's business and operations. The foundation of the knowledge management function lies in guarding and growing the knowledge owned by individuals, and where is possible, transferring the asset into a formation where it can be more effectively shared by other employees in the company (Brooking, 1999,). From the definitions, we can understand that some authors define knowledge management more broadly than the process of knowledge development and the necessary organisational structure and culture, policy and strategy and technology, etc. Some other authors define knowledge management from the point of view of knowledge cycle development.

Acquiring knowledge and knowledge transfer

Organisations acquire knowledge in different ways: within the organisation through learning and networking of knowledge, and outside the organisation by imitating successful practices in other organisations, by participating in various professional meetings, by collecting data on economic, social and technological guidelines, or by cooperating with various economic and non-economic entities, etc. (King, 2009).

Organisations can also acquire knowledge through indirect and experiential learning, through the acquisition of knowledge from other organisations, and through Intelligence Gathering (Huber, 2004, p. 122). Sedej and Justinek (2013) agree and emphasize the use of social media in internal communication.

From the point of view of new knowledge creation, the theory of knowledge development, advanced by Nonaka and Takeuchi (1995, p. 56–73) and named the spiral of knowledge (abbreviation SECI), is also important. The stated theory of knowledge development is based on the epistemological and ontological dimensions of knowledge. The epistemological dimension represents the division of knowledge into explicit and implicit. Based on this dimension, knowledge is created through the interaction between implicit and explicit knowledge. The ontological dimension represents the level of group interaction and refers to the knowledge transition from the individual through groups to the level of the entire organisation, and then to the inter-enterprise level. The authors are convinced that an organisation cannot create knowledge on its own or in isolation. There must be an interaction between the members of the organisation. At the lowest level, an informal group of co-workers is a kind of space where new ideas are developed. This informal group can extend outside the organisation and also include suppliers and customers (ibid.).

How successful knowledge transfer will be among members of an organisation also largely depends on the existing organisational culture (Nooshinfard & Nemati-Anaraki, 2014). Organisations strive to generate as much knowledge as possible on their own, through individual or group learning.

However, new knowledge in the organisation is not necessarily new in the business environment. The acquired knowledge has no useful value if it is not shared with the members of the organisation. Prior to the transfer of knowledge, it is necessary to codify and store as much of the acquired knowledge as possible and ensure its transferability (Bhatt, 2001, p. 70-72). Knowledge transfer can be defined as the process of exchanging knowledge between different members in an organisation, in which the acquired information and knowledge are used for useful purposes (De Luca & Cano Rubio, 2019, p. 11). Nooshinfard and Nemati-Anaraki (2014, p. 243) defined knowledge transfer as a process in which individuals or groups intentionally or unintentionally disseminate their knowledge to achieve common interests.

The importance of organisational culture in the acquisition and transfer of knowledge in the organisation

The professional literature confirms organisational culture as one of the key factors in the process of knowledge development (De Long & Fahey, 2000; Leidner et al., 2006; Du Plessis, 2006; Kangas, 2005; Abdelrahman & Papamichail, 2016; Winkler & Fyffe, 2016, Mlaker Kač & Čuček, 2020; etc.). DeLong and Fahey (2000, p. 115–123) identified 4 ways in which culture influences the behaviours central to knowledge acquiring and sharing:

1) Culture shapes assumptions about which knowledge is important and worth managing. It derives from norms and values and varies according to the activity in which the organisation operates.

2) Culture affects the relationship between individual and organisational knowledge - individuals decide what knowledge they are willing to share and consequently allow the organisation to shape it into a more structured form, depending on the level of trust prevailing among members of the organisation.

3) Culture creates the context for social interaction that determines how knowledge will be used in particular situations. Organisational culture, through norms and practices, influences the lowering of hierarchical levels and consequently influences the creation of conditions for smooth interaction between employees at different levels.

4) Culture shapes the creation and adoption of new knowledge. Organisational culture has a significant impact on the values of employees and their willingness to use knowledge for concrete purposes.

As a factor in the development of knowledge, organisational culture must be conducive to learning, knowledge and the support of components such as flexibility, assistance, cooperation, trust, strength, reliability, etc. (Idris et al., 2015, p. 282–283).

For these processes to take place effectively, it is necessary to create an organisational culture that is prone to changes, joint work and development, and joint effort (Abdelrahman & Papamichail, 2016, p. 22–23). It strives to establish a strong organisational culture.

Research and results

Research hypotheses and statistical population

The paper focuses on the research of the influence of the type of organisational culture strength on the process of acquiring and transferring knowledge. The basic purpose is to research whether the type of strength of organisational culture influences the acquisition and transfer of knowledge. To this end, we formulate and test the following research and null hypothesis:

- Null hypothesis H01: The strength of organisational culture does not affect the acquisition of knowledge (assumption H01a) and knowledge transfer (assumption H01b),
- Research hypothesis H1: The strength of organisational culture does not affect the acquisition of knowledge (assumption H1a) and knowledge transfer (assumption H1b),

The statistical population was represented by medium and large Slovenian organisations. Based on certain criteria and the use of stratified sampling, we included 607 organisations in the survey, of which 300 were medium-sized and 307 were large. The primary data acquisition was performed in February 2019. Within the planned period of 30 days, we received 144 survey questionnaires in the LimeService online database, of which 6 were incomplete and we had to exclude them from further research. The sample consisted of 138 organisations, of which 84 were medium-sized and 54 were large.

Methodology

Quantitative analysis was used for primary data acquisition, and a survey questionnaire was chosen for the measurement instrument. For this purpose, we used a standardised survey questionnaire, which contained a closed-ended and combined type of questions, and questions with a measurement scale. The closed-ended questions related to (1) gender, (2) age, (3) length of service, (4) size of the organisation, and (5) ownership structure. In questions about (1) levels of education, (2) field of employment and (3) legal organisational forms, we used a combined type of questions to provide a wider range of answers. We used a five-point Likert scale for questions on the strength of organisational culture and the acquisition and use of knowledge. In the process, respondents had to take into account that grades 1 to 5 mean the following: 1 - I do not agree at all, 2 - I do not agree, 3 - I neither agree nor disagree, 4 - I partially agree, 5 - I completely agree (Warner, 2013, p. 9–10).

When selecting a questionnaire to determine the strength type of the organisational culture, we chose the one developed and used in practice by Pascale (1984). The questionnaire

consists of 16 statements to which respondents responded on the basis of a five-point Likert scale.

Pascale (1984) divides organisational culture into strong and weak, on the basis of the points won, and in the framework of our research, we divided the power of organisational culture into four basic types: (1) very strong organisational culture, (2) strong organisational culture, (3) weak organisational culture, and (4) very weak organisational culture. For this purpose, we used a ranking type that indicates that organisations that achieve:

- (1) 0 to 20 points have a very weak organisational culture,
- (2) 21 to 40 points have a weak organisational culture,
- (3) 41 to 60 points have a strong organisational culture and
- (4) 61 to 80 points have a very strong organisational culture.

The points were calculated in two steps: (1) we first performed the sum of all assessments or the degree of agreement disagreement with an individual statement, (2) and in the second step we multiplied the sum of assessments by the number of statements.

In the professional literature known to us, we did not find a questionnaire to measure the acquisition and transfer of knowledge which would fully meet our research goals, so we designed our own measuring instrument, following the questionnaire developed by Lawson (2003, p. according to Kangas, 2005). The questionnaire was also used by Jones (2009) and Kangas (2005) in their research. This set of questions contained three statements for each phase of knowledge development.

Having designed the survey questionnaire, we first tested it in six selected organisations. In this way, we obtained feedback on the reasonableness and clarity of the questions and claims posed. We did not receive any major comments or recommendations, so in the next phase, we converted the survey questionnaire into an electronic form using the LimeSurvey online tool.

The method of statistical data processing was performed using IBM SPSS version 20.0. For this purpose, we performed univariate analyses, namely the frequency distribution for the general data analysis on respondents and organisations.

Assumption verification was performed using correlation analysis, for which purpose we used Pearson's correlation coefficient. The coefficient can take a value in the interval between [-1 and 1] where the following applies (Emerson, 2015, p. 242–243):

1) 0.00 - no connectivity;

2) 0.01-0.30 - weak connectivity;

3) 0.31-0.50 - moderate connectivity,

4) 0.51-0.80 - strong connectivity;

5) 0.81-0.99 - very strong connectivity, 1.00 - full connectivity.

To test the hypothesis, we had to perform several calculations relating to the consistency and reliability of the variables, and the analysis of the main components.

Research model and description of variables

Figure 1 shows a conceptual research model consisting of input variables relating to 16 variables that measure the strength type of the organisational culture, and 3 variables of each type that measure knowledge acquisition and transfer and the newly created variables of the strength of organisational culture and the acquisition and transfer of knowledge acquired through Principal Component Analysis – PCA. A description of the variables with abbreviations is shown in Table 1.

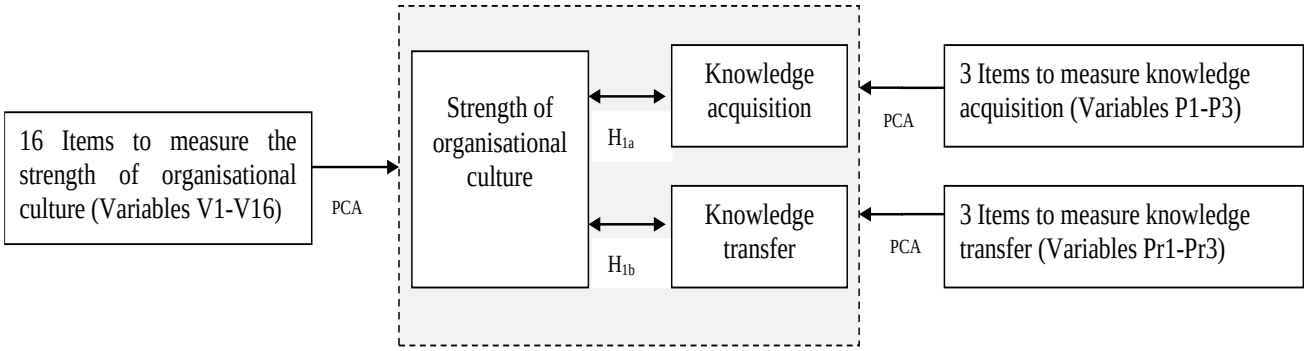

Fig. 1. Conceptual research model

Source: prepared by the authors

Table 1. Description of variables

Variables (symbol)	Variables (description)
V	Strength of organisational culture
V1	New employees must receive additional training for at least one week.
V2	When selecting new employees, human resources pay special attention to those characteristics of employees that are important for the success of the organisation.
V3	Potential job candidates are invited to at least four job interviews.
V4	In the framework of the recruitment process, we accelerate the process of selecting candidates by discovering their good and bad qualities.
V5	We include new employees in training programmes or assign them uncomplicated tasks in the first months.
V6	The extent of experience required to be included in an individual group creates a connection between co-workers in each group.
V7	All professionals in a particular field start as new employees at a certain entry-level position regardless of past experience or advancement.
V8	When rewarding employees, we take into account the individual advancement of employees.
V9	The career path is relatively consistent for professionals in the first five to ten years of their employment in the organisation.
V10	Remuneration systems, incentives for successful work and promotions reflect a high level of compliance.
V11	Homogeneity of organisational and individual values.
V12	Compliance of managers' instructions with the values of the organisation.
V13	The willingness of employees to give up personal values in favour of values that are common to the organisation.
V14	In the event of conflicts that may arise from a mismatch between the short-term and long-term interests of the organisation, we make decisions that emphasise the strengths of the organisation.
V15	We encourage mentorship.
V16	Many similarities can be observed among capable employees in individual fields.
P	Acquiring knowledge
P1	We conduct various internal lectures, training and other forms of acquiring new knowledge and supplementing existing ones.
P2	We have appropriate mechanisms in place to encourage employees to constantly acquire new and complement current knowledge.
P3	Employees are willing to learn on their own initiative from co-workers, superiors and from problems that arise at work.
Pr	Knowledge transfer
Pr1	Our organisation provides regular internal education and training intending to transfer and exchange current knowledge.
Pr2	There is a special place in our organisation (library, centre for independent learning, etc.), which is intended for socialising employees, exchanging knowledge and acquiring new knowledge.
Pr3	In our organisation, we have developed a system of mentoring new employees.

Source: prepared by the authors

Analysis of the respondents and surveyed organisations

The structure of respondents by gender shows that out of 138 respondents, 78 were women (60%) and 60 were men (40%). In terms of age, respondents aged between 31 and 50

predominated, most of them with a university degree. In terms of length of service, respondents who have been employed in the organisation for more than 25 years predominated, and most respondents were employed in the human resources department. Organisations that belong to medium and large organisations in terms of size were included in the research. The sample consisted of 84 medium (61%) and 54 large (39%) organisations. The structure of the organisations by ownership showed that we managed to include 62 (45%) state-owned organisations, 48 (35%) organisations in private ownership and 28 (20%) with mixed ownership. Concerning the legal form, organisations belonging to limited liability companies predominated, as 52 (38%) were included in the sample. 42 (30%) were public institutions, 37 (27%) were joint-stock companies, 6 (4%) were limited partnerships, and the survey also included a sole proprietor (1%).

The influence of the strength of organisational culture on the acquisition and transfer of knowledge

In the measuring instrument, we measured the strength type of the organisational culture with 16 variables, so we had to create a new variable. In doing so, we assumed that the new variable makes sense (1) if each question from a set of 16 variables measures the same construct and (2) if the resulting construct is sufficiently reliable as a measure of the organisational culture.

This was analysed using the Internal Consistency and Reliability Estimate test. In statistics, Cronbach's alpha is most commonly used for this purpose (Cortina, 1993; Zeller & Carmines, 1980; Damon & others, 2011, p. 202; etc.). The value of Cronbach's alpha ranges from 0 to 1, and as a rule, the higher the value of the coefficient, the better the reliability of the construct (Damon et. al., 2011, p. 202). At the value of the coefficient $\alpha \geq 0.8$, we speak of high reliability of the construct, at the value of $0.8 \leq \alpha \geq 0.6$ of the average reliability of the construct, and at the value of $\alpha < 0.6$, we can already ask ourselves about the reliability of the construct (Zeller & Carmines, 1980, pp. 59–60).

The test was performed in two phases. In the first phase, we calculated the value of Cronbach`s alpha, in the next phase we calculated the corrected item-total correlation and the change of Cronbach’s alpha if Item deleted.

Table 2. Reliability Statistics

Cronbach’s Alpha	N of Items
.902	16

Source: prepared by the authors

Table 2 shows that the value of Cronbach's alpha is 0.902 (α = 0.902), which indicates the high reliability of the questionnaire. Also, the calculations of the correlation of each variable with the whole set were greater than the value of 0.5 (Corrected Item-Total Correlation), and the change values of Cronbach's alpha in case of possible exclusion of the variable are lower than the value of the Cronbach's alpha coefficient for all variables (Table 3).

Table 3. Corrected Item -Total Correlation

Items	Corrected Items-Total Correlation	Cronbach`s Alpha if Item deleted
V1	0.505	0.900
V2	0.666	0.893
V3	0.543	0.897
V4	0.576	0.896
V5	0.624	0.895
V6	0.553	0.897
V7	0.544	0.898
V8	0.539	0.898
V9	0.676	0.893
V10	0.721	0.891
V11	0.629	0.895
V12	0.547	0.897
V13	0.426	0.901
V14	0.507	0.899
V15	0.593	0.896
V16	0.597	0.896

Source: prepared by the authors

The sum of 16 statements adequately measures the strength of organisational culture. The new variable was stored under the name of organisational culture strength type. In the following, we divided the organisational culture into four types; for this purpose, we used the ranking type, where we determined that organisations that achieve from 0 to 20 points have a very weak organisational culture, from 21 to 40 points a weak organisational culture, from 41 to 60 points a strong organisational culture and 61 to 80 points a very strong organisational culture.

Based on the calculation of the frequency distribution, we came to the conclusion that an organisation with a strong organisational culture predominates among the surveyed Slovenian organisations.

Questions related to the acquisition and transfer of knowledge also consisted of three variables, so it was necessary to perform a principal component analysis (PCA) during the first phase. The basic purpose of the method is to replace a larger number of variables with a smaller number of variables, based on calculated factors (Jolliffe, 2013, p. 1─5). The relevance of replacing the baseline variables that measured knowledge acquisition in the measurement instrument was verified by the introduction of a new major component using the Bartlett sphericity test and Keiser-Meyer-Olkin statistics. The use of analysis makes sense at the values where the KMO is greater than 0.5 and the degree of characteristic of the Bartlett sphericity test is less than 0.05. Table 4 shows that the KMO unit of measurement is greater than 0.5 (KMO = 0.657) and the Bartlett test characteristic level is less than 0.05 (p = 0.00), which confirms that the data are suitable for performing the main components analysis.

Table 4. KMO and Bartlett's test for the knowledge acquisition component

KMO and Bartlett's test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.657
Bartlett's Test of Sphericity	Approx. Chi-Square	154.711
	df	3
	Sig.	.000

Source: prepared by the authors

Individual statements had to be studied in relation to the values of utilities, starting from the theory that the values must be higher than 0.40. Table 5 shows that all communalities or shares of the explained variable are above 0.40, so all variables can be used in the main components' method.

Table 5. Cumulative for the knowledge acquisition component

Component	Cumulative %
P1	.768
P2	.818
P3	.582

Source: prepared by the authors

How many major components to include in the study was determined based on the eigenvalues calculation and the Scree Plot diagram. There are several rules in the literature for determining the number of factors or main components: (1) the chosen number of factors must explain at least 60% of the total variance; (2) the eigenvalues of the components must

be at least 1; (3) the eigenvalues diagram (scree plot) showing the number of components and the eigenvalues; we retain those factors that have a higher eigenvalue than the factor lying at the "elbow" (Jolliffe, 2013, etc.).

Table 6 shows the calculated eigenvalues, which confirm that we obtained one main component that explains 72.264% of the total variability of the basic variables. Also, from Figure 2 on eigenvalues, it can be seen that the choice of one main component is correct since the "elbow" is at k = 2. From the "elbow" point, the straight line is almost horizontal, which means that further factors contribute very little to the explanation of the variance of the basic variables.

Table 6. Total variance explained for the knowledge acquisition component

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	2.168	72.264	72.264	2.168	72.264	72.264
2	.578	19.267	91.532			
3	.254	8.468	100.000			

Source: prepared by the authors

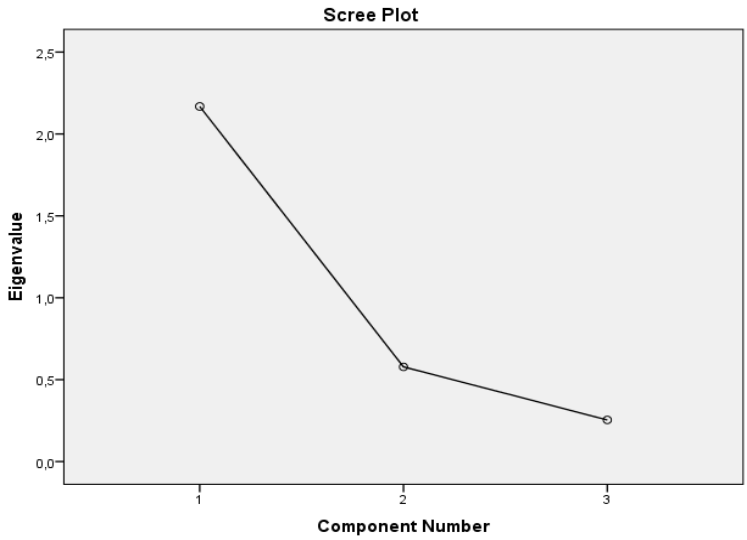

Fig. 2. Scree Plot for the knowledge acquisition component
Source: prepared by the authors

The best indicator of the significance of the method is the calculation of correlations (factor weights), which show how much the individual variables are related to the main component. The higher the weight (at least 60 %), the more important the variable for the factor. From Table 7, we can see that the correlations are very high, and the main component

replaces the input variables very well. Mechanisms that encourage employees to constantly acquire new and complement existing knowledge (P2) play a key role in the development of knowledge. The resulting main component was stored under the name of knowledge acquisition.

Table 7. Component Matrix for the knowledge acquisition component

	Component
	knowledge acquisition
P1	.904
P2	.877
P3	.763

Source: prepared by the authors

Knowledge transfer was also measured in the measuring instrument with three variables. To do this, we need to re-perform the PCA method. Bartlett's test of sphericity ($p < 0.005$) and Keiser-Meyer-Olkin statistics (KMO = 0.646) confirm that the data are suitable for performing the analysis of the main components (Table 8).

Table 8. KMO and Bartlett`s test for the knowledge transfer component

KMO and Bartlett's test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.646
Bartlett's Test of Sphericity	Approx. Chi-Square	83.186
	Df	3
	Sig.	.000

Source: prepared by the authors

Table 9 shows that the values of communalities for all variables are higher than 0.40, so we included all three variables in further research.

Table 9. Cumulative for the knowledge transfer component

Component	Cumulative %
PR1	.706
PR2	.511
PR3	.691

Source: prepared by the authors

The calculated eigenvalues from Table 10 confirm that we obtained one main component which explains 63.591% of the total variability of the basic variables, and one component with an eigenvalue above 1.

Table 10. Total variance explained for the knowledge transfer component

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of variance		Total	% of variance	
1	1.908	63.591	63.591	1.908	63.591	63.591
2	.669	22.286	85.877			
3	.424	14.123	100.000			

Source: prepared by the authors

Table 11 shows the factor weights that are higher than 0.60 for all variables, and that the most important role in the knowledge transfer component is played by internal education and training with the aim of transferring and exchanging current knowledge.

Table 11. Component Matrix for the knowledge acquisition component

	Component
	Knowledge transfer
PR1	.840
PR2	.715
PR3	.831

Source: prepared by the authors

The resulting second main component was stored under the name of knowledge transfer. Based on the analysis of the main components, we obtained two main components, which we named the acquisition and transfer of knowledge. The reliability of the components was checked with Cronbach's alpha coefficient. The values are shown in Table 12, and indicate the reliability of the construct, as the value of the Cronbach's alpha coefficient is higher than 0.7 for all. Theoretically, a value of Cronbach's alpha coefficient higher than 0.7 indicates the reliability of the construct (Zeller & Carmines, 1980).

Table 12. Coefficient Cronbach`s Alpha for component knowledge acquisition and knowledge transfer

Component	Cronbach's Alpha
Acquisition knowledge	0.808
Knowledge transfer	0.702

Source: prepared by the authors

In the final step, the assumption was verified by correlation analysis, for which purpose we calculated the Pearson's correlation coefficient. Table 11 shows that all the characteristics are below 0.05 ($p < 0.05$), which confirms that there is an influence between the observed variables. Connectivity is positive, which means that in organisations with a stronger organisational culture, more attention is paid to the acquisition and transfer of knowledge. A summary of the model is shown in Figure 3.

Table 13. Pearson's correlation coefficient

		Strength of organisational culture
Acquisition knowledge	Correlation coefficient	.773
	P-value	.000
	N	138
Knowledge Transfer	Correlation coefficient	.752
	P-value	.000
	N	138
	N	138

Source: prepared by the authors

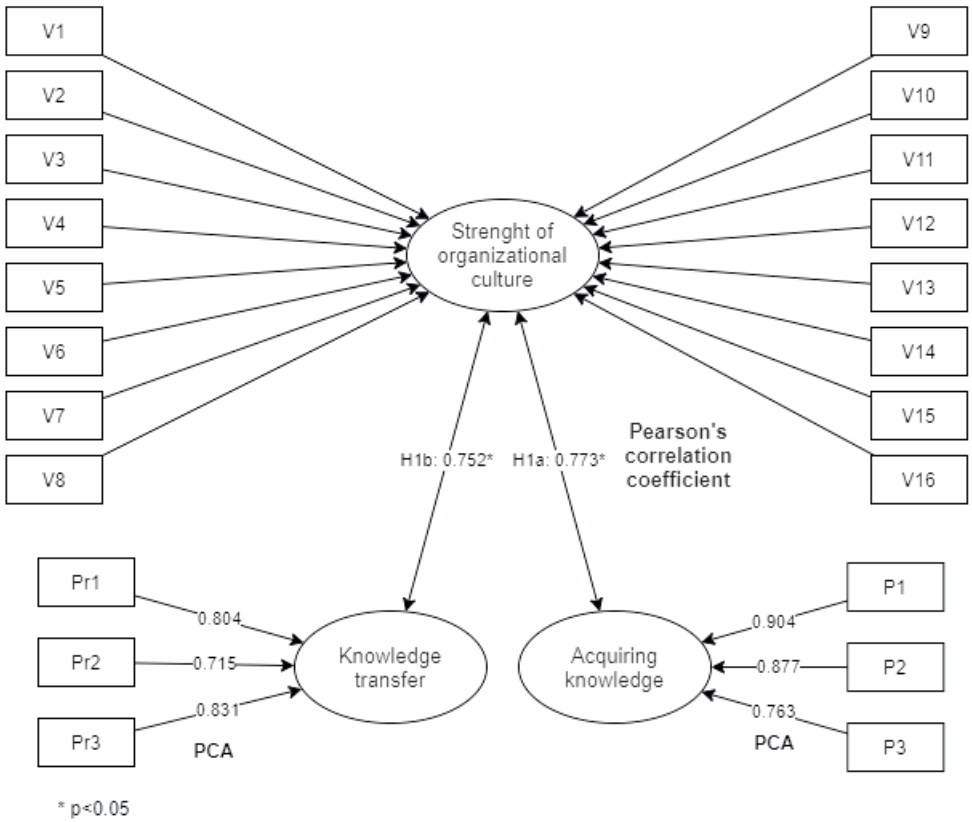

Fig. 3. The influence of the strength of organisational culture on the acquisition and transfer of knowledge

Source: prepared by the authors

Conclusions

In today's business environment, knowledge has become a key factor in achieving the competitive advantage of organisations in the market. Therefore, organisations are evolving towards learning units and strengthening the process of knowledge development. They include knowledge management in their operations and employ knowledgeable workers, all with the aim to achieve maximum effects based on knowledge, which is reflected in new or improved products, services, processes, etc. The development of knowledge is influenced by many factors, among which we learned about organisational culture as one of the key factors that has a positive or extremely inhibitory effect on the process of knowledge development. This has also been confirmed by numerous studies (De Long & Fahey, 1997; Leidner et. al., 2006; Du Plessis, 2006; etc.).

The paper focuses on the research of the influence of the type of strength of organisational culture on the process of acquiring and transferring knowledge. Based on the designed conceptual model, we established a model of empirical research conducted among selected medium and large Slovenian organisations.

In empirical research, we faced content, time and methodological limitations. In choosing the typology of organisational culture, we focused on studying the type of strength of organisational culture, and in the process of developing the knowledge we focused on the acquisition and transfer of knowledge. The obtained primary data expressed the current situation in selected Slovenian organisations and they depended on the subjective perceptions of the respondents, which are not necessarily presenting the objective situation in the analysed organisations. The methodological limitation is based on the choice of instrument and sample of the research and data analysis.

We found out that a strong organisational culture prevails among the Slovenian organisations studied. We were further interested in whether a strong organisational culture influences the acquisition and transfer of knowledge. Based on the calculation of the Pearson’s correlation coefficient, we came to the conclusion that there is a strong correlation between the strength of organisational culture and the development and storage of knowledge.

The article can end with the conclusion that the stronger the organisational culture in the organisation, the more attention it pays to the acquisition and transfer of knowledge. The paper also provides opportunities for further research. It would be advisable to explore the impact of the strength of organisational culture on other phases of knowledge development.

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