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ON THE METHOD AND TOOL OF INTELLECTUALIZATION OF PUBLIC MANAGEMENT OF ENERGY SUPPLY SECTOR IN UKRAINE

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Abstract: *By analyzing the strategic documents on the development of the energy sector of the national economy of Ukraine, the article states that one of the key problems of the development in the context of the energy transition is that these documents lack goals and objectives to change the mentality of the population of the country and the human resources of the industry, as well as of public authorities and the administration of their activities. The article outlines the practical lack of conscious consideration of behavioural factors of human resources in the energy sector of national market economy, which is defined as one of the most difficult components to change given the energy transition of global national economies. To theoretically substantiate the possibilities of improving the public management of the energy transition strategy of the national energy supply system through the intellectualization of its managerial and executive personnel, the article proposes the use of technology of change management in the intellectual orientation and mentality of human resources involved in energy generation, distribution and consumption by intellectualizing and changing their mentality. For this, the article uses an original method and algorithm to create personal and group intellectual portraits based on the graph-analytical model of a person's economic temperament. Ideal, desired and real portraits of a person were formalized, and recommendations were made on their possible participation in the energy supply processes. The article demonstrates that new mechanisms for using the intelligence of each employee and the collective intelligence of the system can be formed in the country's energy management system through selecting human resources for the public management and administration system according to the reasonable and recommended intellectual dominants of the individual. These mechanisms are directed towards accomplishing tasks and ensuring the achievement of the goals of energy transition and sustainable development of the country, as outlined in the government document "Energy Strategy of Ukraine until 2050.*

Keywords: energy transition, public administration, intelligence, mentality change, intellectual portrait.

1. Introduction

Almost over a decade ago now, the UN Global Initiative "Sustainable Energy for All" (SEforAll, 2012) and the initiative "2014-2024 – the Decade of Sustainable Energy for All" (United Nations GAD, 2012) set goals and objectives for humanity to provide the affordable energy to the world's population, and to drive innovative technologies in the use of renewable energy sources and energy efficiency. In this regards, Ukraine's Mission of the Energy Strategy until 2050 (approved by the Government upon the proposal of the Ministry of Energy in May 2023) declares the need to "create conditions for the sustainable development of the national economy by ensuring access to reliable, sustainable and modern energy sources" (Energy Strategy, 2022).

Ensuring movement towards the goals declared by the mentioned documents is an important and quite difficult task for the governing bodies of any national economy, even in the conditions of sustainability and predictability of its development, and this is especially difficult

for Ukraine. With the Russian military aggression and precise targeting of Ukraine's civilian infrastructure as means of achieving military objectives and political goals, the development of Ukraine's governmental energy policy, as well as the quality of strategic and operational planning and management of its effective implementation have become immeasurably complicated.

Therefore, the relevance of finding, identifying and using opportunities to improve these processes in the public administration system is essential, as the energy transition is a challenge for Ukraine on its way to the EU, and requires close cooperation between the government, educational sector, science, and industry.

Considering the fact that the document "Energy Strategy of Ukraine until 2050" was prepared by the Ministry of Energy with the participation of market leaders and system operators such as NNEGC 'Energoatom', NPC 'Ukrenergo', NJSC 'Naftogaz of Ukraine', LLC 'Gas Transmission System Operator', PJSC 'Ukrhydroenergo', and others**,** and building on the advice of the International Energy Agency, the US Department of Energy, the German Energy Agency, the Berlin School of Economics, the Danish Energy Agency, the auditing company KPMG, etc**.**, it should be noted that such a concentration of intellectual resources for the development, discussion and adoption of an important document involving both national and foreign experts and the public has never been observed in the practice of national public administration before.

It is also worth noting that, despite involving experts from the National Institute for Strategic Studies, the National Academy of Sciences of Ukraine and other scientific institutions from the fuel and energy sector, the goals declared in similar documents –"Energy Strategy of Ukraine until 2030" (Energy Strategy, 2006) and "Energy Strategy of Ukraine until 2035" (Energy Strategy, 2017) – were not achieved for a number of reasons.

We consider that one of the most significant of these reasons is the total neglect of the situation and the lack of understanding what changes in the mass consciousness of the country's population must be introduced as a certain aggregate of individual and group intelligences, which, in the process of thinking, interaction and cooperation, generate ideas, feelings, thoughts, attitudes, behaviours, etc. that resist change due to habits, traditions, beliefs or fear of the unknown.

At the same time, for example, citizens – as household energy consumers – and the

personnel of institutions, organizations, business entities – as energy consumers – should accept and use new energy technologies in everyday life; national politicians and public administration officials should develop an effective policy and strategy for the implementation of the energy transition; while the personnel of energy sector enterprises, scientists, researchers, engineers-innovators, etc. should generate the necessary technical, technological and social innovations and insist on their introduction.

To illustrate this, mention should be made that the Government introduced technical regulations and requirements for household appliances to comply with and reflect the level of their energy efficiency and safety. These requirements should serve as a criterion for conscious choice of purchasing and using such appliances, which will be determined by the consumer's existing and formed awareness of the purpose and criteria for such a choice.

It should be emphasized that both the national public administration system as a whole and the Ministry as the central executive body for energy sector are the components of the system of direct state regulation of processes in the field of energy supply and, undoubtedly, need constant improvement and reform based on the consideration of new energy trends in the global and European markets (new generation and transmission technologies, new energy sources, new combinations of them, etc.). However, emphasizing the need for radical changes in the thinking and behaviour of participants in the energy transition process, the experience gained by the global schools of change management (including the systems of energy provision of national economies) demonstrates the significant psychological complexity of improving and transforming the value system: perceptions, feelings, thoughts, beliefs, goals, habits, mentality and behaviour of people who are participants in the processes of energy production, distribution and consumption (Steg, Perlaviciute, & Van der Verff, 2015; Upham, Bogel, & Johansen, 2019; Gerdien de Vries, 2021; Chappin & Blomme, 2022).

It is this set of important mental factors that was not taken into account in the process of forming and setting relevant priorities, goals and objectives in any of the above-mentioned strategic state documents in the field of national energy. This can be confirmed by the fact that even in a thorough study of possible scenarios for the development of Ukraine's energy sector, carried out by the Institute for Economics and Forecasting of the National Academy of Sciences of Ukraine in 2015 (Yevdokimov, 2015), the expediency and necessity of changes in the public

consciousness, mentality and behaviour of human resources in all spheres of the country's life, including the energy sector, were not analyzed, and no goals and objectives in the context of changing the mentality were even set.

Meanwhile, in the 2019 review and assessment of Ukraine's energy sector, its structure, regulatory and governance systems (OECD, 2019), the Organization for Economic Co-operation and Development (OECD) pointed to the "ineffective corporate governance of state-owned enterprises" (OECD, 2019, p. 22), due to which "energy sector companies remained unprofitable" (OECP, 2019, p. 24), while "the electricity market still faces corruption and competition problems" (OECP, 2019, p. 39). Nonetheless, we believe that the ineffective and improper governance, corruption and unfair competition result not only and not so much from imperfect laws, regulations, structures and components of the system, but also from the intellectual, moral state, mentality and life orientation of the people who fill these structures and their components.

The lack of conscious consideration of the behavioural factors of human resources in the energy sector is the key managerial problem of the energy transition in Ukraine, and can be identified in many dissertation studies (Popovchenko, 2003; Hruba, 2005; Stavytska, 2005; Sukhodolia, 2006), analytical notes (Sukhodolia, 2013; Biehun, 2015; Riabtsev, 2018), scientific articles on assessing the state of mechanisms and results of state regulation and management (Stavytska, 2005; Dovgalova, 2009; Bedin, 2013; Amosov & Halushko, 2013; Yevdokimov, 2015; Kushlyk, 2018), as well as objectives (Diachuk, Chepeliev, Podolets et al, 2017) and existing threats in the energy sector and ways to avoid them (Mokhova, Shcherbak, 2020; Biehun, 2015; Riabtsev, 2018, etc.). In these works, the authors studied the organizational, legal, technological, and economic foundations as well as the mechanisms of state regulation of energy supply processes, but not the moral and mental beliefs of those who must implement these regulations accurately, efficiently, and effectively. In this regard, researchers have long been recording the facts that in the Ukrainian energy sector "the introduced mechanisms of state administration have not had a proper impact on the processes that determine the level of energy efficiency of the national economy", that "the energy intensity of the Ukrainian economy remains a lot higher than in our closest neighbours, the EU countries: <...> and even the CIS countries", that "the vast majority of introduced and actually all active economic mechanisms

for stimulating energy saving are aimed at supporting enterprises – "producers", that "economic mechanisms for stimulating <...> "consumers" of energy resources" need to be clarified (Sukhodolia, 2013), and that the industry is "dominated by administrative methods of management" (Biehun, 2015).

The best example of avoiding the need to take into account the human factor can be found in the conclusion of one of the analytical notes stating that "criminalization and corruption in the energy sector are primarily due to the lack of and backwardness of accounting and quality control" (Biehun, 2015, p. 3). The above statement illustrates and makes obvious the fact that the traditional search for deficiencies in the functioning of systems lies not so much in the characteristics of the personnel of the systems as in the technical, technological, legal, economic, and other conditions of their functioning. After all, the introduction of advanced high-precision technological solutions for automating the data transmission from metering devices, and even the inclusion of artificial intelligence to predict leaks and losses in both the electricity and the natural gas markets, cannot and will not eliminate the possibility of malicious interference or unprofessional behaviour of natural intelligence carriers.

Since the basis of any socio-economic system includes such structural elements as productive forces and their socio-economic, technical and technological, organizational and economic relations in the functioning of the state regulatory and economic mechanism, it is the specific characteristics of these productive forces, along with the past experiences, their religious, moral, professional, legal knowledge, norms and rules, habits and traditions, that will determine the state of managing the implementation of tasks and achievement of planned outcomes of activities. Therefore, in the context of energy transition, the primary task for the energy supply system of Ukraine is modernizing and aligning with the standards of the European Union.

2. Theoretical Background

Since the purpose of the article is to provide a theoretical justification for the need and feasibility of improving the public management of the energy transition strategy in the national energy supply system of the national economy on the basis of intellectualization of its managerial and executive personnel, it becomes evident that there is a need to identify ways and tools for

making appropriate changes in the intellectual orientations and mentality of the personnel of this system.

It should be noted that in the dissertation "Management of changes in the energy supply of Algeria using the potential of influence on human resources", which was recently completed and defended in Ukraine for obtaining the scientific degree of Doctor of Philosophy in "Management and Administration", the author states that the so-called transition of Algeria to the new conditions of energy supply requires "substantiation of the feasibility and determination of the necessary changes in the management of the energy transition of Algeria using the potential of influence on human resources" (Ghandir, 2021, p. 18), and suggests including "the stage of mandatory changes in the mentality of human resources" for managing technical and technological changes and ensuring the necessary results in socio-economic systems (Ghandir, 2021, p. 21).

As the mass consciousness and mentality of the population of a democratic country is the result of joint practical activity and intellectual interaction of certain sets of people under the influence of certain social institutions, any changes proposed by these institutions should provide for necessary and mandatory changes at the levels of intelligence, professional knowledge and experience, behaviour and performance of all participants, which requires careful planning and implementation of the relevant goals, objectives and measures for their intellectualization.

Despite numerous theoretical studies and practical documents on the problems of state regulation of Ukraine's energy sector (Yevdokimov, 2015; OECD, 2019; Hruba, 2005; Stavytska, 2005; DSTU, 2006; Dovhalova, 2009; Bedin, 2013; Amosov & Halushko, 2013), on energy supply (Kushlyk, 2018) and energy security (Biehun, 2015; Riabtsev, 2018), studies on energy saving (Popovchenko, 2003) and energy efficiency (Sukhodolia, 2006; Sukhodolia, 2013; Mokhova & Shcherbak, 2020), on the development of renewable energy (Stoyan, 2013; Diachuk, Chepelev, Podolets, et al., 2017), there are no studies in the area of the managerial influence on the mentality and behaviour of human resources and, consequently, no recommendations.

Thus, it is obvious that planning and implementing any changes (including strategic) in the national energy policy, improving the existing and introducing new regulations, legal acts and policy influences of the institutions of the public management of the national energy supply processes require simultaneous and proactive planning and implementation of measures to form

the necessary changes in the participants' beliefs, goals, habits, mentality and behaviour. This requires a radical revision and improvement in the existing mechanisms of public management of energy transition processes in Ukraine by strengthening intellectual factors of influence on the participants' knowledge, experience, motives, incentives, behaviour and, most importantly, the way of their thinking.

3. Methods

In this regard, it is worth mentioning that, in response to the challenges and requirements of behavioural economics, the researchers of the problems related to the national system of public administration and management have recently turned to the topic of intellectualization of the processes of public authorities (Dzvinchuk & Petrenko, 2018; Dzvinchuk & Liutyi, 2020), to the topic of innovative, regulatory and organizational support for the intellectualization of management processes in their activities (Yakobchuk, Tyshchenko, & Puhacheva, 2018; Zaporozhets, 2020), to the intellectualized management of the state and its components as an object of post-war reconstruction (Olshanska, Oleshko, Shatska et al., 2022), etc.

However, if intellectualization is understood only as an increase in the "share of mental labour" or "enhancing the importance of intellectual activity of personnel, the level of their intelligence, professional and general educational knowledge, which are ensured by continuous development of personnel" (Zubchynska, 2012, p. 6), then criminal activities and corruption also require from their potential creators both "mental labour" and "significant intellectual activity" to plan and implement actions aimed not at satisfying the needs and demands of society, but at satisfying the personal or group interests and needs of certain groups.

Consequently, developing, testing and implementing effective mechanisms to intellectualize the management of the energy transition and energy supply problems of the national economy should be considered as an urgent and necessary step to improve both the existing regulations and mechanisms in the system and to develop recommendations for intellectualizing the processes of staffing the system with appropriate human resources.

It should be noted that the positive results of the theoretical substantiation and practical implementation of recommendations for the intellectualization of the management and functioning of individual enterprises and industries have already been demonstrated in a number

of dissertation studies (Shvydkyi, 2012; Kis, 2016; Sytnyk, 2018).

However, the nature of the problems of intellectualization in the field of public administration radically distinguishes this sphere of human intelligence from the already established paradigm of intellectualization of labour, management, economics, entrepreneurship, enterprises and institutions, education and science, art and trade, etc. The specificity of public administration lies in the fact that the goals, objectives, criteria of behaviour, etc. of the carriers of personal intelligence operating in the system of government and those operating in other spheres of society can and quite reasonably should be different. As a matter of fact, if we assume that intellectualization processes are based on personal intelligence, which is characterized by its creative way of thinking, generation of ideas and solutions, desire for new experience, morality, goal-setting, responsibility, etc., we should recognize that all these components should be present to some extent in every healthy and competent person.

Yet, the intelligence of a public administration employee should be different from the intelligence of an employee in business, education, art, science, etc., and to explain this, we should refer to the well-known conclusion of R. Descartes, who once stated that "the difference in our opinions does not stem from the fact that some people are smarter than others, but only from the fact that we direct our thoughts in different ways and do not experience the same things" (Dekart, 2015, p. 37).

It means that the positioning of an individual in society, their belonging to various structural parts of the society as a carrier of intelligence can and will influence the formation of differences in their intellectual and mental characteristics. It is this feature that the authors of the publication (Khamchuk, Karpyk, & Petrenko, 2021) drew attention to regarding the new possibilities of using the laws of Carlo M. Cipolla (1987) in public administration, proposing to use his model to differentiate various personalities according to the "direction of thoughts" and manifestations of creativity for themselves or for the benefit of others.

The authors of the study on the identification of the conditions for the interaction of intellectual resources of human communities proposed a method and an algorithm for the study, as well as an analysis and an evaluation of personal and group intellectual portraits in order to develop recommendations for their necessary and appropriate changes (Dzvinchuk, Petrenko, & Khamchuk, 2022). The proposed differentiation of people by their individual intellectual

portraits based on the use of graph analytical interpretation of Cipolla's model made it possible to evaluate them according to the characteristics of intellectual orientation in the Cartesian coordinates of "benefits and losses to oneself – their benefits and losses to others" (Fig. 1).

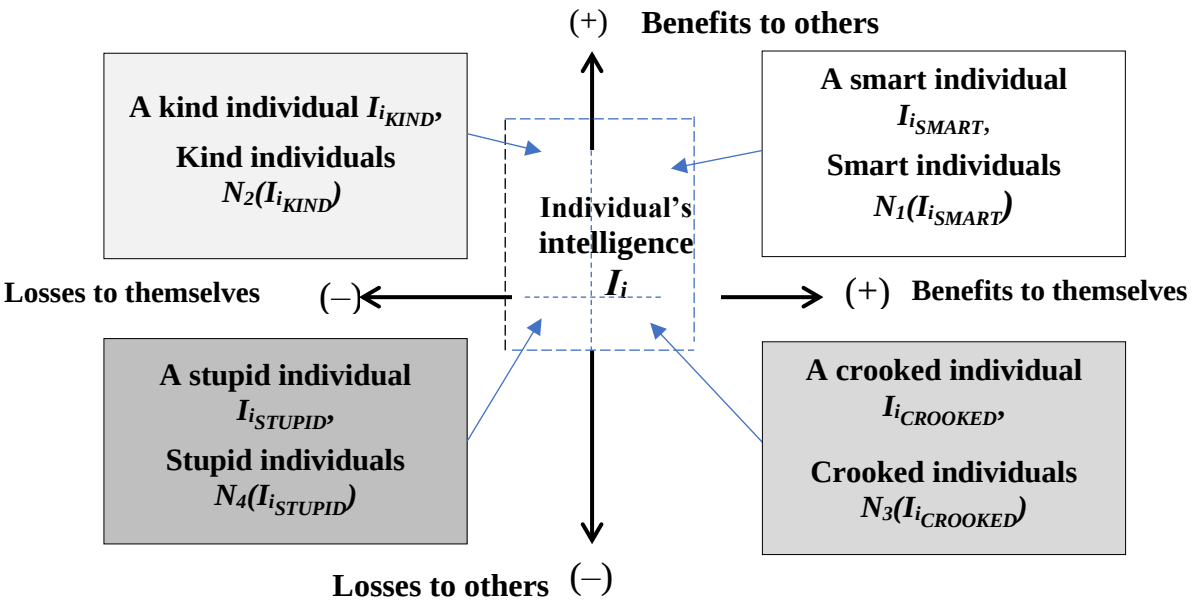

Fig. 1 – The reinterpreted model of Cipolla's differentiation of individuals and their groups by "direction of thoughts" (Cipolla, 1987)

Furthermore, it was proposed to use the results of the assessment for making decisions regarding the compliance of an individual with the requirements, needs and limitations of functioning in the system of public administration and management.

To experimentally verify the assumptions about the possibility and feasibility of using individual and collective intellectual portraits for the intellectualization of public administration, we assessed and analyzed the components of intellectual dominants in students of Public Administration and Management with the help of the Individual Difference Research Labs test (IDRLabs, 2023). The results of the testing performed demonstrated the real division of respondents (both individuals and collective) according to the recorded values of their intellectual characteristics in the categories of "smart", "kind", "crooked", and "stupid", and the existence of dominant and minor components in them.

At the same time, a generalized view of the individual's intellectual portrait was

interpreted as the following equation:

$$I_i = I_{i_{SMART}} + I_{i_{KIND}} + I_{i_{CROOKED}} + I_{i_{STUPID}} \quad (1)$$

where $I_{i_{SMART}}$ refers to intelligence; $I_{i_{KIND}}$ stands for kindness; $I_{i_{CROOKED}}$ is crime; $I_{i_{STUPID}}$ is stupidity (Dzvinchuk, Petrenko, & Khamchuk, 2022).

The intellectual portrait of the group, presented as a set of N individuals, is divided into

$$N = N_1(I_{i_{SMART}}) + N_2(I_{i_{KIND}}) + N_3(I_{i_{CROOKED}}) + N_4(I_{i_{STUPID}}), \quad (2)$$

where $N_1(I_{i_{SMART}})$ refers to the number of intelligence agents whose dominant component is the mind, $N_2(I_{i_{KIND}})$ – kindness, $N_3(I_{i_{CROOKED}})$ – evil intentions, $N_4(I_{i_{STUPID}})$ – lack of intelligence.

The reason for using Cipolla's model to identify a person's predisposition to public service was the interpretation of those individuals who can act as "givers", "helpless", "naïve", and "kind" in different versions of his model, and are described by him as "doing good for others, while neglecting to do good for themselves (win-lose), generous but too good for this world" (Cipolla, 1987).

Such people are undoubtedly known in the history of mankind as heroes, defenders, warriors, passionate personalities, saviours of nations and people. They are the society members who, being intellectuals, are ahead of others in terms of their willingness to sacrifice for the benefit of others; they demonstrate the behaviour of a person whose calling is to serve others – a public servant whose priority is to serve the interests of the country and its population. In a newspaper article by Professor S. Proleiev, such people are called the elite as they are the ones who "care about the common good of society. They, like others, have their own interests, but give priority only to the public interest" (Proleiev, 2023).

In this case, the desirable intellectual portrait of an ideal (kind and smart) public servant should have been expressed in the following equation

$$I_i = I_{i_{KIND}} + I_{i_{SMART}} \quad (3)$$

provided that $I_{i_{KIND}} \approx I_{i_{SMART}}$, $I_{i_{CROOKED}} = \mathbf{0}$, and $I_{i_{STUPID}} = \mathbf{0}$.

The actual representation of various variants of intellectual portraits should look like a set of inequalities of

$$I_i = I_{i_{SMART}} > I_{i_{KIND}} > I_{i_{STUPID}} > I_{i_{CROOKED}} \quad (4)$$

where $I_{i_{SMART}} \rightarrow max$ and $I_{i_{KIND}} \rightarrow max$, $I_{i_{CROOKED}} \rightarrow min$ and $I_{i_{STUPID}} \rightarrow min$.

Figure 2 illustrates the examples of the tangible results of the IDRLabs test taken remotely by the students of the Public Administration and Management at Ivano-Frankivsk National Technical University of Oil and Gas.

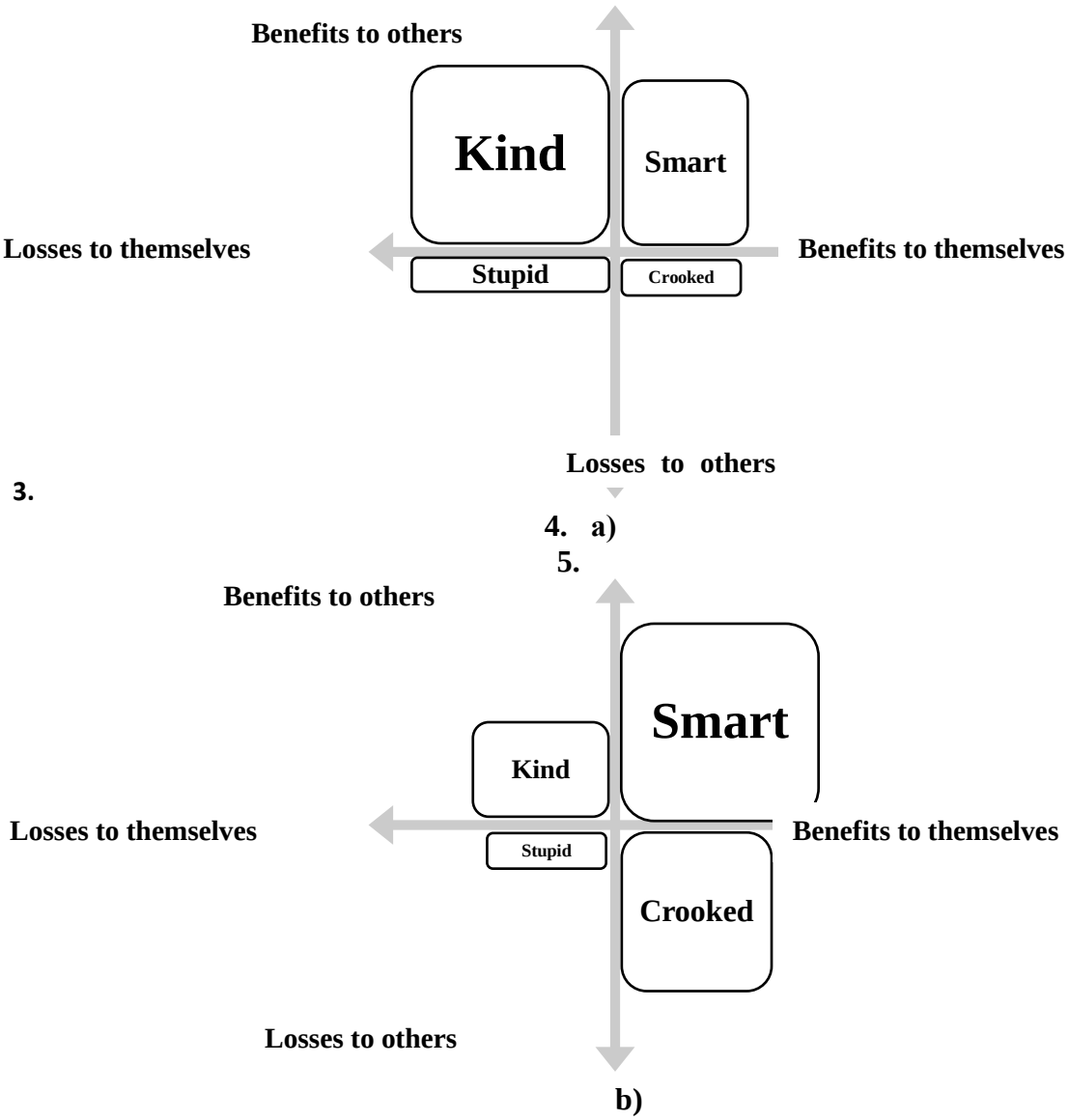

Fig. 2 –Real intellectual portraits of the students of Public Administration and Management

Obviously, the respondent's set of intellectual orientations, the results of which are presented in Figure 2a, looks as follows:

$$I_i = I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{STUPID}} > I_{i_{CROOKED}} \quad (5)$$

And the respondent's set of intellectual orientations, the results of which are shown in Figure 2b, is

$$I_i = I_{i_{SMART}} > I_{i_{CROOKED}} > I_{i_{KIND}} > I_{i_{STUPID}} \quad (6)$$

Without resorting to a comparative analysis of the given examples, we note that the set ***N*** of such individual intellectual portraits can and should become the basis for obtaining, analyzing, and evaluating individual and collective intellectual portrait of any deterministic part of society (subdivision, institution, organization, enterprise, industry, etc.) in the form of different variants of a set of N inequalities. At the same time, we suppose that the most desirable option for any group should be

$$N = N_1(I_{i_{KIND}}) > N_2(I_{i_{SMART}}) > N_3(I_{i_{CROOKED}}) > N_4(I_{i_{STUPID}}) \quad (7)$$

where $N_1(I_{i_{KIND}})$ represents a number of people in the group, for whom the intellectual dominant component is $I_{i_{KIND}}$, $N_2(I_{i_{SMART}})$–$I_{i_{SMART}}$, $N_3(I_{i_{CROOKED}})$–$I_{i_{CROOKED}}$ and $N_4(I_{i_{STUPID}})$–$I_{i_{STUPID}}$.

Table 1 shows the results of testing in three groups of higher education students majoring in 281 "Public Management and Administration". The results of the IDRLabs test demonstrated by the respondents are interpreted with numbers, where 0 shows lack of an intellectual component in the intellectual portrait of a person, 1 shows the highest rated intellectual dominant, 2 is the dominant of lower value, 3 and 4are their decreasing values.

The table also presents individual and collective intellectual portraits of full-time undergraduate students and master's students who study remotely and are current public servants.

Table 1 – Personal intellectual portraits of the students of Public Administration and Management and interpretation of their collective intellectual portrait

№	Intellectual priorities demonstrated by respondents				Intellectual portraits of each respondent
	Positive		Negative		
	$I_{i_{KIND}}$	$I_{i_{SMART}}$	$I_{i_{CROOKED}}$	$I_{i_{STUPID}}$	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{CROOKED}} > I_{i_{STUPID}}$
Group 1– first-year students (bachelor's)					
1	1	3	2	4	$I_{i_{KIND}} > I_{i_{CROOKED}} > I_{i_{SMART}} = I_{i_{STUPID}}$
2	1	2	0	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{STUPID}}$
3	1	2	3	4	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{CROOKED}} > I_{i_{STUPID}}$

4	1	4	2	3	$I_{i_{KIND}} > I_{i_{CROOKED}} > I_{i_{STUPID}} > I_{i_{SMART}}$
5	1	3	4	2	$I_{i_{KIND}} > I_{i_{STUPID}} > I_{i_{SMART}} > I_{i_{CROOKED}}$
6	2	1	3	4	$I_{i_{SMART}} > I_{i_{KIND}} > I_{i_{CROOKED}} = I_{i_{STUPID}}$
7	1	2	4	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{STUPID}} > I_{i_{CROOKED}}$
8	1	3	4	2	$I_{i_{KIND}} = I_{i_{STUPID}} > I_{i_{SMART}} = I_{i_{CROOKED}}$
9	4	1	2	3	$I_{i_{SMART}} > I_{i_{CROOKED}} > I_{i_{STUPID}} > I_{i_{KIND}}$
10	2	1	3	4	$I_{i_{SMART}} = I_{i_{KIND}} > I_{i_{CROOKED}} = I_{i_{STUPID}}$
11	1	2	4	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{STUPID}} > I_{i_{CROOKED}}$
12	1	2	3	4	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{CROOKED}} > I_{i_{STUPID}}$
13	1	2	0	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{STUPID}}$
14	1	2	4	3	$I_{i_{KIND}} > I_{i_{SMART}} = I_{i_{STUPID}} > I_{i_{CROOKED}}$
15	1	2	4	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{STUPID}} > I_{i_{CROOKED}}$
	Number of respondents' choices by model dominants				Collective intellectual portraits of the first-year students (bachelor's)
	N_1=12	N_2=8	N_3=4	N_4=5	$N_1 > N_2 > N_4 > N_3$
Group 2 – second-year students (bachelor's)					
1	3	1	4	2	$I_{i_{SMART}} > I_{i_{STUPID}} > I_{i_{KIND}} > I_{i_{CROOKED}}$
2	1	2	3	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{CROOKED}} = I_{i_{STUPID}}$
3	1	2	4	2	$I_{i_{KIND}} > I_{i_{SMART}} = I_{i_{STUPID}} > I_{i_{CROOKED}}$
4	2	1	4	3	$I_{i_{SMART}} > I_{i_{KIND}} > I_{i_{STUPID}} > I_{i_{CROOKED}}$
5	1	2	2	4	$I_{i_{KIND}} > I_{i_{SMART}} = I_{i_{CROOKED}} > I_{i_{STUPID}}$
6	1	3	4	2	$I_{i_{KIND}} > I_{i_{STUPID}} > I_{i_{SMART}} > I_{i_{CROOKED}}$
7	1	2	4	2	$I_{i_{KIND}} > I_{i_{SMART}} = I_{i_{STUPID}} > I_{i_{CROOKED}}$
8	1	2	3	4	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{CROOKED}} > I_{i_{STUPID}}$
9	1	2	3	4	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{CROOKED}} > I_{i_{STUPID}}$
10	1	2	4	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{STUPID}} > I_{i_{CROOKED}}$
11	2	1	3	4	$I_{i_{SMART}} > I_{i_{KIND}} > I_{i_{CROOKED}} > I_{i_{STUPID}}$
12	2	1	3	4	$I_{i_{SMART}} > I_{i_{KIND}} > I_{i_{CROOKED}} > I_{i_{STUPID}}$
13	2	1	4	3	$I_{i_{SMART}} > I_{i_{KIND}} > I_{i_{CROOKED}} > I_{i_{STUPID}}$
14	2	1	4	3	$I_{i_{SMART}} > I_{i_{KIND}} > I_{i_{STUPID}} > I_{i_{CROOKED}}$
15	1	2	4	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{STUPID}} > I_{i_{CROOKED}}$
16	2	1	4	3	$I_{i_{SMART}} > I_{i_{KIND}} > I_{i_{STUPID}} > I_{i_{CROOKED}}$
	Number of respondents' choices by model dominants				Collective intellectual portraits of the second-year students (bachelor's)
	N_1=9	N_2=8	N_3=5	N_4=5	$N_1 > N_2 > N_3 = N_4$

Part-time master's students					
1	1	2	4	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{STUPID}} > I_{i_{CROOKED}}$
2	1	2	2	4	$I_{i_{KIND}} > I_{i_{SMART}} = I_{i_{CROOKED}} > I_{i_{STUPID}}$
3	1	3	2	4	$I_{i_{KIND}} > I_{i_{CROOKED}} > I_{i_{SMART}} > I_{i_{STUPID}}$
4	1	2	0	0	$I_{i_{KIND}} > I_{i_{SMART}}$
5	2	1	3	3	$I_{i_{SMART}} > I_{i_{KIND}} > I_{i_{CROOKED}} = I_{i_{STUPID}}$
6	1	3	4	2	$I_{i_{KIND}} > I_{i_{STUPID}} > I_{i_{SMART}} > I_{i_{CROOKED}}$
7	1	3	4	2	$I_{i_{KIND}} > I_{i_{STUPID}} > I_{i_{SMART}} > I_{i_{CROOKED}}$
8	1	2	0	0	$I_{i_{KIND}} > I_{i_{SMART}}$
9	2	1	0	3	$I_{i_{SMART}} > I_{i_{KIND}} > I_{i_{STUPID}}$
10	1	2	3	4	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{CROOKED}} > I_{i_{STUPID}}$
11	1	3	4	1	$I_{i_{KIND}} = I_{i_{STUPID}} > I_{i_{SMART}} > I_{i_{CROOKED}}$
12	1	2	3	0	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{CROOKED}}$
13	1	2	0	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{STUPID}}$
14	1	2	4	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{STUPID}} > I_{i_{CROOKED}}$
15	1	2	3	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{CROOKED}} = I_{i_{STUPID}}$
16	1	2	2	3	$I_{i_{KIND}} > I_{i_{SMART}} = I_{i_{CROOKED}} > I_{i_{STUPID}}$
17	1	2	2	3	$I_{i_{KIND}} > I_{i_{SMART}} = I_{i_{CROOKED}} > I_{i_{STUPID}}$
18	1	2	3	4	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{CROOKED}} > I_{i_{STUPID}}$
19	1	2	2	0	$I_{i_{KIND}} > I_{i_{SMART}} = I_{i_{STUPID}}$
20	1	3	2	4	$I_{i_{KIND}} > I_{i_{CROOKED}} > I_{i_{SMART}} > I_{i_{STUPID}}$
21	1	3	4	2	$I_{i_{KIND}} > I_{i_{STUPID}} > I_{i_{SMART}} > I_{i_{CROOKED}}$
22	1	2	3	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{CROOKED}} = I_{i_{STUPID}}$
23	1	1	2	2	$I_{i_{SMART}} = I_{i_{KIND}} > I_{i_{CROOKED}} = I_{i_{STUPID}}$
24	1	3	4	2	$I_{i_{KIND}} > I_{i_{STUPID}} > I_{i_{SMART}} > I_{i_{CROOKED}}$
25	1	1	2	1	$I_{i_{KIND}} = I_{i_{SMART}} = I_{i_{STUPID}} > I_{i_{CROOKED}}$
26	1	2	0	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{STUPID}}$
27	1	1	4	3	$I_{i_{SMART}} = I_{i_{KIND}} > I_{i_{STUPID}} > I_{i_{CROOKED}}$
28	1	3	0	2	$I_{i_{KIND}} > I_{i_{STUPID}} > I_{i_{SMART}}$
29	1	2	0	0	$I_{i_{KIND}} > I_{i_{SMART}}$
30	2	1	3	4	$I_{i_{SMART}} > I_{i_{KIND}} > I_{i_{CROOKED}} > I_{i_{STUPID}}$
31	1	2	2	3	$I_{i_{KIND}} > I_{i_{SMART}} = I_{i_{CROOKED}} > I_{i_{STUPID}}$
32	1	2	2	1	$I_{i_{KIND}} = I_{i_{STUPID}} > I_{i_{SMART}} = I_{i_{CROOKED}}$
33	2	1	4	3	$I_{i_{SMART}} > I_{i_{KIND}} > I_{i_{STUPID}} > I_{i_{CROOKED}}$
34	1	3	0	2	$I_{i_{KIND}} > I_{i_{STUPID}} > I_{i_{SMART}}$

35	1	4	3	2	$I_{i_{KIND}} > I_{i_{STUPID}} > I_{i_{CROOKED}} > I_{i_{SMART}}$
36	1	2	0	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{STUPID}}$
37	1	2	4	3	$I_{i_{KIND}} > I_{i_{SMART}} > I_{i_{STUPID}} > I_{i_{CROOKED}}$
	Number of respondents' choices by model dominants				Collective intellectual portraits of a group of part-time master's students of Public Administration
	N_1=33	N_2=20	N_3=8	N_4=6	$N_1 > N_2 > N_3 > N_4$

If we use the comparative analysis for the results of testing in all three groups of learners, where the first-year students' intellectual portrait is

$$N_1(12) > N_2(8) > N_4(5) > N_3(4), \quad (8)$$

and the second-year students' intellectual portrait is

$$N_1(9) > N_2(8) > N_3(5) = N_4(5), \quad (9)$$

and the intellectual portrait of the part-time master's students, who already work in the system of public administration and management, is

$$N_1(33) > N_2(20) > N_3(8) > N_4(6), \quad (10)$$

We can see that there is a clear improvement in the redistribution of intellectual dominants in favour of smartness and kindness in individual and group portraits, depending on the level of education and experience of their carriers.

The 2017 analysis of the possibilities, prospects and recommendations regarding cooperation between Ukraine, the EU and the Russian Federation in the energy sector (Brusylovska, 2017) predicted complications due to the Russia's use of energy as a weapon against Ukraine and the EU. Therefore, the intellectualization of public management personnel in the energy sector and energy supply of the national economy requires innovative approaches and effective changes in shaping interaction between Ukraine and the EU.

This also requires the personnel of the public management system to be committed to priorities and tasks, which should not be based on unqualified decisions or criminal intentions and plans but be built on universal human and civilizational values of kindness and reason of the New Europe.

4. Results and discussion

Thus, the data on intellectual orientations of individuals in the system as well as their collective intellectual portraits provide valuable and relevant information about the human resources potential of any socio-economic system, which can be skilfully used in management processes. The proposed method can be applied not only to future changes in the mentality of its personnel, but also to the selection of smart and good employees for the public administration system of the country's energy supply sector, while minimizing the possibility of hiring "crooked" personalities "who do harm to others and think about their own benefit; who are dishonest and infringe on the rights of other people," and "stupid" personalities who "cause damage without receiving benefit: goods are destroyed, society becomes poorer" (IDRLabs, 2023).

Although every participant N_i of any socio-economic system takes part in shaping the collective intelligence, in the context of public administration tasks, special attention should be given to forming a managerial subset n_j exclusively of people whose intellectual characteristics satisfy conditions (3) or (4). This will limit the possibility of access to the system's management processes for self-confident, ambitious and convinced of their imaginary advantages individuals whose intellectual dominant components include evil, corruption, harm to others for their own benefit.

It is worth mentioning that the research (presented by Dzvinchuk, Petrenko, & Khamchuk, 2022) was carried out solely for educational purposes in order to identify the real proportions of the dominant components of the intellectual orientations of groups of students, to evaluate their real state, and to plan appropriate measure to improve the process of professional training within the Public Administration and Management programme.

We believe that the proposed method and tools for obtaining information about the intellectual orientations of human resources can be used for developing recommendations and managing the introduction of the necessary changes in the collective intelligence of any socio-economic system, its units and subdivisions through planning and implementing mental changes in the process of forming the national mentality, which is "an urgent task of the modern Ukrainian state" (Lopushynsky, 2006) or the so-called reengineering of the mentality of its human resources (Andybur, Melnytskyi, Petrenko, A., & Yasinska, 2017; Panasiuk, Petrenko

V., Popova, & Yasinska, 2018).

Obviously, when making final decisions about assessing the intellectual preferences of an individual or a community, one should not confine oneself to the results of the IDRLabs test alone. However, if the proposed method and tool for creating and using intellectual portraits is supplemented with other psychological tests or if a new special test is developed, it can significantly improve the validity of the results, assessments and recommendations.

If human resources are selected on grounds of reasonable intellectual dominants, the Ukrainian energy supply system will receive new mechanisms for using the collective intelligence of the public administration system of the energy sector, its enterprises and business partners, with the latter focused on ensuring the achievement of the goals of energy transition and sustainable development. This way the mechanisms of traditional management will not change, but the proposed approach to intellectualization of both managerial and executive personnel of the system through the selection and use of human resources with appropriate intellectual characteristics will ensure a number of synergistic effects in the process of synthesizing the so-called social and professional components of the intelligence of managerial personnel $\boldsymbol{n_j}$, since it will take into account the needs, capabilities, knowledge, skills, practical experience of all personnel $\boldsymbol{N_i}$ and will ensure systematic and effective management of the system through standard organizational, economic and social measures at all levels of management. It will minimize the use of traditional administrative methods in the system, ineffective and inappropriate corporate governance and unprofessional decisions, problems with corruption, etc.

At this stage of the study, we cannot yet estimate the impact that the proposed method of intellectualization will have on the efficiency, effectiveness and quality of public administration. Nonetheless, it is expected that the impact on improving the quality of staffing of the public management bodies of the energy supply of Ukraine will be positive, provided that qualified and morally sound (“smart” and “kind”) employees are attracted, and incompetent and harmful individuals (“stupid” and “crooked”) are excluded, or their presence is minimized.

5. Conclusions

Thus, using the example of the goals and objectives of public management and

administration of Ukraine's energy supply system in the conditions of the energy transition, we demonstrated that traditional approaches to the intellectualization of labour and its management, based on the performance of certain tasks aimed at developing and increasing the level of knowledge, experience and intellectual level of human resources in any community and developing intellectual activity in this community, can be effectively supplemented by one more approach to enhancing the collective intelligence of human resources, which involves the identification, analysis, evaluation and use of information about the active and specially formed characteristics of the intellectual dominants of the carriers of intelligence.

It has been proven that it is expedient to use the method and algorithm for creating intellectual portraits of individuals and their groups based on the results of testing the human resources of public administration bodies according to the reinterpreted model of C. M. Cipolla with the subsequent use of these portraits in the processes of targeted changes in the intellectual, moral and mental characteristics of the personnel.

The models of ideal, desirable and real intellectual portraits of employees of the public administration and management system have been described, and recommendations for their use in the processes of intellectualization of management and functioning of the system have been made.

The feasibility and expediency of using intellectual portraits of individuals and their groups have been demonstrated not only within the system of public administration and management, but also in the processes and procedures of intellectualization of the management of any other socio-economic system.

It is recommended that all technical and technological goals and objectives of the government document "Energy Strategy of Ukraine until 2050" on energy supply, energy security, energy saving, energy efficiency, etc., be supplemented in the part of the implementation plans with corresponding goals and tasks for preparation and development, selection and provision, and retention of professional and effective, but necessarily "kind" and "smart" human resources both in the system of public administration and management of Ukraine's energy industry, and in all its possible institutions and organizations and enterprises.

By using the method and tool of creating individual and collective intellectual portraits in the process of training and preparing public management personnel for the energy sector,

Ukraine can substantially accelerate its modernization and adapt its internal regulations and rules to the European standards of energy market functioning.

Further research should be directed to the improvement and testing of a set of test tools for creating real individual and group intellectual portraits and the practical use of the latter for the intellectualization of institutions and organizations of the domestic system of public management and administration, both in the energy sector and in other sectors of the national economy of Ukraine.

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Appendix

Inflation rate in EU accession candidate countries and potential candidates (rate of change)

	Albania	Bosnia and Herzegovina	Kosovo	Serbia	Montenegro	Turkey	North Macedonia
2010	:	1.3	:	6.2	:	8.6	1.1
2011	:	4.4	:	11.2	:	6.5	3.2
2012	:	6.3	:	7.4	:	9.0	1.8
2013	:	4.8	:	7.7	:	7.5	2.7
2014	:	4.3	:	2.3	:	8.9	0.0
2015	:	-0.7	:	1.5	:	7.7	0.1
2016	:	-1.2	:	1.3	-0.1	7.7	0.2
2017	3.2	-0.5	1.5	3.3	2.7	11.1	2.1
2018	1.8	1.1	1.1	2.0	2.6	16.3	2.3
2019	1.7	1.3	2.7	1.9	0.5	15.2	0.7
2020	2.2	-0.3	0.2	1.8	-0.5	12.3	1.2

Sources: Compiled by the authors on the data from Eurostat (2023b)