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CONTENT

EDITORIAL INTRODUCTION

Dear Authors, Readers and Colegues!

I am proud that the Law, Business and Sustainability Herald is actively developing and attracting a growing audience. Since the publication of the first issue, the Editorial Board was replenished by B. Aleksandraviciute, Doctor, Affiliate professor (Lithuania), O. Bochko, D.Sc., prof. (Ukraine), V. Brych, D.Sc., prof. (Ukraine), Kunal Sil, Dr. (India), Ye. Krykavskyi, D.Sc., prof. (Poland), M. Starynskyi, D.Sc., prof. (Ukraine), Zh. Zavaljna, D.Sc., prof. (Ukraine). These scholars declared their commitment to the Sustainable Development Goals and fully participated in the production of the current issue. We are very grateful for their help.

I also want to note a technical innovation on the journal's website. Our journal is electronic to minimise environmental damage. Thus the website is the starting point from where the materials are distributed worldwide under one of the most democratic licenses - Creative Commons BY 4.0 International. Now, thanks to the efforts of our technicians, we can analyse statistics of abstracts views and article downloads to know more precisely the interests of our audience.

This issue brings together articles from different fields, united by the ideas of sustainable development. Our new colleagues M. Starynskyi and Zh. Zavaljna presented an original study of the conditions and principles of states' economic sovereignty in the context of sustainable development. The results of this study are essential for developing country governments.

Supper Roland Okijie and Ubong Edem Effiong explored the impact of demographic factors and economic development on carbon intensity in the context of the Kuznets Curve Hypothesis. This article is a solid empirical study, including recommendations useful for urbanisation planning.

L. Lipych, O. Khilukha, M. Kushnir, I. Volynets, and L. Shostak presented a study of the entrepreneurial orientation of small enterprises through the prism of their participation in sustainable development. The recommendations can be helpful for both SMEs and governments seeking to develop policies to strengthen sustainable small businesses.

The international team of authors, including B.-P. Koshovyi, I. Petryk, A. Yevstakhevych and I. Von-Nahy make us consider the dark side of motivation - the labour demotivation. The authors convincingly prove the importance of developing diagnostic systems to catch labour demotivation in enterprises to achieve the eighth goal of sustainable development. The recommendations presented can be helpful for both human resource management and governments that share the values enshrined in the eighth SDG.

O. Furdychko, O. Drebot, O. Yaremko, V. Bondar, M. Vysochanska, L. Sakharnatska investigated three essential tasks for sustainable forestry on the example of Ukraine. Scientists deeply analysed the problems of production, the tax burden and

prospects for investing in forestry. The developed recommendations will be helpful to the Government of Ukraine in modernising the forest management strategy and may also be valuable to policymakers of other states interested in developing sustainable forestry.

All submitted articles successfully passed the editorial control and double-blind reviewed. To avoid conflict of interest, I personally conducted the editorial process for the article co-authored by B.-P. Koshovyi, who is the editor of the LBSHerald.

Preparing the second issue, we received sixteen articles. Eight of them were rejected for technical reasons, one due to plagiarism, and two more were declined on reviewers' recommendation. Finally, the acceptance ratio for the current issue was 31.25%. We are conscientious in our endeavour to produce and disseminate only high-quality scientific content.

Additionally, I would like to announce the participation of our editorial team in producing the international collective monograph. In December 2021, the Publishing System of Lviv University of Business and Law intends to publish a collective monograph 'Sustainable Development, Global Prosperity and Crisis Constraints: National and International Standpoints'. Therefore, our editors and reviewers were invited to ensure the quality of the editorial process. You can find details at http://gprosperity.org/index.php/journal/colm1

Congratulations on the beginning of the new academic year! Editorial Board wishes you inspiration, perseverance and patience in achieving your goals!

Sincerely,

Juliusz Piwowarski, DSc, Professor,

Editorial Board Chairman

Economic sovereignty of a modern state in the context of sustainable development

Mykola Starinskyi[*], *Zhanna Zavalna*[**]

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Abstract. The article deals with economic sovereignty as a part of national sovereignty. We found that researchers fail to pay adequate attention to the economic sovereignty of Ukraine in the context of stable development. We use the doctrine method of law research in order to answer four research questions. First, we study the establishment of sovereignty in the constitutions of some developing countries. Second, we investigate the notion and meaning of economic sovereignty in academic doctrine. Third, we describe and distinguish the peculiar features of economic sovereignty entrenchment using the example of some developed countries. Fourth, we name the exact problems of the realisation of the economic sovereignty of Ukraine. For each of these issues, we provide specific recommendations concerning the ensuring of stable development of Ukraine for the latter to be able to join the EU. Within the framework of the discussion, we give recommendations for taking into consideration the political and other mutual influences of other countries upon the economic sovereignty of Ukraine. The recommendations provided can be used to develop suggestions concerning stable development strategies.

Keywords: economic sovereignty, economic functions of the state, fair partnership, interstate interaction, legal harmonisation

[*] Mykola Starinskyi, Doctor of Law, Professor, Professor of Department of Administrative, Economic Law and Financial and Economic Security, Academic and Research Institute of Law, Sumy State University, Rimskogo-Khorsakova str., 2, 40000 Sumy, Ukraine, ORCID: https://orcid.org/0000-0003-2661-5639

[**] Zhanna Zavalna, Doctor of Law, Professor, Professor of the Department of Civil Law, V.N. Karazin Kharkiv National University, Svobody sq.,4, 61022 Kharkiv, Ukraine, e-mail: zavaln@karazin.ua (corresponding author), ORCID: https://orcid.org/0000-0001-6511-2482

1. INTRODUCTION

Our humankind nowadays is on a top step in its development which manifests itself in both scientific achievements and the living standard of its representatives. At the same time, we have to pay for this with a highly significant influence on the environment, both natural and social, and with profound exhaustion of our natural resources. Considering that we all live on one planet, the developed countries tend to violate the interests of other countries quite often when pursuing their interests. As a result, today, knowledge is coming to the foreground. While meeting the needs of the modern civilization, it allows ensuring its stable and peaceful existence in the future and the protection of the generations to come.

One of the most critical factors of stable development in the modern world is globalization as the process of economic, political and cultural integration and unification in the world (Montanaro & Violi, 2020). Influenced by it, the world economic system is turning into a complex of the economic systems of individual countries that interact actively. However, the absolute priority given to the market and free competition has caused the denial of the role of a national state as an efficient economic regulator. Consequently, states tend to fulfil more of their functions in cooperation with other states, and for that purpose, they withdraw their resources to meet everyday needs. The processes mentioned above are on full display in the functioning of the developing countries since the economically developed ones try to influence their development by pursuing their interests and priorities and at the same time substituting them with common interests. This situation results in the imbalance and obstacles on the way of developing countries' fair partnership and development. In this context, as it seems, any further development can be ensured only on the principles of respect, global partnership and cooperation among all countries of the world, thus allowing meeting all the objectives of stable development. Therefore, in our opinion, it is reasonable at the global and interstate level to provide the realization of one of the essential functions for the modern stable development of a state, i.e. the economic one, which is materialised in the economic sovereignty.

1.1. Literature Review

Research of a state's economic sovereignty is quite a complicated task because it requires taking into account both the sovereignty in general and a part of it, i.e. economic sovereignty. The analysis of modern research literature shows no unified definition of the notion of "state". In the article, we use a narrow definition of the state that includes a feature of sovereignty too, which traditionally is perceived as supremacy within one's borders, independence and self-sufficiency in domestic and external affairs. At the same time, modern researchers treat sovereignty as a variable phenomenon that fascinates and disturbs its diversity (Ruggie, 1998) and polysynthetism of the notion (Stankiewicz, 1969). Before J. Bodin, it was interpreted as a "secondary context-dependent predicate" (Walther, 1976), which could also have no political meaning.

At the current stage of social development in the context of the sovereignty value being confirmed (Duke, 2019), the ideas about the "vertical dispersion of sovereignty" are expressed (Pogge, 1992) because our world has entered the post-sovereignty era (Cormick, 2010). Numerous concepts are being invented with the view of explaining the current condition of sovereignty in the time of the new global order, in particular, "post-Westfalian sovereignty" (Lapid, 2001), "divisible sovereignty" (Witte, 1998), "multilevel sovereignty" (Loughlin, 2006), "disintegrated sovereignty" (Slaughter, 2004). Furthermore, analyzing the economic situation in specific countries, some authors define many different types of sovereignty. These factors, in nature, do not ensure absolute power for the legitimate government on the territory of the country and present it as "graduated sovereignty" (Park, 2005; Holden, 2017) or "fragmented sovereignty" (Su, 2018) et cetera.

Considering the peculiarities of modern economic development of individual countries or regions, the authors investigate the role and place of sovereignty in certain branches of the national economy and differentiate digital sovereignty (Komaitis, 2021), energy sovereignty (Schelly et al., 2020; Abraham-

Dukuma, 2020), and foodstuff sovereignty (Tilzey, 2017; Thompson, 2019; Laforge et al., 2021). Nowadays, the latter seems to be the most talked-about type of sovereignty in all modern research discussions.

With the escalation of old conflicts and emerging of new ones in different regions, the desire of the countries to protect their economic interests with various methods is only getting stronger. It is suggested that for this purpose, both internal democratic resources (use of civil society institutions to resolve conflicts based on the suppression of "seed sovereignty" (Hernández, et al., 2020), and international means (withdrawal from international treaties (Richardson & Stähler, 2019) should be applied.

1.2. The theoretical and legal background of the economic state sovereignty

The sovereignty idea has long-lasting development in the works of J. Bodin, T. Hobbs, J. Locke, J.J. Rousseau, Hugo Grotius and lots of modern and contemporary philosophers. However, we believe that at the current stage of global economic development, the traditional perception of sovereignty must be revised, taking into account the Decisionism doctrine of Schmitt (1979) that claims: the one that makes decisions about the emergency is the sovereign (Schmitt, 1979).

Consequently, a state can be considered sovereign if it is absolutely independent in its territory, implements its development strategy, and uses all available resources. In other words, a state is sovereign if it develops and executes its development strategy regardless of the position of other states but at the same time observes the principle of state equality and non-interference in the domestic affairs of other countries.

In this article, we address the following research questions:

RQ_1: What are the features of the establishment of sovereignty in the constitutions of some developing countries?

RQ_2: What is the meaning of economic sovereignty in academic doctrine?

RQ_3: What features of the achievement of economic sovereignty entrenchment exist in developed countries?

RQ_4: What are the exact problems of the realization of the economic sovereignty in Ukraine?

2. METHODS

We conducted the research using the doctrine method of law research. To answer the research questions, we have studied the establishment and realisation of formal and actual sovereignty considering constitutional law-making instruments of several developed countries (US, Germany, France, Italy, Japan).

We analysed the Ukrainian foundation documents in their connection with the economic sovereignty of Ukraine. During analysis, we considered such traditional criteria for the developed countries as the founding rights of a nation, the right to natural resources, and the right to interstate interaction in the economy. Furthermore, we performed a qualitative analysis of the Constitution of Ukraine has to find the provisions that concern the establishment and realisation of economic sovereignty. We also discussed the possibility of clarifying the peculiarities of economic sovereignty that are crucial to reaching stable development.

This research follows the system approach. We understand economic sovereignty as a system of elements connected with the domestic and foreign policies of the states.

At the current stage of social development, the idea is dominant that a state is either founded by its population or "re-built" by it due to revolutions, liberation wars, and reforms. Thus, the nation itself is the source and the initial carrier of power and state sovereignty. The nation executes its sovereign power during elections, referendums, et cetera, and creates a state apparatus (governmental authorities), who it is then subordinate.

3. RESULTS

3.1. Establishment of state sovereignty

All constitutions we analyzed has specific provisions that establish the sovereignty, independence, and self-sufficiency of the given state. At the same time, certain remarks are worth mentioning as crucial for our research. First, a state establishes the order and procedure of fulfilling the government power and subordinates to it by distinguishing the

notions of sovereignty and anarchy. Second, the execution of external functions by the state is objectified, among others, in the conclusion of international treaties, participation in international organizations, et cetera. This all results in the sovereignty limitation rising from the state's obligations to other parties. The states have created an interstate system of justice, within which the settlement of specific interstate issues is delegated to the non-state level.

So, we can divide state sovereignty into formal and actual. A state is formally sovereign if it is independent on its territory and executes its development strategy. The formally sovereign state uses all the available resources regardless of the position of other states and at the same time sticks to the principle of equality and non-interference. Actual sovereignty we understood as an attempt of a political organization of population on some territory to claim its supremacy, independence and self-sufficiency in domestic and international affairs. Such a claim to sovereignty must be constantly confirmed by reliable power controlling the territory and supported by the community.

As the analysis of current international relations shows, the most efficient way to support stats claim to actual sovereignty is to use all possible means to interfere in domestic affairs of other countries, impose one's will on them, i.e. oppress their claims to sovereignty. The states that constantly influence other countries' policies cultivate their dependence and create interstate coalitions around them. The states that manage to impose their will on others and demonstrate their superiority are called superpowers. Nowadays, there are two primary components of interstate superiority, namely military and economic. Before establishing the current world order, military superiority was enough. However, during the last century, civilization's development makes it insufficient. Thus, today actual sovereignty is a combination of military and economic superiority. Moreover, the economic component moving to the forefront and gets objectified in the economic sovereignty of the state.

3.2. The notion and characteristic of economic sovereignty

The economic sovereignty of any state is a kind of objectification of the substantial component in its actual sovereignty (Blishchenko, & Doria, 2000). In literature, such notions as "finance sovereignty", "tax sovereignty", or "resource sovereignty" are also widespread, though with certain restrictions, along with "economic sovereignty" (Blishchenko, & Doria, 2000; Mochernyj, 2005). In general, we can agree with such an approach since, in the context of globalization, a state possesses the economic possibilities to use its material resources independently, which are objectified in its finance, taxes, and currency earnings, allow it to be called economically sovereign.

The research literature on economic sovereignty contains different opinions concerning this institution (Blishchenko, & Doria, 2000; Karro & Zhyuar, 2002; Farhutdinov, 2008;). At the same time, we believe that Baidin (2010) best defined the notion of economic sovereignty, considered the elements of economic sovereignty to include the following: a) the right to join international associations; d) equality in international economic relations, respect for the economic interests of other countries, right to participate in the solution of international economic problems, first of all, those that concern the national interests. Understanding all these aspects let Baidin (2010) disclose the meaning of economic sovereignty and define it as a possibility for the state to make decisions regarding the development of its national economy by executing several sovereign rights of the state in economic areas. The mentioned sovereign rights in the economic area are objectified in the economic policy of the state.

The UN General Assembly adopted the Charter of Economic Rights and Duties of States (UN, 1974), taking into account that the economic sovereignty of a state means its ability to dispose of its resources independently from other countries. At the international level, this document established the main principles of international economic interaction among different states. In particular, these political and economic interaction principles include sovereignty, political independence, sovereign

equality of all states, mutual and fair benefit, peaceful settlement of unfairness caused by the use of force that deprives any nation of the natural resources necessary for its normal development.

The Charter establishes the fundamental principle that declares the following: each state must possess unrestricted and absolute constant sovereignty upon all its natural resources, wealth and economic activity, including the right to possess, use and exploit. Furthermore, all states possess the right to dispose of their resources freely and act according to the established law and order objectified in three primary rights: to regulate and control foreign investments; regulate and control transnational corporations; nationalize, expropriate or transfer foreign property. Moreover, all states get the right to participate in international trade and other types of economic cooperation regardless of any differences in their political, social or economic systems. Finally, the Charter establishes that no state shall suffer discrimination based on such differences only.

By fixing these provisions at the international level, the UN intended to establish general principles of international economic interaction and create a fair international justice system. This requirement sets an obligation to all states on confirming specific provisions at national levels. In most states, the mentioned provisions are entrenched at the level of their constitutions.

The analysis of constitutional provisions shows that almost every constitution includes some provisions that establish the right of people to possess natural resources and be able to use them for the benefit of the nation. For example, Article 15 of the Constitution of Germany states that "the land and mineral wealth, natural resources and means of production can be transferred to common property or other types of the public economy according to the law…" (Maklakov, 2010). Constitutions of different states also contain some provisions that concern the financial element of their functioning, namely the provisions that determine the right of the state to establish the system of taxes and charges. In some cases, a state has the exclusive right to pass such laws (Article 105 of the Constitution of Germany). In others, it is ensured that only laws can introduce or cancel them; certain taxes and charges (Article 47 of the Constitution of the French Republic, Article 84 of the Constitution of Japan, section 8 Article 1 of the Constitution of the USA). (Maklakov, 2010; Shapoval, 2018).

The constitutions of different states also include some provisions that establish the sovereign right of the state to enter international relations with other states and conclude international treaties. In some cases, it means general civil cooperation (Article 88 of the Constitution of the French Republic) (Shapoval, 2018). In others, it concerns the right of governmental authorities to conclude agreements that are connected with international trade (section 8 Article 1 of the Constitutions of the USA) (Maklakov, 2010).

The constitutions pay much attention to the defence of countries' territory. In particular, they establish the right of the nation to the defence that the government executes (Article 20 of the Constitution of the French Republic, article 15-a of the Constitution of Germany) and the right to declare war to protect the state (Article 35 of the Constitution of the French Republic) (Shapoval, 2018; Maklakov, 2010).

The constitutions of some states also include interesting provisions if, for various social and political reasons, these states refuse war as a tool to settle international issues. For instance, Article 9 of the Constitution of Japan states the following: "Aspiring sincerely to an international peace based on justice and order, the Japanese people forever renounce war as a sovereign right of the nation and the threat or use of force as means of settling international disputes. In order to accomplish this aim, land, sea, and air forces, as well as another war potential, will never be maintained. Furthermore, the right of belligerency of the state will not be recognized" (Maklakov, 2010).

Thus, as we see, the primary trend of establishing economic sovereignty in constitutions manifests in:

- the fixation of the right of ownership of natural resources that can be found on the territory of states;

- its sovereign right to define and levy taxes, charges and customs duties from different types of economic activity carried out on the territory of the state;

- the right to conclude international treaties and the right to defend its territory.

3.3. Constitutional entrenchment of the economic sovereignty of Ukraine

The economic sovereignty of Ukraine is deeply and widely entrenched by the legislative instruments that proclaimed its status as an independent state (Verkhovna Rada URSR, 1990-a; Verkhovna Rada URSR, 1990-b; Verkhovna Rada Ukrayiny, 1991-a; Verkhovna Rada Ukrayiny, 1991-b). When the Ukrainian parliament (the Verkhovna Rada) proclaimed the independence of Ukraine in the Declaration of State Sovereignty of Ukraine (1990), the criteria of sovereignty, among others, included economic independence, territory supremacy, internal and external security (Verkhovna Rada URSR, 1990-a). Considering the importance of economic development for an independent state, the Law of Ukraine "On Economic Self-Reliance of the Ukrainian Soviet Socialist Republic" (1990) provided the basics of the sovereign economic rights of Ukraine enforcement. Particularly it emphasised the crucial role of economic self-reliance to secure the state sovereignty of Ukraine (Verkhovna Rada URSR, 1990-b). Thus, Ukraine self-determines economic status, the strategy of social and economic development and foreign policy independently.

The Constitution of Ukraine (adopted on June 28, 1996) expressed the development of listed provisions. It establishes the primary sovereign economic rights of the state (Verkhovna Rada Ukrayiny, 1996). For instance, Article 13 of the Constitution of Ukraine (1996) entrenches the juridical model of the ownership of land and other natural resources belonging to the people of Ukraine. The Constitution of Ukraine declares that the environment objects within the territory of Ukraine, its continental shelf and exclusive maritime (economic) zone are the objects of property rights of the Ukrainian people that is an independent holder of the property right of the specified objects (Verkhovna Rada Ukrayiny, 1996). The Ukrainian people shall have the right to utilise the natural objects of the people's property rights following the law. State authorities and local self-government bodies shall exercise the ownership rights on behalf of the Ukrainian people within limits determined by the Constitution. It should be highlighted that the Constitution of Ukraine provides the juridical objectification of the natural right to natural resources as a legal right of the Ukrainian people and binds the state to protect the land and other natural resources as the national wealth.

The Constitution of Ukraine declares the land to be the main item of national wealth that can be widely interpreted as everything that a nation owns in whatever way. In other words, national wealth includes material values and all natural resources, climate, works of art, et cetera (Tatsii, & en al. (Eds.) 2011). Moreover, considering the high role of agrarian resources in the Ukrainian economy, the land is its main, basic and irreplaceable means of production that, along with the climate, human labour, and other production means, can ensure stable economic development of Ukraine both for its domestic well-being and in EU integration perspective.

Speaking about the sovereign right of Ukraine to control its financial system, it is worth studying paragraph 1 of part 2 of Article 92 of the Constitution of Ukraine (1996), according to which the following matters shall be determined exclusively by laws of Ukraine: the State Budget of Ukraine and the budgetary system of Ukraine; the system of taxation, taxes and levies; the principles of the formation and operation of financial, monetary, credit, and investment markets; the status of the national currency and the status of foreign currencies on the territory of Ukraine; a procedure for the formation and settlement of state domestic and foreign debt; and a procedure for the issue and circulation of state securities and their types and forms (Verkhovna Rada Ukrayiny, 1996).

According to Article 17 of the Constitution of Ukraine, protecting the sovereignty and territorial integrity of Ukraine, ensuring its economic and information security shall be the most essential function of the State and a matter of concern for all the Ukrainian people (Verkhovna Rada Ukrayiny, 1996). The defence of Ukraine and protection of its sovereignty, territorial integrity and inviolability shall be entrusted to the Armed Forces of Ukraine. Ensuring the security of the State and protecting the State borders of Ukraine shall be

entrusted to respective military formations and law enforcement bodies of the State, whose organisation and operational procedure shall be determined by law.

The constitutional provisions that entrench economic sovereignty are developed in the legislative instruments that specify the constitutional norms and establish their execution procedure which proves the theoretical entrenchment of the economic rights of the state but also a possibility of their accurate fulfilment. Therefore, the analysis of the provisions included in the Constitution of Ukraine allows declaring that Ukraine as a state possesses adequate constitutional provisions that prove that its economic sovereignty is entrenched in the Constitution and can be supported according to the existing international system of justice.

4. DISCUSSION

In the latest decades of development in the modern world, the perception of the economic sovereignty of a state has changed significantly, especially if we consider the deepening integration processes. The expansion of free trade zones, states coming together in various unions and associations, and international financial and credit institutions' functioning greatly influenced this process.

The research shows that the activity of plenty of international organizations is based on the use of universal rules and norms of economic regulation that leads to the unification of national economic policies and fewer possibilities to take into consideration national economic interests (Melnyk, 2015; Gurrea-Martínez, 2019; Shadikhodjaev, 2021; Bronckers, & Gruni, 2021). Especially it concerns the demand to harmonize national legislation with the regulations of the World Trade Organization that is a compulsory requirement for states that aspire to join this organization. The WTO bases on the principles of trade liberalization. It is the most favoured nation basis and the national regime that often contradict the differentiated national rules of internal market protection and taxation that make narrower the possibilities of national governments in the area of regulating the development of economy, especially in the countries with the economy in transition. A vivid example of the situation that proves the influence of the WTO upon economic sovereignty is the situation with Ukraine that met the demand to weaken the customs protection of its internal market while preparing itself to join the WTO and implemented the critically low levels of agriculture support.

The wide-known global financial organization - International Monetary Fund based on interference in sovereign economic rights. The analysis of the statutory documents of the International Monetary Fund shows that the provisions of the IMF Agreement regulate not only the functioning peculiarities of the fund itself but are also the source of legal regulation of financial relations on the territory of the member state (Starynskyi, 2015). The IMF activity intervents the economic sovereignty of the member states since it interferes with national governments' domestic policy. Fund's requirements concern the rates of monetary and tax policies and the directions of economic reforms, namely the increase of tariffs and prices.

The analysis of international economic interaction also proves that economic sovereignty suffers significantly because of international treaties' international restrictions. For instance, the Kyoto Protocol concluded in 1997 by a hundred countries demands that the developed countries, which account for 55% of carbon dioxide being discharged in the atmosphere of the Earth, should curtail harmful production (UN, 1997).

The transformation of approaches towards economic sovereignty perception and its contents has been greatly influenced by the position of some superpowers that do not separate economy and geopolitics under current conditions (Leonard, M. et al., 2019; Vidigal, 2020; Shaffer, & Gao, 2020). For example, modern processes that are taking place in the world and connected with the launch of the Nord Stream 2 demonstrate that certain states with world monopolist status do not mind using blackmail to reach their political goals. It is also worth mentioning that some states take advantage of the poor financial condition of developing countries and grant them credits under such terms that can significantly influence their economy and foreign policy (Gelpern, 2021).

Economic sovereignty is also influenced by the creation of special economic zones that provide preferences for certain states and regions and beget disproportions in the economic development of other states (Simo, 2020; Delimatsis, 2021). Such actions cause fragmentation of the legal framework in these countries and create the outlines for the unilateral transition under the jurisdiction of a special economic zone. Then regional economic regulation gets concentrated and influences the economic sovereignty of neighbouring states (Chi, 2021).

The above-mentioned theoretical structures of economic sovereignty were disrupted by the intense development of the financial sector and its fusing with cyberspace that has significantly weakened the ability of states to control their financial assets (Leonard, 2016; Paul T., (2019; Veerpalu, en al 2020; Lupo-Pasini, 2021). Some research and experts point at the possibility of the significant influence of cryptocurrencies upon the economy of states and the appearance of financial obligations (Evariest, 2020) though they offer specific perspectives of their regulation (Nabilou, 2019; Zetzsche, D., et al., 2021).

Nowadays, the described problems are waiting for solutions, forcing the global community to find them. Economic sovereignty issues move to the global level because economic sovereignty is a standard feature of any state and guarantees its existence as an independent and self-reliant player in foreign relations.

The academic importance and novelty of the research consist in the fact that the results received by the authors complete the existing knowledge about the peculiarities and problems of economic sovereignty realization in Ukraine and the world. Obtained results can be helpful to governments in making their strategies of economic development and strengthening international partnerships for more effective interstate cooperation.

Limitations

In our research, we focused on the existence of economic sovereignty and illustrated its entrenchment both in international regulations and at the level of constitutions in different states. At the same time, since the discussion about economic sovereignty realization under the novel conditions has just begun, the characteristic of any reasonable attempt to exercise economic sovereignty and its mechanisms remain unaddressed.

5. CONCLUSION

At the current stage, economic sovereignty and its realisation remain pressing because their solution allows independent states to become economically self-sufficient players in interstate relations.

The existing international system of justice acknowledges that states possess their economic sovereignty that is objectified in the following claims: a) to dispose of their resources; b) to determine their economic policy independently; c) to join international associations; d) to acknowledge the equality of all states in international economic relations; e) to respect national economic interests of states.

Almost all countries of the world establish their economic sovereignty in their constitutions and reserve their right to protect it with various means, including force. However, constitutions of some states do not acknowledge the right to war, especially to protect their economic sovereignty.

In Ukraine, economic sovereignty is established in the norms that determining the legal status of land, subsoil and other natural resources; regulating the procedure to determine financial and monetary policies; setting taxes and levies; providing grounds for protecting and defending Ukrainian territory.

The described norms serve as the fundamentals for the efficient use of the resources available in Ukraine as provide for the legal base to ensure its economic sovereignty. They can also be used as the legal base for economic development and the strengthening of international partnerships.

At the same time, the modern global development of our civilisation proves there are new challenges for the functioning of states themselves and for confirming their economic sovereignty, which requires extra attention when designing new mechanisms of its realisation.

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Effect of demographic factors and economic development on carbon intensity in nigeria: an insight into the environmental Kuznets curve hypothesis

Supper Roland Okijie[*], *Ubong Edem Effiong*[**]

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Abstract. This paper sought to examine the effect of urbanisation, population growth and economic development on carbon intensity in Nigeria from 1961 to 2014. The study utilised secondary data from the World Bank Development Indicators. The data were analysed using ordinary least squares regression, vector autoregressive model, and threshold regression. Findings from the study revealed that economic development had an inverse and significant effect on carbon intensity in line with the prediction of the Environmental Kuznets Curve. Meanwhile, population growth and urbanisation exerted a positive and significant effect on carbon intensity in Nigeria. The VAR regression result indicated that urbanisation, carbon intensity, and economic development were strongly endogenous in predicting themselves. The threshold regression revealed that the optimal urbanisation level that will not propel carbon intensity in Nigeria is 14.444%. As such, rural development policies should be encouraged to curb massive rural-urban migration, which can drive up the degree of urbanisation in Nigeria.

Keywords: economic development; urbanization; population growth; carbon intensity; environmental pollution

[*] Supper Roland Okijie, Department of Sociology and Anthropology, University of Uyo, P.M.B. 1017, Uyo, Akwa Ibom State, Nigeria, ORCID: https://orcid.org/0000-0001-6313-8881

[**] Ubong Edem Effiong, Department of Economics, University of Uyo, P.M.B. 1017, Uyo, Akwa Ibom State, Nigeria, e-mail: ubongeffiong3@gmail.com (corresponding author), ORCID: https://orcid.org/0000-0003-4677-1268

1. INTRODUCTION

The rising drive towards achieving an environmentally sound economy has generated some concerns about urbanisation, population growth, and economic development in increasing carbon intensity in Nigeria. Though urbanisation is considered as an instrument of economic, social and political progress, it has led to severe socio-economic problems (Rai, 2017). Such socio-economic problems include urban sprawl, urban crimes, overcrowding, unemployment, slums and squatter settlement, transportation, trash disposal, sewage, water, and air and noise pollution. Despite these threats to the socio-economic well-being of society, reasons have been put forward to justify the rising rate of urbanisation. Such include better employment facilities, medical facilities, better facilities for trade and commerce, better facilities for higher education, facilities for entertainment, sports and games, and proximity to administration and important government offices. Sequel of the above reasons, environmental problems arise due to the tremendous increase in the urban population. As such, urbanisation is viewed as "a process that leads to the growth of cities due to industrialisation and economic development" (Rai, 2017).

As an outcome of industrialisation and economic development in the urban areas, urbanisation generates some environmental impacts that are of great concern. Such impacts can be traced to the disorganised and unplanned growth of urban areas and a lack of infrastructure to support the rising urban population. The urban population in Nigeria has been on the increase over the years. Such a trend we depicted in Figure 1.

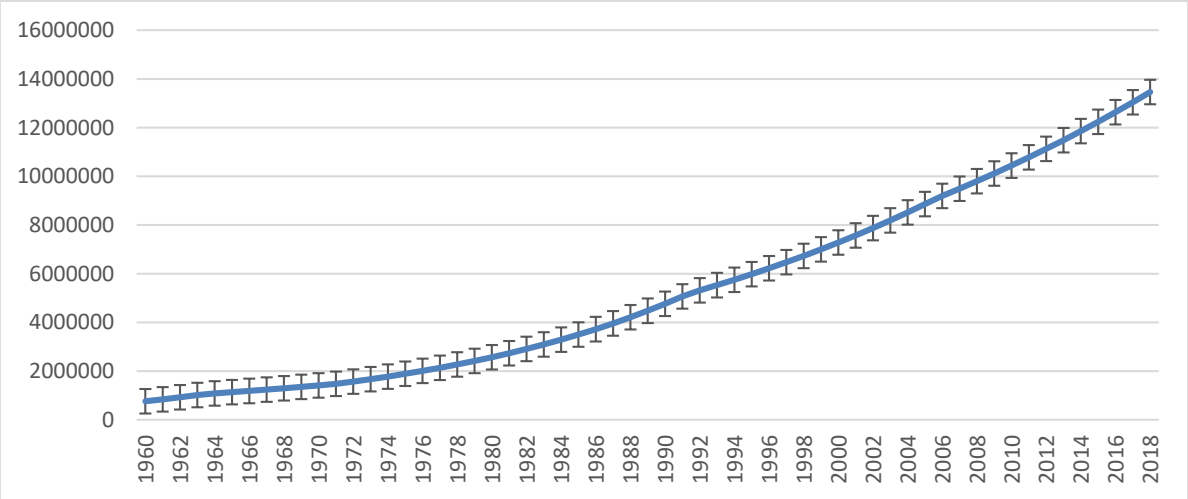

Figure 1. Population in Largest Cities in Nigeria (1960 – 2018)

Source: World Development Indicators (2018)

Given Figure 1, it is evident that the urban population in Nigeria increases quite rapidly, of which the difference is significant between 1960 and 2018, which increase environmental problems.

Such an increase in environmental problems can be viewed in terms of the country's significant increase in carbon dioxide emissions, as portrayed in Figure 2.

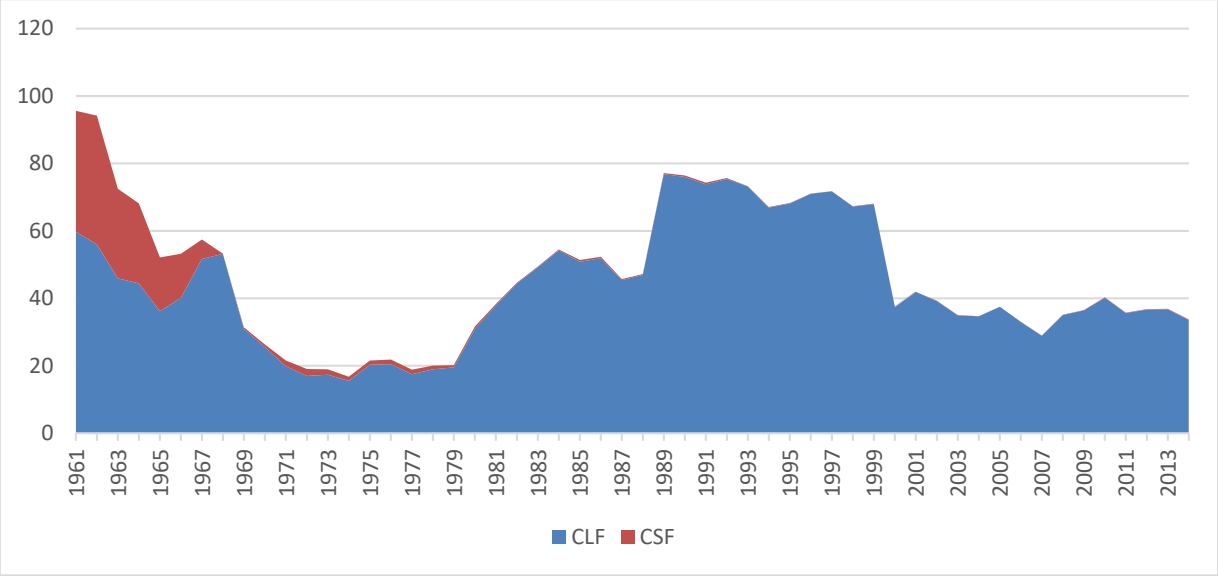

Figure 2. Carbon Dioxide Emissions from Liquid and Solid Fuel Consumption (1961 – 2014)
Source: World Development Indicators (2018)

Figure 2 indicates that carbon dioxide emission from liquid fuel consumption has been higher than solid fuel consumption in Nigeria. It can be captured it in the trend analysis below.

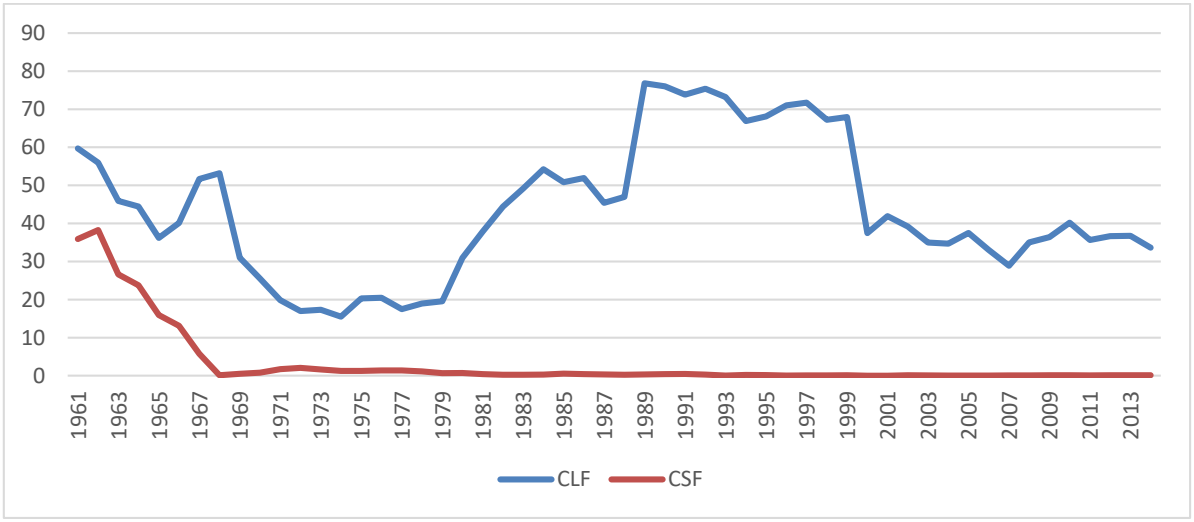

Figure 3. Trend of Carbon Dioxide Emissions in Nigeria (1961 – 2014) Source: World Development Indicators (2018)

The period 1961 to 1977 has been characterised by declining trend in carbon dioxide emissions from liquid fuel consumption. After that, carbon dioxide emissions from liquid fuel consumption took an upward trend from 1978 till 1997 where it started to decline sharply till 1999. Slight oscillations have characterised the decline from 1999 till 2014. The period 1961 to 1968 was characterised by a sharp decline in carbon dioxide emissions from solid fuel consumption in Nigeria. After that, such a trend in carbon dioxide emissions from solid fuel consumption become flattened from 1968 to 2014. This trend can be explained through the shift in energy use over the analysed period. Such dynamics in energy use also generates series of fluctuations in the carbon dioxide emissions in the country, as presented in Figure 4.

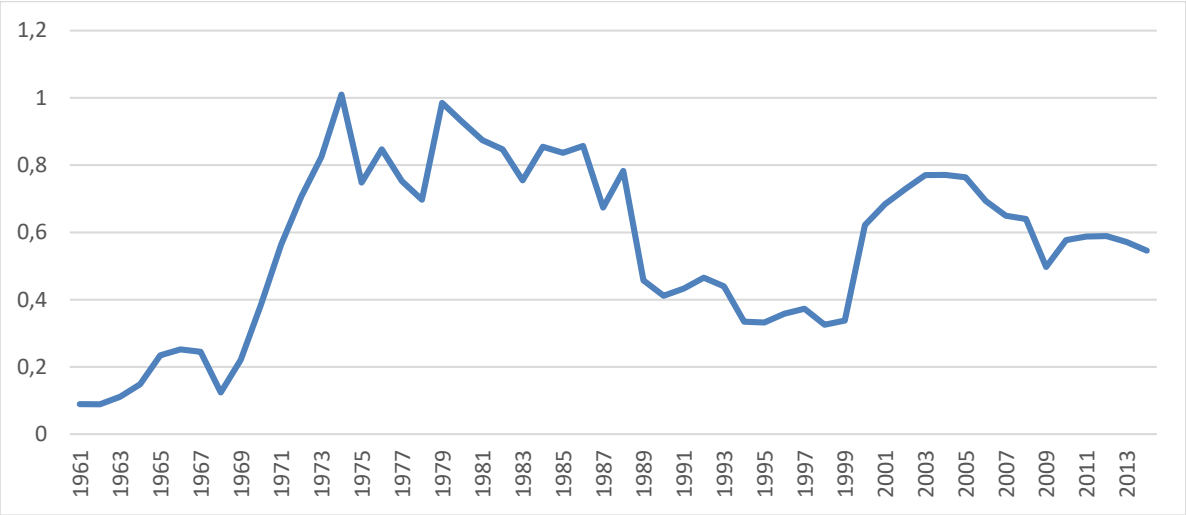

Figure 4. Trend of Carbon Dioxide Emissions in Nigeria (1961 – 2014) Source: World Development Indicators (2018)

The period 1961 to 1974 showcases a massive increase in carbon intensity in Nigeria. Thereafter, there has been some degree of oscillations from 1975 to 1987, after which the trend exhibits some downward movements till 1999. This trend was followed by a sharp rise from 2000 to 2002, where it climaxed and then started to decline till 2014. This decline in carbon intensity can be linked to the prediction of the Environmental Kuznets Curve (EKC) Hypothesis. Presently, extreme emission of Green House Gas (GHG) is tantamount to climate change, and it has received wide attention among the national and international community (Neenu and Nishad, 2021). Such emissions are considered a major environmental threat to human existence (Wang, Su, and Li, 2018). Given such an argument, essential questions, therefore, become pertinent. Such question includes:

$RQ_{1:}$ What is the effect of urbanization and economic development on carbon intensity in Nigeria?

$RQ_{2:}$ What is the link between urbanization, economic development, and carbon intensity in Nigeria?

$RQ_{3:}$ What is the optimal threshold level of urbanization that will not skyrocket carbon intensity in Nigeria?

In this light, this study seeks to examine the effect of urbanization on carbon intensity in Nigeria. The specific objectives are:

– to ascertain the effect of urbanization and economic development on carbon dioxide emission in Nigeria.

– to examine the link between urbanization, economic development and carbon dioxide emission in Nigeria.

– to detect the optimal threshold level of urbanization that will not generate massive carbon dioxide emissions in Nigeria.

The structure of this study is in five sections. Immediately following this introduction is the literature review. Then, in section three, the research methodology is explained, while section four focuses on the empirical analysis and discussion of findings. Finally, section five presents the conclusion and recommendations of the study.

1. 1. Review of Relevant Literature

The theoretical basis of this study is on the *Environmental Kuznets Curve (EKC)* hypothesis. The *Environmental Kuznets Curve (EKC)* hypothesis describes the link between economic growth and environmental degradation as an inverted U-shaped curve (Maneejuk, Ratchakom, Maneejuk, and Yamaka, 2020). This relationship is depicted in Figure 5.

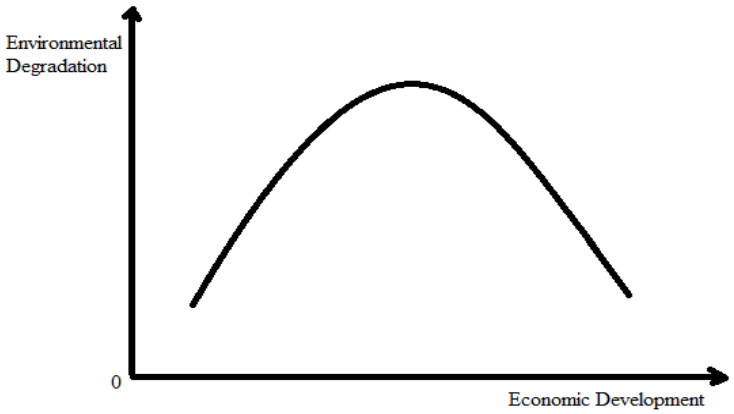

Figure 5: Environmental Kuznets Curve

Based on this hypothesis, the pattern of environmental degradation is in two stages related to society's economic development. First, during the early phase of economic development, environmental degradation increases due to increased pollution emissions and extensive and intense exploitation of natural resources and increased use of production resources and adoption of specific production methods to support rising economic activity (Maneejuk, et al., 2020). This process reaches up to a certain level as income rises. After such level, when GDP rises at a high rate, environmental degradation reduces, owing to growing public knowledge and concern about environmental degradation, as well as research and development efforts being geared more toward the notion of the green economy (Stern, 2004; Kaik and Zervas, 2013). Second, in addition to the prediction of the EKC hypothesis, the IPAT framework has been used to portray that environmental impact is equal to the product of population, affluence and technology.

The I = PAT framework (environmental impact (I) equals the product of population (P), affluence (A) and technology (T), has continued to creep around in the background of much of the discussion about environmental pressures. As pointed out by Martine (1996: 7), "A sizable segment of the literature on population and environment during the past 25 years has taken the ubiquitous I=PAT equation as the starting point" (White, et al., 2009). However, while the IPAT equation (or identity) generate much thinking, there is far less empirical evidence to show how much impact a population increment (or urban population increment) has on environmental quality.

In examining the validity of the EKC, Grossman and Krueger (1991) investigated the environmental impact of NAFTA, using ambient sulfur dioxide (SO2) and suspended particulate matter (SPM) as indicators of environmental quality. The researchers discovered a U-shaped connection between GDP per capita and the two contaminants, confirming the Environmental Kuznets Curve (EKC) theory. The researchers discovered a U-shaped connection between GDP per capita and the two contaminants, confirming the Environmental Kuznets Curve (EKC) theory. Following this research, a significant effort has been made to validate the EKC hypothesis by utilising multiple econometric models and variables to quantify environmental conditions. By examining the link between environmental and financial performance, Cohen, Fenn, and Konar (1997) discovered that investors who pick environmental leaders in an industry-balanced portfolio outperform those who choose environmental laggards.

Li and Ma (2014) examined the relationship among the urbanisation rate, economic development and environmental change for thirty administrative regions in China from 2003 to 2011 using panel data analysis. The pressure-state-response (PSR) model was utilised to ascertain environmental quality indices for the thirty regions. The panel regression result revealed an inverted U-shaped relationship between the urbanisation rate and changes in environmental quality. Furthermore, the study revealed that the turning point generally appeared near a 60% rate of

urbanisation. Further, economic development had a significant effect on the regional environment. An improved environment follows a higher degree of economic development, but an extensive economic growth programme aimed at increasing the economic growth of the regions harmed the environment.

The ARDL model was used by Shahbaz, Solarin, and Ozturk (2016) to investigate the EKC for 19 African nations, and the EKC phenomena were identified in just six of them: Algeria, Cameroon, the Congo Republic, Morocco, Tunisia, and Zambia. Atasoy (2017) used two methods to test the EKC hypothesis across the 50 states of the United States and discovered that the Augmented Mean Group (AMG) method provided supporting evidence in 30 states, while the Common Correlated Effects Mean Group Estimator (CCEMG) method indicated that the EKC hypothesis held in only ten states. Aruga (2019) used panel regression and cointegration models to investigate the EKC hypothesis in the Asian-Pacific area. He revealed that the idea held for those with much money. Furthermore, the EKC theory has been validated in developing Eastern European and Central Asian states (Koilo, 2019). However, other studies have found that the EKC does not exist in various nations. Pal and Mitra (2017) used the ARDL model to investigate the relationship between GDP per capita and CO2 emissions in India and China. Their findings revealed the presence of the N-shaped EKC, as CO2 emissions increased faster than GDP growth at first, then decreased as economic activity expanded, but stopped decreasing at a threshold before increasing again.

Mikayilov, Galeotti, and Hasanov (2018) used Autoregressive Distributed Lag Bounds Testing (ARDLBT), Fully Modified Least Squares (FMOLS), Dynamic Least Squares (DOLS), and Canonical Cointegrating Regression (CCR) methods to investigate the relationship between economic growth and CO2 emissions in Azerbaijan. The techniques yielded consistent evidence showing that economic growth has a positive connection with CO2 emissions in the long term in the form of a monotonically rising function, suggesting that the EKC hypothesis does not apply to Azerbaijan. Moutinho, Varum, and Madaleno (2017) used data from 13 main economic sectors, with Gross Value Added (GVA) representing income and CO2 emissions showing environmental degradation, to test the EKC hypothesis for Spain and Portugal using the Panel Corrected Standard Errors (PCSE) technique. They discovered an N-shaped link between GVA and CO2 emissions in Portugal and N-shaped and inverted N-shaped functions in Spain, indicating a deviation from the theoretical EKC since CO2 appeared to be lowered for a while before increasing and decreasing again along the direction of GVA growth.

Studies have uncovered a wealth of information on carbon emissions and economic development. They demonstrated that the economic activity level was adversely linked with carbon intensity on both national and regional levels by studying the significant elements impacting carbon intensity at both national and regional levels (Wang, Zhang, & Liu, 2016). They established the importance of China's economic development in supporting reduced carbon intensity. In China, urbanisation has a direct impact on carbon intensity. Nag and Parikh (2000) used the Divisia decomposition technique to analyse the carbon emissions from the end-use of commercial energy by four key sectors: industrial, transportation, agriculture, and the commercial sector. They concluded that energy intensity has accounted for the majority of the increase in carbon emission intensity. Wang et al. (2018) compared the decoupling impact of economic growth from carbon emissions and its causes. They found a significant impact of urbanisation and industrialisation on India's and China's economic growth.

Investors have become more interested in contributing to global sustainability in various ways in recent years; incorporating environmental, social, and governance aspects into their portfolio is one of their initiatives (Souza, 2019). Such aids in integrating social, ethical, and environmental considerations with economic considerations for investors (Jain, Sharma, & Srivastava, 2019). Using the GARCH model to investigate the impact of macroeconomic factors such as crude oil price, exchange rate, 10-year bond price, and non-

farm payrolls on firms that combine CSR operations with stock securities, Kathiravan, Selvam, Maniam, Venkateswar, and Sigo (2020) looked at the effect of temperature on the top five cities in India - Delhi, Kolkata, Bangalore, Mumbai, and Chennai. They discovered a substantial influence of temperature on the performance of the BSE GREENEX index in India from 2009 to 2018.

Maneejuk et al. (2020) investigate the link between economic progress and environmental degradation under the Environmental Kuznets Curve (EKC) framework. Under the EKC hypothesis, the level of CO2 emissions is employed as an indication of environmental harm to assess whether or not higher economic development may reduce environmental deterioration. The research focused on eight central worldwide economic communities, which included 44 nations from around the world. The kink regression model, which identifies the turning point of a shift in a relationship, was used to assess the connection between economic growth and environmental condition. The findings show that just three of the eight international economic communities, namely the European Union (EU), the Organization for Economic Co-operation and Development (OECD), and the Group of Seven (G7), accept the EKC theory. Further, financial development, the industrial sector, and urbanisation have all been linked to higher CO2 emissions, whereas renewable energy has been shown to alleviate environmental deterioration. In addition to determining if the EKC hypothesis exists in a specific nation, the findings revealed that the EKC hypothesis is valid in just 9 of the 44 countries studied.

Neenu and Nishad (2021) studied the influence of five factors on carbon intensity in India, including economic level, population level, urbanisation level, industry percentage, fossil fuel energy consumption, and methane emission. The study's data was gathered from the World Bank Database and the Bombay Stock Exchange's official website. Using OLS models, researchers assessed the influence of the five factors on carbon intensity. With econometrics methods such as GARCH and EGARCH, they assessed the news' volatility and impact. According to the study, the economic level, fossil fuel energy consumption, population level, urbanisation level, and methane emission all have a substantial positive influence on carbon intensity. However, the economic level and carbon intensity have a negative connection. The SENSEX has a higher volatility than sustainability indices. The study discovered that positive and negative news have asymmetric effects on stock volatility, as the parameter is negative and significant for all indices.

In examining the factors affecting carbon dioxide emission, in Turkey and India, for example, Boutabba (2014) and Pata (2018) offered empirical evidence of a positive connection between financial development and environmental deterioration. Furthermore, the industrialisation process was positively related to CO2 emissions in China and Turkey due to increasing energy consumption for manufacturing operations (Liu and Bae, 2018). Furthermore, research has indicated that urbanisation and renewable energy use are essential contributors to CO2 emissions. Bilgili, Koçak, and Bulut (2016) and Saidi and Omri (2020) also examined the relationship between renewable energy use and CO2 emissions and came to similar conclusions.

The EKC theory was reviewed by Bilgili, Koçak, and Bulut (2016) in light of the possible influence of renewable energy use on environmental quality. They discovered that renewables negatively influenced CO2 emissions in seven OECD nations from 1977 to 2010. Furthermore, Bhattacharya, Churchill, and Paramati (2017) examined the influence of renewable energy on environmental deterioration in several economic zones and found that renewable energies had a negative impact on emissions. According to this research, an area may attain a sustainable environment by limiting fossil fuel energy and encouraging renewable energy sources such as wind, solar, biomass, and geothermal energy. Much prior research has indicated that urbanisation increases carbon emissions (Pata, 2018; Ali, Bakhsh, and Yasin, 2019); Zafar, Ullah, and Majeed, 2020).

2. METHODOLOGY

2.1. Model Specification

The model for the study is specified based on the set objectives. To ascertain the effect of

urbanization on carbon dioxide emission in Nigeria, this study employs the modified model of Neenu and Nishad (2021), who examined the impact of *economic level, population level, urbanization level, industry proportion, fossil fuel energy consumption, and methane emission* on carbon intensity in India. The modified model for this study is specified as follows:

$$CEM = f(CLF, CSF, EDV, POP, URB), \quad (1)$$

where:

CEM = CO_2 emissions (metric tons per capita), which is a measure of carbon intensity

CLF = CO_2 emissions from liquid fuel consumption (% of total)

CSF = CO_2 emissions from solid fuel consumption (% of total)

EDV = GDP per capita growth (annual %)

POP = Population growth (annual %)

URB = Population in the largest city (% of urban population), an index of urbanization

Transformation of Equation (1) result in Equation (2) as follows:

$$CEM = \xi_0 + \xi_1 CLF + \xi_2 CSF + \xi_3 EDV + \xi_4 POP + \xi_5 URB + \mu, \quad (2)$$

where ξ_0 is the constant of the regression model; ξ_1 to ξ_5 are the parameters to be estimated; and μ is the random error term. It is expected that $\xi_1, \xi_2, \xi_4, and\ \xi_5$ must be positive. This implies that an increase in carbon emission from liquid fuel consumption, carbon emission from solid fuel consumption, population growth, and urbanization will lead to an increase in carbon intensity and vice versa. Also, it is expected to be negative to align with the prediction of the 'Environmental Kuznets Curve'. Based on this, at the early stage of economic development, the rate of carbon intensity will be high. However, as society develops to a sustainable level, clean energy emerges, which lowers the nation's carbon intensity. Therefore, the following partial differentiation is attainable:

$$\partial CEM/\partial CLF > 0;\ \partial CEM/\partial CSF > 0;\ \partial CEM/\partial POP > 0;\ and\ \partial URB/\partial URB > 0$$

Similarly, $\partial CEM/\partial EDV < 0$.

In the second objective, we seek to examine the link between urbanization, economic development and carbon dioxide emission in Nigeria. This requires using the vector autoregressive (VAR) model, impulse response function, and variance decomposition. The VAR(1) model is specified as follows:

$$CEM_t = \delta_{01} + \sum_{i=0}^{1} \alpha_1 CEM_{t-i} + \sum_{i=0}^{1} \beta_1 URB_{t-i} + \sum_{i=0}^{1} \beta_2 EDV_{t-i} + \mu_{1t} \quad (3)$$

$$URB_t = \delta_{02} + \sum_{i=0}^{1} \alpha_1 URB_{t-i} + \sum_{i=0}^{1} \beta_1 POP_{t-i} + \sum_{i=0}^{1} \beta_2 EDV_{t-i} + \mu_{2t} \quad (4)$$

$$EDV_t = \delta_{02} + \sum_{i=0}^{1} \alpha_1 EDV_{t-i} + \sum_{i=0}^{1} \beta_1 POP_{t-i} + \sum_{i=0}^{1} \beta_2 URB_{t-i} + \mu_{3t} \quad (5)$$

The estimation of Equations (3) to Equation (5) simultaneously under the VAR framework generates the parameter estimates.

Finally, the threshold regression is carried out to achieve the third objective. The third objective is to detect the optimal threshold level of urbanization that will not generate massive carbon dioxide emissions in Nigeria. The threshold equation is specified as follows:

$$CEM_t = \delta_{URB} + \psi_1 d_t^{URB}(URB_t - URB^*) + \psi_2(1 - d_t^{URB})(URB_t - URB^*) + \varepsilon_t \quad (6)$$

Where CEM is carbon intensity; URB is urbanization; URB* is the value used for the iteration process in our search for the optimal threshold point. The effect of urbanization is captured by ψ_1 for the period in which urbanization is greater than the threshold (high urbanization regime) while ψ_2 represents the effect of urbanization when urbanization is lower than the threshold value (low urbanization regime). The dummy variable for urbanization (d_t^{URB}) is defined as:

$$d_t^{URB} = \begin{cases} 1 & \text{if } URB_t > URB^* \\ 0 & \text{elsewhere.} \end{cases}$$

2.2. Sources of Data

The data for this study are obtained from the World Bank database on World Development Indicators. The study period is limited to 1960 to 2014 due to data availability on key variables of interest. This, therefore, reflects a period of 54 years which has duly covered some key regimes in the economy.

2.3. Analytical Technique

The study employed diverse techniques to drive home the achievement of the set objectives. The first objective is achieved through the use of the *ordinary least squares* (OLS) regression as specified in Equation 2; the second objective is achieved through the use of vector autoregressive technique as stated in Equations 3 to Equation 5; while the third objective is achieved through the use of *threshold regression* under the *Threshold Autoregressive* (TAR) and *Smooth Transition Autoregressive* (STAR) models as specified in Equation 6.

3. EMPIRICAL FINDINGS

3.1. Descriptive Statistics

The descriptive statistics of the variables in the model is presented in Table 1. The mean, median, maximum, minimum, and standard deviation of the variables represents the measures of the central tendency and dispersion.

Table 1

Descriptive Statistics of the Variables

	URB	EDV	CEM	CLF	CSF	POP
Mean	15.583	1.422	0.563	43.557	3.332	2.524
Median	15.918	2.472	0.588	39.643	0.294	2.542
Maximum	17.308	22.182	1.010	76.819	38.246	3.032
Minimum	11.669	-17.553	0.089	15.518	0.009	2.029
Standard Deviation	1.372	7.186	0.251	17.945	8.584	0.226
Observations	54	54	54	54	54	54

Source: Author Computation using Eviews 10.

From Table 1, it is observed that the index of urbanization averaged 15.583 with a standard deviation of 1.372. This gives the coefficient of variation to be 8.80%, indicating low variability in the variable. The maximum value was 17.308, while the minimum value was 11.669. The index of economic development averaged 1.422%, with a standard deviation of 7.186%. Thus, the coefficient of variation is given to be 505.34% showing a higher degree of variability.

The minimum value of the variable was -17.553%, while the maximum value was 22.182%. Carbon intensity (CO2 emissions) over the study period averaged 0.563 with a standard deviation of 0.251, thus giving a coefficient of variation to be 44.58%, indicating high variability in the variable. The variable has a minimum value of 0.089 and a maximum value of 1.010. CO2 emissions from liquid fuel consumption averaged 43.557%, with a standard deviation of 17.945%. Therefore, the coefficient of variation is given to be 41.20%, which gives a high degree of variability. The variable has a minimum value of 15.518% and a maximum value of 76.819%. CO2 emissions from solid fuel consumption averaged 3.332% with a standard deviation of 8.584%, thus giving a coefficient of variability of 257.62%. Finally, population growth averaged 2.524% with a standard deviation of 0.226%; giving the coefficient of variation to be 8.95%.

3.2. Correlation Analysis

Given that a linear combination of variables utilised in a regression model can generate multicollinearity, the correlations between the variables are ascertained to avoid such defects. The correlation matrix is presented in Table 2.

Table 2

Correlation Matrix

Variables	URB	EDV	CEM	CLF	CSF	POP
URB	1.00					
EDV	-0.1174	1.00				
CEM	0.3899	-0.0340	1.00			
CLF	0.4084	-0.2721	-0.5081	1.00		
CSF	-0.7060	-0.0301	-0.5715	0.0918	1.00	
POP	0.5184	-0.0818	0.7426	-0.2831	-0.6481	1.00

Source: Author Computation using Eviews 10.

The correlation matrix in Table 2 shows a weak inverse relationship between urbanisation and economic development, as indicated by the correlation coefficient of -0.1174. This implies that as urbanisation increases, economic development decreases, and vice versa. Similarly, there is a robust negative relationship between urbanisation and carbon dioxide emission from solid fuel consumption, given the correlation coefficient of -0.7060. Conversely, there is a weak positive relationship between urbanisation and carbon intensity since the correlation coefficient is 0.3899. Thus, an increase in urbanisation is likely to lead to greater carbon intensity and vice versa. Also, there is a weak positive relationship between urbanisation and carbon dioxide emission from liquid fuel consumption. This implies that as urbanisation increases, carbon dioxide emission from liquid fuel consumption also increases, and vice versa. In the same vein, there is a reasonably direct solid relationship between urbanisation and population growth. This implies that as population growth rises, urbanisation also rises and vice versa.

We also observed that carbon intensity, carbon dioxide emission from liquid fuel consumption, carbon dioxide emission from solid fuel consumption, and population growth all have a weak inverse relationship with economic development, given their correlation coefficients of -0.0340, -0.2721, -0.0301, and -0.0818 respectively. Thus, as these variables increases, economic development decreases and vice versa. In the same vein, carbon intensity has a strong positive relationship with population growth, as indicated by the correlation coefficient of 0.7426. This implies that as population growth increases, carbon intensity also increases and vice versa. Meanwhile, carbon intensity has a relatively strong negative relationship with carbon dioxide emission from liquid fuel consumption and carbon dioxide emission from solid fuel consumption, given their respective correlation coefficient of -0.5081 and -0.5715. Thus, carbon intensity increases as these variables decreases and vice versa. We also observed that carbon dioxide emission from liquid fuel consumption has a weak positive relationship

with carbon dioxide emission from solid fuel consumption, given the correlation coefficient of 0.0918, but has a weak negative relationship with population growth given the correlation coefficient -0.2831. Then, carbon dioxide emission from solid fuel consumption has a relatively strong negative relationship with population growth, given the correlation coefficient of -0.6481.

Each of the variables correlates perfectly with themselves, thus giving the perfect correlation coefficient of 1.00. Since none of the correlation coefficients among the explanatory variables is very high, then there is no perfect linear relationship among the explanatory variables in the model. Hence, the possibility of multicollinearity in the model is ruled out.

3.3. Ordinary Least Squares Regression

The regression result to ascertain the effect of urbanization on carbon dioxide emission in Nigeria is estimated, and the result is presented in Table 3.

Table 3

OLS Regression Result

Variable	Coefficient	Standard Error	t-Statistic	Probability
CLF	-0.0097	0.0016	-5.9006	0.0000***
CSF	0.0021	0.0037	0.5590	0.5787
EDV	-0.0046	0.0027	-1.7072	0.0943*
POP	0.3242	0.1261	2.5708	0.0133**
URB	0.1019	0.0280	3.6376	0.0007***
C	-1.4208	0.4003	-3.5490	0.0009***
R-squared	0.7514	F-statistic	29.0147	
Adjusted R-squared	0.7255	Prob(F-statistic)	0.0000***	

Note: *, **, and *** denotes significance at 10%, 5%, and 1% level of significance.
Source: Author Computation using Eviews 10.

The OLS regression result shows that urbanization exerts a positive and significant effect on carbon dioxide emissions in Nigeria. This is given by the t-value of 3.6379, which is significant at the 1% significance level. From the coefficient (0.1019), a unit percentage increase/decrease in urbanization will lead to a 10.19% increase/decrease in carbon dioxide emission in Nigeria. Thus, a decrease in urbanization is likely to curb carbon intensity in Nigeria. Pata (2018), Ali, Bakhsh, and Yasin (2019), and Zafar, Ullah, and Majeed (2020) obtained similar findings. People relocate to cities mostly because there are greater job possibilities in cities. Therefore, the number of cars on the road is increasing due to urbanization, which has an impact on traffic emissions.

Also, it is observed that economic development has a negative and significant effect on carbon dioxide emissions in Nigeria. This is portrayed by the t-statistic of -1.7072, which is significant at the 10% significance level. Thus, the coefficient (-0.0046) implies that a unit per cent increase/decrease in economic development will lead to a 0.46% decrease/increase in carbon intensity in Nigeria. This finding aligns with the prediction of the Environmental Kuznets Curve (EKC). According to the EKC, carbon intensity increases with the increase in economic development, climaxed at the middle stage, and then continue to decline as development continues to increase. The result confirms Wang, Zhang and Liu (2016) findings as they proposed that economic level negatively correlated with carbon intensity.

Further, the result indicated that population growth exerts a positive and significant effect on carbon intensity in Nigeria. The significance is indicated by the significance of the t-value (2.5708) at the 5% level of significance. Therefore, a unit per cent increase/decrease in population growth will lead to a 32.42% increase/decrease in carbon intensity in Nigeria.

Carbon dioxide emission from liquid fuel consumption is observed to exerts a negative

and significant effect on carbon intensity at the 1% level of significance. This indicates that a unit per cent increase/decrease in carbon dioxide emission from liquid fuel consumption will lead to a 0.97% decrease/increase in carbon intensity. Meanwhile, carbon dioxide emission from solid fuel consumption exerts a positive but insignificant effect on carbon intensity in Nigeria. The constant term (-1.4208) indicates that carbon intensity will be -1.4208 if all the explanatory variables are held constant.

The coefficient of determination, which is the r-squared, is 0.7514 and indicates that the variations in the explanatory variables explain 75.14% of the total variations in carbon intensity. The F-statistic (29.0147) is statistically significant at the 1% level, indicating that the overall model is statistically significant in explaining the variations in carbon intensity in Nigeria.

3.4. Vector Autoregressive (VAR) Estimates

In detecting the linkages between urbanization, carbon intensity, and economic development in Nigeria, the VAR regression result is presented in Table 4.

Table 4

VAR Regression Result

	CEM	EDV	URB
CEM(-1)	0.873895	-6.212847	-0.070350
	(0.06509)	(3.89544)	(0.10863)
	[13.4265]***	[-1.59490]*	[-0.64760]
EDV(-1)	0.001392	0.419963	-0.005174
	(0.00211)	(0.12605)	(0.00352)
	[0.66114]	[3.33166]**	[-1.47195]*
URB(-1)	-0.001944	0.008348	0.918663
	(0.01208)	(0.72276)	(0.02016)
	[-0.16095]	[0.01155]	[45.5791]***
C	0.108059	4.272202	1.365936
	(0.17837)	(10.6751)	(0.29769)
	[0.60583]	[0.40020]	[4.58839]***
R-squared	0.811436	0.229762	0.980593
Adj. R-squared	0.799892	0.182605	0.979405
F-statistic	70.28642***	4.872240**	825.2798***

Note: *, **, and *** denotes significance at 10%, 5%, and 1% level of significance. Standard errors are enclosed in normal brackets ( ) while the t-statistics are enclosed in square brackets [ ].
Source: Author Computation using Eviews 10.

The VAR regression result in Table 4 shows that carbon intensity, economic development, and urbanization are strongly endogenous in predicting themselves. This is because they have a significant effect in predicting themselves, while every other variable does not significantly affect them. For instance, carbon intensity strongly predicts itself since the t-statistic (13.4265) is statistically significant at the 1% level. Hence, carbon intensity is strongly endogenous. Furthermore, the endogeneity of carbon intensity implies that the past realization of carbon intensity is associated with an 87.39% increase in carbon intensity on the average, ceteris paribus. Meanwhile, economic development and urbanization are weakly exogenous in predicting carbon intensity in Nigeria.

Similarly, economic development is strongly endogenous in predicting itself since the t-value (3.33166) is statistically significant at the 5% level. Thus, the past realization in economic development is associated with a 42% increase in economic development on the

average ceteris paribus. It is also observed that carbon intensity is strongly exogenous in predicting economic growth since its t-value (-1.5949) is statistically significant at the 10% level of significance. Thus, a unit per cent increase in carbon intensity will lead to a 6.21% decrease in economic development and vice versa. However, urbanization is weakly exogenous in predicting economic development.

Finally, urbanization is strongly endogenous in predicting itself since its t-value (45.5791) is statistically significant at the 1% significance level. Hence, the past realization in urbanization is associated with a 91.87% increase in urbanization in Nigeria. Carbon intensity is weakly exogenous in predicting urbanization, while economic development is strongly exogenous. A unit per cent increase in economic development will exert a 0.52% decrease in carbon intensity. The validity of these results is tested using the variance decomposition.

3.5. Variance Decomposition

The variance decomposition captures the proportion of the forecasted error variance predicted by each of the variables in the VAR framework. The result is indicated in Table 5. The analysis is broken down into the short run (period 1 to period 3) and long run (period 4 and 5).

Table 5

Variance Decomposition for CEM, EDV and URB

Variance Decomposition of CEM:				
Period	Standard Error	CEM	EDV	URB
1	0.1094	100.00	0.0000	0.0000
2	0.1477	99.67	0.3349	0.0006
3	0.1717	99.329	0.6689	0.0018
4	0.1878	99.077	0.9199	0.0035
5	0.1990	98.897	1.097	0.0056
Variance Decomposition of EDV:				
Period	Standard Error	CEM	EDV	URB
1	6.5461	13.046	86.954	0.0000
2	7.0370	11.487	88.513	4.61E-06
3	7.1274	11.657	88.343	3.93E-05
4	7.1750	12.574	87.425	0.0001
5	7.2177	13.594	86.406	0.0003
Variance Decomposition of URB:				
Period	Standard Error	CEM	EDV	URB
1	0.1825	0.0075	1.7716	98.221
2	0.2536	0.7145	5.4364	93.849
3	0.3040	1.3583	8.1282	90.514
4	0.3422	1.8167	9.9451	88.238
5	0.3720	2.1283	11.172	86.699

Source: Author Computation using Eviews 10.

In the short run, carbon intensity explains 100% of its total forecasted error variance while economic development and urbanization contributed nothing. This declined sluggishly to 99.329% in the third period. In the long run, carbon intensity still explained 98.897% of its forecasted error variance, while economic development and urbanization jointly contributed a meagre 1.103% of its total forecasted error variance. This indicated that carbon intensity is strongly endogenous both in the short-run and in the long run.

Similarly, economic development explained 86.954% of its forecasted error variance in the short-run, which increased steadily to 88.343% in the third period. Within the short run, urbanization contributed nothing to the forecasted error variance in economic development. In contrast, carbon intensity

contributed up to 11.657% of the forecasted error variance in economic development in the short run. This shows that economic development is strongly endogenous in the short run, with a minor exogenous effect from carbon intensity. However, in the long run, economic development still remained strongly endogenous by explaining up to 86.406% of its forecasted error variance, while carbon intensity explained about 13.594% of the total forecasted error variance in economic development. Thus, economic development remained strongly endogenous, even in the long run.

Regarding urbanization, the variable is also strongly endogenous both in the short-run and in the long run. The variables explained 98.221% of its forecasted error variance in the first period, which declined steadily to 90.514% in the third period. Within the short run, both carbon intensity and economic development are weakly exogenous. For instance, carbon intensity explained 1.36% of the forecasted error variance in urbanization in the third period, while economic development explained 8.13% in the same period. In the long run, urbanization remained strongly endogenous, explaining up to 86.699% of its forecasted error variance in the fifth period, while economic development and carbon intensity jointly explained 13.30% of the total forecasted error variance. Though economic development showed some progress in explaining urbanization, its proportion is relatively small. The decomposition of the effects of the variables on the other is captured by the historical decomposition as well.

3.6. Impulse Response Function

The impulse response function captures the question of how the variables respond to shock in another variable. Such responses are portrayed in Figure 5. The response follows a one standard deviation shock in the variable of interest.

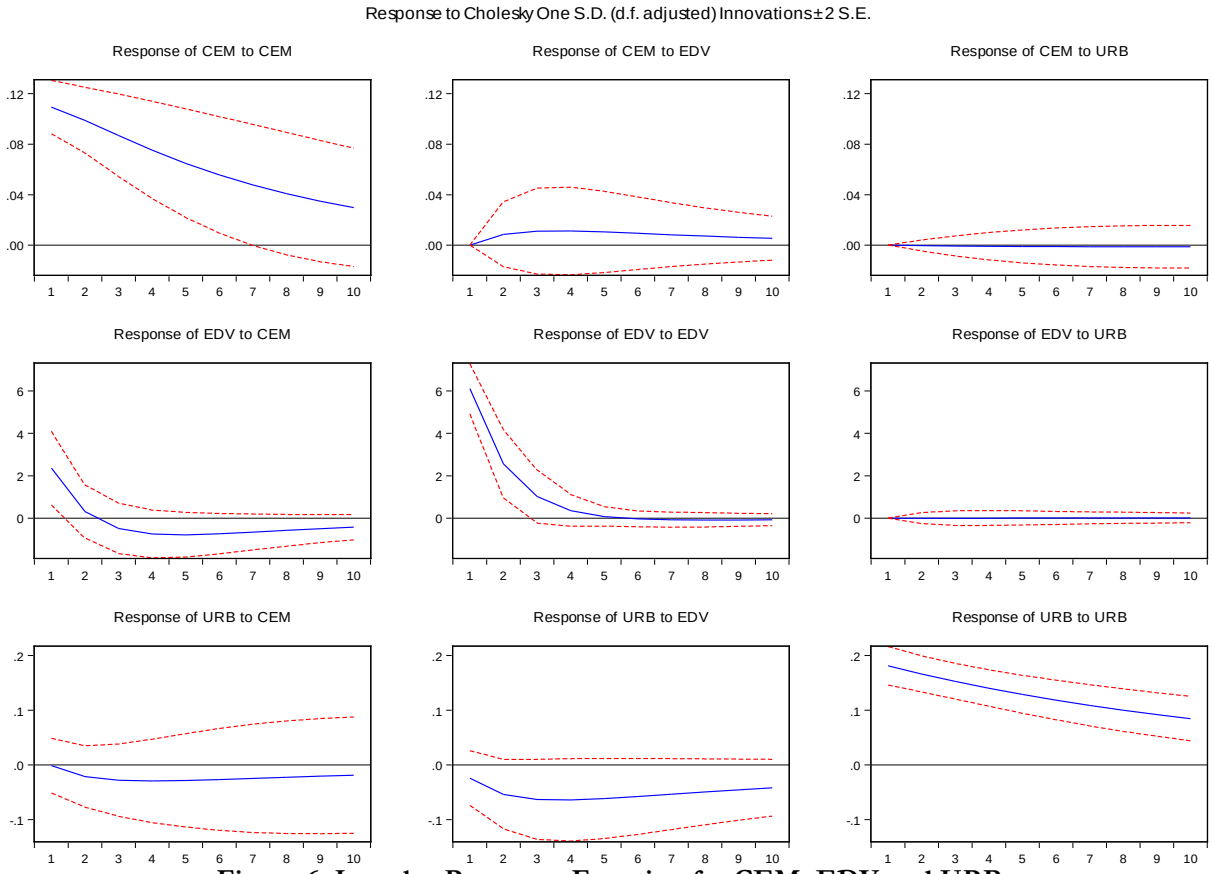

Figure 6. Impulse Response Function for CEM, EDV and URB

From Figure 6, a one-standard-deviation shock in carbon intensity will cause economic development to decline sharply in the short run, but such an effect dies off in the long run. Similarly, a one-standard-deviation shock in carbon intensity will cause urbanisation to

decline slowly in the short run but becomes explosive in the long run since such shocks will cause a more significant deviation from the long-run path.

A one-standard-deviation shock in economic development is associated with increased carbon intensity in the short run-up to the third period. But, thereafter, it declined steadily over the long run, though the effect does not die off even in the tenth period. In the same vein, a one-standard-deviation shock in economic development will cause urbanisation to decline up to the second period, then maintained a steady trend over the long run.

The response of carbon intensity to a one-standard-deviation shock in urbanisation looks explosive. However, there is a more significant divergence both in the short run and in the long run. Meanwhile, the response of economic development to a one-standard-deviation shock in urbanisation is less in the short and long run.

3.7. Threshold Regression

The threshold regression is conducted to detect the optimal threshold level of urbanisation that will not generate massive carbon dioxide emissions in Nigeria. The result is presented in Table 6. The result identified both the linear and nonlinear parts of the threshold regression result.

Table 6

Threshold Regression Result

Dependent Variable: CEM Method: Smooth Threshold Regression Transition function: Logistic Threshold variable: URB				
Variable	Coefficient	Standard Error	t-Statistic	Probability
Threshold Variables (linear part)				
URB	-1.0107	2.7551	-0.3668	0.7154
C	10.6155	26.3879	0.4023	0.6893
Threshold Variables (nonlinear part)				
URB	-0.2551	1.1989	-0.2128	0.8324
C	12.6867	16.4044	0.7734	0.4431
Slopes				
SLOPE	0.6731	0.6932	0.9710	0.3364
Thresholds				
THRESHOLD	14.444	1.6165	8.9358	0.0000***
R-squared	0.754053	F-statistic		29.43273
Adjusted R-squared	0.728433	Prob(F-statistic)		0.000000***

Source: Author Computation using Eviews 10.

From the threshold regression result in Table 6, it is observed that there is a linear relationship between carbon intensity and urbanization. This is because both the linear and nonlinear coefficients have the same sign (negative). Therefore, the threshold coefficient (14.444) implies that the optimal threshold level of urbanization that will not generate massive carbon dioxide emission in Nigeria is 14.444%. At this threshold level, the slope coefficient (0.6731), which is statistically insignificant at the 5% level, indicates that urbanization will not have a significant positive effect on carbon intensity in Nigeria. We check on the effect of deviation from the threshold level, and the following threshold estimates are presented in Table 7.

Table 7

Threshold Estimates

Variable	Coefficient	Standard Error	t-Statistic	Probability
URB < 14.2004 -- 9 observations				
URB	0.0599	0.0501	1.1941	0.2383
C	-0.6323	0.6717	-0.9414	0.3512
14.2004 <= URB < 16.4746 -- 27 observations				
URB	0.1166	0.0315	3.7021	0.0006***
C	-1.0697	0.4854	-2.2037	0.0324**
R-squared	0.8045	F-statistic		39.5056
Adjusted R-squared	0.7841	Prob(F-statistic)		0.0000***

Source: Author Computation using Eviews 10.

Given the estimates, if urbanization is less than 14.20% (below the threshold level of 14.444), urbanization will not significantly affect carbon intensity. However, if it is above 14.20% up to 16.47% (above the threshold value of 14.444), it will yield a positive and significant effect on carbon intensity. In this regard, it will increase carbon intensity by 11.66%.

4. SUMMARY OF MAJOR FINDINGS

Based on this study, the following significant findings were obtained:

– Urbanization exerts a positive and significant effect on carbon intensity in Nigeria. Meanwhile, economic development has a negative and significant effect on carbon intensity in Nigeria, which is in line with the prediction of the EKC.

– Carbon intensity, economic development, and carbon intensity are strongly endogenous in the Nigerian context over the study period.

– The optimal threshold level of urbanization that will not generate massive carbon dioxide emissions in Nigeria is 14.444%.

5. CONCLUSION

This study examined the effect of urbanization, population growth, and economic development on carbon intensity. In addition, the optimal threshold of urbanization that will not skyrocket carbon intensity was also examined. The study employed time-series data that covers the period 1961 to 2014. The choice of the time frame was based on data availability. The ordinary least squares (OLS) regression analysis, vector autoregression and threshold regression were utilized in the study. The OLS regression result discovered that economic development has a negative and significant effect on carbon intensity. In contrast, population growth and urbanization both have a positive and significant effect on carbon intensity. A unit per cent increase/decrease in economic development is associated with a 0.46% decrease/increase in carbon intensity. Meanwhile, a unit per cent increase/decrease in population growth and urbanization exerts a 32.42% and 10.19% increase/decrease in carbon intensity in Nigeria.

The VAR regression result indicated that carbon intensity, urbanization, population growth, and economic development are strongly endogenous in predicting themselves. This was further supported by the variance decomposition and the historical decomposition. The impulse response function indicated that a one-standard-deviation shock in carbon intensity would cause economic development to decline sharply in the short run. However, such an effect dies off in the long run. Similarly, a one-standard-deviation shock in carbon intensity will cause urbanization to decline slowly in the short-run but become explosive since such shocks will cause a more significant deviation from the long run path.

The threshold regression result indicated that the optimal threshold level of urbanization that will not generate massive carbon dioxide emission in Nigeria is 14.444%. At this threshold level, the slope coefficient (0.6731), which is statistically insignificant at the 5% level, indicates that urbanization will not have a significant positive effect on carbon intensity in Nigeria. If urbanization is less than 14.20% (which is below the threshold level of 14.444), urbanization will not significantly affect carbo intensity. However, if it is above 14.20% up to 16.47% (above the threshold value of 14.444), it will yield a positive and significant effect on carbon intensity. In this regard, it will increase carbon intensity by 11.66%.

Based on the findings of this study, it can be concluded that as urbanization accelerates, environmental quality declines. It follows that overall environmental quality will decline as urbanization accelerates. Similarly, as the population grows, it generates some undesirable effects on the environment. There is bound to be an increase in carbon dioxide emissions from both liquid and solid fuel consumption with an attendant increase in domestic waste, increasing the country's carbon intensity. Conversely, as the economy develops, there is the likelihood of a reduction in carbon intensity as projected by the Environmental Kuznets Curve (EKC) hypothesis. Thus, there is a need for concerted effort to curb environmental pollution to ensure a better living environment for the citizenry. Regulations on carbon emissions should be made to be quite stringent to discourage excessive carbon emissions. Furthermore, a shift towards the use of clean energy should be promoted and implemented. Moreover, rural development policies should be implemented to curb rural-urban migration, which could increase urbanization in Nigeria.

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Sustainability, growth and entrepreneurial orientation of small innovative enterprises

Lyubov Lipych[*], *Oksana Khilukha*[**], *Myroslava Kushnir*[***], *Iryna Volynets*[****], *Liudmyla Shostak*[*****]

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Abstract. Almost all over the world, small business is a source of prosperity and sustainability for societies and nations. Therefore, research on small businesses in measuring sustainability is essential for achieving several sustainable development goals. In this article, we propose to reflect on the relationship between entrepreneurial orientation, growth and sustainability of a small business. This study consists of three main parts. Firstly, we revealed the role of small businesses in Ukraine's sustainable development and explored the European experience. Secondly, we explored the main components of business orientation and enterprise growth of Ukrainian small innovative enterprises. Thirdly, we established the relationship between the individual components of enterprise growth and its entrepreneurial orientation. We also discussed the informatization issues in connection with expanding the entrepreneurial orientation of small enterprises to strengthen their role in sustainable development processes, especially in the context of the COVID-19 pandemia. This research can be helpful both to SMEs and the government as the basis for developing and changing policies on small business growth and innovations.

Keywords: small enterprises, innovative enterprises, entrepreneurial orientation, enterprise growth, sustainable development goals

[*] Lyubov Lipych, DSc (Economics), Professor, Department of Entrepreneurship, Trade and Logistics, Lutsk National Technical University, Lvivska 75, 43018 Lutsk, Ukraine, e-mail: lglipych@gmail.com (corresponding author), ORCID: https://orcid.org/0000-0002-9059-7271

[**] Oksana Khilukha, PhD, Associate Professor, Department of Enterprise Economics and Information Technology, Lviv University of Business and Law, Kulparkivska str. 99, 79021 Lviv, Ukraine, ORCID: https://orcid.org/0000-0002-1228-7171

[***] Myroslava Kushnir, PhD, Art. teacher, Department of Applied Economics and Business, Ukrainian Catholic University, Ilariona Sventsitskoho 17, 79011 Lviv, Ukraine, ORCID: https://orcid.org/0000-0002-4441-4278

[****] Iryna Volynets, Candidate of Economic Sciences, Associate Professor, Department of Management and Administration, Lesya Ukrainka Volyn National University, Prosp. Voli, 13, 43025 Lutsk, Ukraine, ORCID: https://orcid.org/0000-0003-2556-2109

[*****] Liudmyla Shostak, Candidate of Economic Sciences, Associate Professor, Department of Entrepreneurship and Marketing, Lesya Ukrainka Volyn National University, Prosp. Voli, 13, 43025 Lutsk, Ukraine, ORSID: https://orcid.org/0000-0001-8786-9582

1. INTRODUCTION

The main reason for the significant attention of scientists to the small business is that it plays a vital role in shaping the level of employment, ensuring a proper competitive environment for medium-sized businesses and improving the socio-economic development of society as a whole. Small enterprises are increasingly directing their activity to establish innovative products and make creative organizational decisions. The benefits of such activity are usually analyzed through the prism of rising competitiveness, gaining new market positions, using existing business and management competencies and available resources. On the other hand, the success of such activity largely depends on the entrepreneurial behaviour, innovation potential and level of entrepreneurship.

Traditionally, small businesses are the driver of progress and innovation due to greater flexibility and a lower level of bureaucracy. However, high competition and the search for their niche contain stagnation and push small businesses to keep moving. Until recently, the main problem for small businesses was limited funding, but new methods of finding support for startups and innovative ideas have revealed the potential. As a result, new ideas for improving the world are now emerging in small businesses' competition.

Small business is an essential factor in sustainable development. By increasing employment and living standards, providing food, educational services, implementing innovations related to energy efficiency and waste management, small businesses are building a sustainable future for our planet. However, we must remember that altruistic behaviour is challenging in highly competitive circumstances. Therefore, we seek to explore the phenomenon of entrepreneurial orientation on the example of small enterprises in Ukraine and their role in ensuring sustainable development.

The entrepreneurial orientation is a characteristic of the enterprise manifested in strategic decisions aimed at responding quickly to the challenges of a turbulent environment. An entrepreneurial enterprise creates innovations, takes an initial position and takes risky measures. The entrepreneurial orientation intensity feels the influence of various internal (human capital potential, available material values, own research and development, knowledge, et cetera) and external factors caused by the external environment. Therefore, small businesses must use their entrepreneurial orientation to create a sustainable competitive advantage. A small business has a competitive advantage when it is more successful than its current and potential competitors, measured by its growth rate.

Journeault, M., Perron, A., & Vallières, L. (2021) note that governments worldwide strive to improve small businesses' social and environmental performance, which are considered essential performers of sustainable development goals.

The research was inspired by the authors' observation of problems related to the definition of entrepreneurial orientation in sustainability problems, small business growth in Ukraine and the lack of a holistic approach to solving this issue.

1.1. Literature review

Sustainable entrepreneurship is an essential subject of research in the modern era of the dominance of the doctrine of sustainable development. At the same time, this area is challenging to research because it is multidisciplinary, requires extensive knowledge in various fields of economics, business, politics and environmental sciences (Anand, A., Argade, P., Barkemeyer, R., & Salignac, F., 2021).

Terán-Yépez, E. et al. (2020) proved that from the standpoint of sustainable development, entrepreneurship could not be considered as achieving economic benefits solely. After analyzing more than two hundred scientific articles, scientists have proved that sustainable entrepreneurship is one of the central areas of research in sustainable development theory. At the same time, the entrepreneurs should make concrete efforts to promote sustainable development principles in the entrepreneurial orientation framework. Hummels, H., & Argyrou, A. (2021) noted that governments and businesses threaten sustainable development because their focus on meeting current needs does not consider the potential consequences for future generations.

As a result, "many businesses unjustifiably see themselves as such contributing to sustainable development". Journeault, M., Perron, A., & Vallières, L. (2021) conclude that, despite their best efforts, SMEs are still trying to integrate the principles of sustainable development into their activities in their business practice.

Dhahri, S., Slimani, S., & Omri, A. (2021) proved that sustainable entrepreneurship is based on entrepreneurs' behaviour and motivation. The researchers used empirical data and explained how entrepreneurial orientation affects the impact of enterprises on the economic, social and environmental aspects of sustainable development.

Thelken, H. N., & de Jong, G. (2020) explored the process of shaping the intentions of sustainable entrepreneurs and opportunities to generate social, environmental, and economic value. Researchers emphasized the influence of values and entrepreneurial orientation on the process of forming intentions for sustainability.

Entrepreneurial orientation means a coherent set of interrelated activity types and processes, structures, methods, practices and behaviours used by managers. The definition bases on the assertion that enterprises carrying on business tend to be at greater risk than non-profit entities. Such enterprises are actively seeking business opportunities and focusing on innovative change, especially in conditions of uncertainty. Entrepreneurial orientation characterizes the firm's state in which organizational processes, practices, and procedures create value through internal entrepreneurial activity (Lumpkin, G. T., Dess, G. G., 1996). Entrepreneurial orientation emerged as a theoretical construction in the organizational and managerial literature and immediately became a popular topic in academic journals, textbooks and specialized publications. The entrepreneurial orientation is one of the most studied concepts; however, there are many definitions since its emergence that significantly change the essence of the concept.

Table 1 provides a broader overview of the studied construction definitions.

Table 1

The interpretation of the definitions entrepreneurial orientation and entrepreneurial enterprise

Author	Definition
Mintzberg, H., & Waters, J. A. (1982)	Strategy development is an active search for new opportunities and a dramatic shift forward in an entrepreneurial style of action under the conditions of uncertainty.
Khandwalla, P. N. (1976)	An entrepreneurial style is characterized by energetic, risk, aggressive decisions taking.
Miller, D., & Friesen, P. H. (1982)	The entrepreneurial model is used by enterprises being innovated regularly and vigorously while taking on significant risk in product and market strategies
Miller, D. (1983)	Entrepreneurial orientation is inherent in an organization that carries out innovative, risky activities, seeks to be one step ahead of competitors.
Morris M. H., Webb J. W., Franklin R. J. (2011)	An entrepreneurial firm has decision-making norms that cover proactive, innovative strategies and contain an element of risk.
Covin, J. G., Slevin, D. P. (1989)	Entrepreneurial enterprises are organisations in which top managers use an entrepreneurial management style manifested through strategic decision-making and operational management philosophy. On the other hand, non-entrepreneurial or conservative enterprises are such firms in which the style of top management is characterized by risk avoidance, lack of innovation and passivity or reactivity.
Russell Merz, G., & Sauber, M. H. (1995).	Entrepreneurial orientation is determined by the firm's level of proactivity (aggression) in product and market units and the intention to be innovative to create new market proposals.

Dess G. C., Lumpkin G. T. (2005)	Entrepreneurial orientation refers to the processes, practices and activities of decision-making that lead to a new result. It is characterized by one or more components such as propensity to act autonomously, willingness to innovate, willingness to take risks, aggressive behaviour towards competitors, and proactive behaviour concerning market opportunities.
Zahra, S. A., Neubaum, D. O., & Huse, M. (2000)	Entrepreneurial orientation is the sum of radical innovations of the enterprise, active strategic and risky actions aimed at supporting projects with unknown results.
Giraud Voss, Z., Voss, G. B., & Moorman, C. (2005).	The entrepreneurial orientation is an intention of the firm to be involved in behaviour that reflects risk-taking, innovation, proactivity, autonomy and competitive aggression leading to changes in the organization or market.
Avlonitis, G. J., & Salavou, H. E. (2007).	Entrepreneurial orientation is an organizational phenomenon that reflects the firms' managerial ability to take proactive or aggressive initiatives to change the competition in their favour.
Van Den Broeck, H., & Cools, E. (2006).	Entrepreneurial orientation applies to the strategy of top management in terms of innovation, proactivity and risk appetite.
Pearce, J. A., Fritz, D. A., & Davis, P. S. (2010)	Entrepreneurial orientation can be defined as a set of different but interrelated behaviours that have the characteristics of innovation, proactivity, competitive aggression, risk appetite and autonomy.

1.2. Theoretical aspects of entrepreneurial orientation

There are two main approaches to the conceptualization of the concept of "entrepreneurial orientation". The first is a unidimensional approach presented by D. Miller (1983) and later supplemented by J. G. Covin and D. P. Slevin (1990). The second is multidimensional, associated with G. T. Lumpkin and D. D. Dess (2005). In the first approach, the critical factors of entrepreneurial orientation are risk-taking, innovation and proactivity. The main idea of this approach is to have all three dimensions simultaneously contribute to the formation of entrepreneurial orientation equally. The elements must interact with each other, and to increase entrepreneurial orientation, managers need to raise the intensity of behaviour and activities in all dimensions.

Consider each of these elements in terms of behavioural characteristics of the enterprise. Innovation characterizes the propensity of the enterprise to experiment, create new ideas, and participate in activities to create new products, processes, and services and openness of organizational culture to new ideas and combinations (Lumpkin, G. T., Dess, G. G., 1996). In other words, innovation determines the readiness and desire of the enterprise to participate in new ventures. Technological, product and administrative innovations are usually considered in the literature (Dess G. C., Lumpkin G. T., 2005).

Another factor is proactivity, manifested as the ability to anticipate future needs and make the necessary changes ahead of competitors (Dess G. C., Lumpkin G. T., 2005). Proactive enterprise with its initiatives forces competitors to respond to its actions (Covin J. G., Slevin D. P., 1990). Willingness to take risks has always been considered a characteristic feature of entrepreneurs. Such factor refers to decisions related to resource allocation, product selection and markets. Willingness to risk reflects the level of willingness of top management to invest significant resources in projects with a significant level of uncertainty when the result is unknown, and there is a high probability of significant losses (Lumpkin, G. T., Dess, G. G., 1996).

The second multidimensional approach factors do not determine the entrepreneurial orientation but its manifestation. Entrepreneurial orientation is identified as a set of independent characteristics, including risk appetite, innovation, proactivity, competitive aggression, and autonomy in the multidimensional approach. Two additional components are added to the Miller / Covin / Slevin scale, and thus the definition of entrepreneurial orientation is expanded.

Autonomy is a catalyst for entrepreneurial activity and an independent spirit of freedom necessary to create a new enterprise. Competitive aggression is related to the characteristics of the enterprise, reflects the motivation to achieve through intense competition and improve their competitive position in the market (Lumpkin, G. T., Dess, G. G., 1996; Alexandrova M., 2004).

Despite the popularity of the mentioned approaches in determining business orientation in recent years, there have been studies that demonstrate the need to revise some aspects. For example, G. T. Lumpkin and D. D. Dess (1996) emphasized the need and importance of studying the national context and its impact on entrepreneurial orientation and testing such concepts in other countries.

For our study, we adopted five elements of entrepreneurial orientation, three proposed by D. Miller, such as proactivity, innovation and risk, and two supplemented by G.T. Lumpkin and G.G. Dess, such as autonomy and competitive aggression.

The study of the components of entrepreneurial orientation allows determining the strategic prospects of the enterprise to formulate and implement strategic choices in conditions of uncertainty. Therefore, interest in entrepreneurial orientation is steadily growing, and it is becoming one of the priority areas of entrepreneurship.

The research covers not only the phenomenon itself but also the potential of its components. Based on the literature analysis on this issue, we can conclude that the most significant number of studies in small businesses was devoted to the element of "innovation. Therefore, a broader analysis of other components of entrepreneurial orientation in the context of small business growth is justified.

We formulated the following research questions:

RQ_1: What is the role of small businesses in the sustainable development of Ukraine?

RQ_2: How the entrepreneurial orientation impacts the activities of small enterprises in Ukraine?

RQ_3: Is there a connection between the entrepreneurial orientation and the growth of the enterprise?

2. METHODS

To solve out defined research questions in the first stage, we performed theoretical analyses of small businesses' role in the sustainable development of Ukraine and the European experience. We used open data and reviewed scientific sources connected to the issues of SMEs and sustainability.

In the second stage, we conducted exploratory analyses of entrepreneurial orientation and growth of the enterprise using Ukrainian small enterprises data. The second stage was conducted from November 2020 to January 2021 using CATI and CAWI methods to collect data from small innovative enterprises. We considered an innovative enterprise as one that introduced any innovation in the last three years, including the introduction of new or improved products or services, new or improved methods of production or providing services, new or improved management methods. To get the representative sample, we analysed the Statistical Compendium "Activities of Large, Medium, Small and Micro Enterprises in 2018" (State statistical service of Ukraine, 2019). As we found that in the sample in 2018, 339,374 small enterprises were registered in Ukraine. Using applied formula by J. Stechkovsky (Steczkowski, J., 1995), we concluded that representative sample should include at least 783 subjects.

We contact 1,200 enterprises (800 core and 400 reserves) from all regions of Ukraine. The reserve of enterprises was formed to prevent lost data issues (because of the respondents' refusal or obsolete records in the database). We send 1200 questionnaires by e-mail and get 923 responses. Thus, the number of correctly filled questionaries was 795. Using collected data, we assessed the components of entrepreneurial orientation and growth of the enterprise.

Orientation is a multi-vector phenomenon that requires an appropriate research procedure according to scientific developments on entrepreneurship. Entrepreneurial orientation was determined using five components: proactivity, innovation, autonomy, risk and competitive aggression rated on a 5-point Likert

scale. Creating the scale, we took into account the recommendations for building measuring scales were. We assessed the reliability and accuracy of the scale using Cronbach's alpha reliability coefficient. The Cronbach's alpha coefficient ranges from 0 to 1. The reference value is in the range of 0.6-0.94. Values below the reference may indicate, for example, poor interdependence between indicators or an insufficient number of questions; thus, too high values may say about a large number of such indicators. In our case, this ratio was 0.729, which proves the reliability of the research tool. Finally, we calculated the level of entrepreneurial orientation as the arithmetic means of the respondents' answers.

It is important is to determine the level of enterprise growth in the context of assessing the efficiency of the enterprise compared to competitors. This indicator is ambiguous, multi-vector, and at the same time such one that it is difficult to quantify. In studies on this topic, there is no agreement on the unambiguous identification of growth indicators of the enterprise. It is often determined through the growth of sales and employment and the growth of assets, market share, production and profits. The choice of indicators to assess the growth of a small enterprise is a difficult task due to the difficulty of access to financial statements. There is no legal need to publish the latter by small enterprises of Ukraine. Therefore, research often uses subjective assessments of the respondents' enterprise growth components, undoubtedly inaccurate. We also used subjective indicators of enterprise growth such as turnover, employment, profit and productivity in the study. The calculation was made using a 5-point Likert scale. Respondents assessed the components of growth over the last three years (2017-2020) compared to direct competitors on a scale from 1 to 5 where 1 is a significant decrease compared to direct competitors, 2 is a decrease, 3 is difficult to say, 4 is an increase, 5 is a significant magnification. When constructing the scale as in the "entrepreneurial orientation" construction, the scale's design and reliability were evaluated using Cronbach's scale's reliability. The coefficient for this scale was 0.943, which proves the research tool's high reliability and efficient processing of respondents' answers.

In the last stage, we calculated correlations between entrepreneurial orientation factors and the enterprise's growth.

We performed the calculations were using the SPSS program version 17.

3. RESULTS

3.1. The role of small business for sustainable development of Ukraine and the European experience

Small businesses are one of the main tools for the development of the national economy because they:

– form the basis of small-scale production;

– establish the rate of economic growth, form the structure and quality component of gross domestic product, increase the level of democratization of society;

– contribute to the restructuring of the economy, rapid payback, freedom of market choice;

– provide market saturation with goods and services, implementation of innovations, create additional jobs;

– characterized by high mobility, rational forms of management;

– form a layer of entrepreneurs-owners, which is the basis of the middle class; contribute to the weakening of monopoly and the development of healthy competition in the market (Bilous H. P., 2016).

Small enterprises ensure the development of the country's economic system and bring it closer to consumers. Entrepreneurship can solve such economic problems as creating a competitive environment in the country, attracting private capital and foreign investment, and improving existing production technologies. At the same time, these enterprises play the most crucial role in the state - they provide jobs to the country's citizens, create natural sources of their income, ensure the production of goods for work and services.

As for 2019, according to the official data of the State Statistics Committee, the number of small business entities (both legal entities and individuals) was 87 per 10,000 general populations. For comparison: in Italy, this

indicator is 92, in Spain - 93, in Austria - 94, in Great Britain - 95, in France - 96, in Germany – 97 (OECD, n.d.). The data shows the possibility of further growth of small enterprises in the economy.

In the field of small business in Ukraine, as of January 1, 2017, there were 158.6 thousand enterprises, which provided 9% of GDP. At the same time, in Ukraine's neighbouring Czech Republic, Slovakia and Hungary, the share of small enterprises in GDP was set at 30-40% (OECD, n.d.).

The territorial structure of the number of small enterprises by region has uneven distribution. From the total number of small enterprises operating in the country, more than half acts in 7 regions of Ukraine (in particular, Kyiv (25.1% of the total number of small enterprises in the country), Dnipropetrovsk (8.4), Kharkiv (7.8%), Lviv (6.5%), Odesa (6.2%), Zaporizhia (5.8%), Vinnytsia (5.3%) (State statistical service of Ukraine, 2019).

World practice shows that 12% of small businesses grow into large companies. Unfortunately, in Ukraine, these are only isolated cases, as the growth of small enterprises is blocked. The average term of existence of small Ukrainian enterprises is very insignificant. The life cycle of small enterprises averaged 3-5 years. From 50 to 80% of Ukrainian small businesses go bankrupt OECD, 2021).

Even in world practice, under the conditions of a favourable external environment in the first five years of existence, from 30 to 70% of small enterprises go bankrupt. Thus, in the United States, 65% of companies with up to 20 employees work in bankruptcy in the first four years of existence, and every fourth company - in the first year (UENI Blog, 2021).

Improving the system of microcredit, investment and providing guarantees is one of the urgent tasks of the state for the development of small businesses. Such measures can be helpful to:

– increase the competitiveness of enterprises;

– withdraw most of them from the shadow sector (almost 70% of small businesses hide their real profits (Bilous H. P., 2016);

– create more jobs.

Analyzing the six most attractive countries in Europe in terms of investment climate - Great Britain, Ireland, the Netherlands, Sweden, Norway and Bulgaria, we can emphasize that they all have a "green corridor" for small business development. Ireland ("Celtic Tiger") is the most favourable country for small business development among other European countries. At the same time, the government is taking all possible measures to encourage the emergence of new enterprises, creating desirable conditions for this (corporate tax rate is only 12.5%). Bulgaria has become a hub for entrepreneurs from all over the world with the possibility to open a small business there with all the permits in 18 days. In Norway, small businesses can be started online. The simplified procedure saves time, and the risk of operation for small businesses in this country is minimal. In an expensive country of residence - the UK, starting a new business costs an average of $81.45 (Smale Th., 2017).

According to a study by The world bank group, the Scandinavian countries rank third in ease of doing business, while the United States is eighth in comparison. However, the latter has highly qualified staff and supports innovation in small businesses best of all. James Wilkinson, CEO of Streaming Tank, emphasizes that "people in New York are open and eager for new ideas and concepts" (Smale Th., 2017).

The importance of small business lies in its significant share in the overall structure of the business. In the Organization for Economic Co-operation and Development (OECD) member countries, more than 95% of all business is held by small and medium-sized businesses. 60 - 70% of the employed population work in small and medium businesses (OECD, 2000).

T.V. Chernychko emphasizes that: "Small enterprises provide flexibility and sustainability of the economic system, bring it closer to the needs of specific consumers, and at the same time - play an important social role, providing jobs and providing a source of income for large segments of the population" (Chernychko T.V., 2010, 152). In our opinion, small businesses do even more because they are flexible enough for risky innovation and paving new economic and social development ways.

3. 2. Entrepreneurial orientation

The surveyed business entities were mainly involved in the service sector (68.93%), production (21.64%) and trade (9.43%). The structure of the spatial market was dominated by the domestic market (78.11%), followed by the regional market (12.83%), and the international market with the lowest share (9.06%). Mature companies that dominated the study sample have existed in the market for more than ten years. They accounted for 83.52% of respondents, and the least were companies operating in the market for up to 3 years, only 16.48%.

Analysis of the components of entrepreneurial orientation showed that of the five factors, the highest score was given to innovation. Almost 82% of respondents rated it at 4 and 5. At the same time, the lowest level in the ranking went to autonomy that is only 25.86% of respondents rated 4 and 5 (Table 2).

Table 2

Factor-by-factor assessment of entrepreneurial orientation of the studied enterprises

Entrepreneurial Orientation Factors	Grades from 1 to 5, %				
	1	2	3	4	5
Proactivity – the company systematically monitors the environment to determine future consumer needs and forecast future demand conditions.	4.53	9.07	19.06	33.60	29.87
Innovation – the enterprises focuses on the introduction of new products and processes, technical or organizational changes and creates a culture loyal to innovation.	5.47	7.20	21.73	39.73	41.73
Autonomy – managers and employees have the right to make independent decisions, taking care of the interests of the enterprise.	16.53	33.20	30.40	18.53	7.33
Risk – the company is willing to take risks by entering a new unexplored market, invest, make changes, such as innovation.	7.60	19.07	52.00	14.80	12.53
Competitive aggressiveness – the company systematically improves its competitive position due to the high quality of products / services and a wide range of products, introducing innovations.	4.93	11.47	28.13	46.00	15.47

Respondents assessed the size of entrepreneurial orientation, answering questions about the functioning of the surveyed enterprise on a scale from 1 to 5, where 1 – unequivocally no, 2 – no, 3 – difficult to answer, 4 – yes, 5 – unequivocally yes.
Source: own research

The growth of the enterprise was calculated as the arithmetic mean of the respondents' answers to questions about the indicators included in this unidimensional construction.

A detailed analysis of the components of the "enterprise growth" structure showed that in the case of all analyzed variables, i.e. increase in sales / turnover, employment growth, profit growth and productivity growth, more than 56% of respondents rated the analyzed indicators as "growth" and "significant growth" compared to competitors (Table 3).

Table 3

Estimation of a construction "growth of the enterprise" components for the last three 2017-2020 years in comparison with direct competitors

A construction "growth of the enterprise" components	Grades from 1 to 5, %				
	1	2	3	4	5
Volume (sales) of turnover	6,4	11,3	20.4	36,7	25,2
The size of employment	9,0	9,5	22.1	34,8	24,6
The amount of profit	5,3	11,2	21,3	35,7	26,5
Productivity	8,5	9,7	25,6	33,1	23,1

Respondents evaluated the performance of enterprises for the last three years (2017-2020) compared to direct competitors on a scale from 1 to 5, where 1 – a significant decrease compared to direct competitors, 2 – a decrease, 3 – difficult to say, 4 – an increase, 5 – significant increase.
Source: personal studies

As noted above, innovation received the highest score among the components of entrepreneurial orientation. According to the content and scope, the following innovations are distinguished: product (creation of new products consumed in the field of production or consumption), environmental (new products and technologies that reduce environmental pollution, provide cleaning of harmful emissions, waste-free processing of raw materials, waste disposal, improving the sphere of life), technological (new ways of producing old or new products, new information systems), economic (innovations in financial or accounting spheres), social (the process of changing working conditions, cultural, environmental and political aspects, changing lifestyles in general), management (new methods of work used by the administration: the system of strategic planning, modelling of economic processes, personnel management). Respondents assessed the impact of the above types of innovations on enterprise development on a scale from 1 to 5, where 1 – invisible, 2 – insignificant influence, 3 – challenging to say, 4 – yes, affect, 5 – the impact is significant. The analysis of answers showed that the greatest impact on the development of the enterprise has technological (43.8% of respondents) and product (33.6% of respondents) innovations, the least environmental (7.7% of respondents) and social (6.3% of respondents).

3.3. Relationships between enterprise growth and entrepreneurial orientation

In the next stage, we investigated statistically significant relationships between enterprise growth and its entrepreneurial orientation. To assess this dependence, we used Pearson's Correlation Coefficient. We processed data with SPSS and get the following correlation matrix (Table 4).

The obtained results confirmed a statistically significant density of the relationship between the indicators of the analyzed structures.

We confirmed that in Ukraine, entrepreneurial orientation and enterprise growth are also factors that unite the variables identified and described by Avlonitis, G. J., & Salavou, H. E. (2007), Covin, J. G., Slevin, D. P. (1989), Covin, J. G., Wales, W. J. (2019), Dess G. C., Lumpkin G. T. (2005), Khandwalla, P. N. (1976), Rauch, A., Wiklund, J., Lumpkin, G. T., Frese M. (2009). At the same time, we found a significant correlation (significant at the 0.01 level) between risk and profit, proactivity and productivity. Furthermore, the correlation between innovation and productivity, autonomy, aggression and turnover (significant at the 0.05 level) is also essential.

Table 4

Correlations between variables on enterprise growth and its entrepreneurial orientation

		Proactivity	Innovation	Autonomy	Risk	Aggressiveness	Turnover	Employment	Profit	Productivity
Proactivity	Pearson Correlation	1								
	Sig. (2-tailed)	.								
	N	795								
Innovation	Pearson Correlation	.664**	1							
	Sig. (2-tailed)	.000	.							
	N	795	795							
Autonomy	Pearson Correlation	.657**	.559**	1						
	Sig. (2-tailed)	.000	.000	.						
	N	795	795	795						
Risk	Pearson Correlation	.779**	.774**	.654**	1					
	Sig. (2-tailed)	.000	.000	.000	.					
	N	795	795	795	795					
Aggressiveness	Pearson Correlation	.878**	.695**	.576**	.885**	1				
	Sig. (2-tailed)	.000	.000	.000	.000	.				
	N	795	795	795	795	795				
Turnover	Pearson Correlation	.432*	.349*	.430*	.294*	.334*	1			
	Sig. (2-tailed)	.014	.022	.019	.021	.009	.			
	N	795	795	795	795	795	795			
Employment	Pearson Correlation	.453*	.140	.211*	.315*	.119	.493*	1		
	Sig. (2-tailed)	.022	.065	.049	.033	.094	.029	.		
	N	795	795	795	795	795	795	795		
Profit	Pearson Correlation	.398*	.344*	.198	.473**	.272*	.762**	.712**	1	
	Sig. (2-tailed)	.013	.016	.084	.009	.026	.000	.000	.	
	N	795	795	795	795	795	795	795	795	
Productivity	Pearson Correlation	.511**	.492*	.384*	.212	.298*	.853**	.844**	.798**	1
	Sig. (2-tailed)	.000	.015	.039	.076	.019	.000	.000	.000	.000
	N	795	795	795	795	795	795	795	795	795

*. Correlation is significant at the 0.05 level (2-tailed)

**. Correlation is significant at the 0.01 level (2-tailed)

4. DISCUSSION

Small businesses play an essential role in our country's economy because they are an integral part of its socio-economic system. However, their normal development is possible only in a balanced system of state and legal measures. It is possible to promote the development of small enterprises only by combining different methods of regulation and support, the main of which are: financial and credit support; favourable tax policy; creation of a policy of structural changes, in order to harmonize the domestic economy with the standards of EU member states; optimization and acceleration of Ukraine's integration processes into world structures.

A significant problem is the low level of informatization processes and innovative technologies. Only every 4th enterprise in Ukraine made a gross capital investment, and among small enterprises - every 5th. Out of every 100, only 12-13 enterprises incurred expenses for informatization (and only eight among small enterprises). Only one of 287 enterprises (0.39% of the total business entities) incurred expenditures on technological innovations in 2016. For small enterprises, this indicator was one out of 982 (or 0.1%) (State statistical service of Ukraine, 2019).

COVID-19 pandemia in the whole world and Ukraine especially shows the fragility of old-style management with its accent on human resources, micro-operations, and search for ways to minimize taxes. Thus, IT as the component of entrepreneurial orientation can be an essential topic for future research on SMEs growth.

5. CONCLUSIONS

Highlights of the study are as follows:

– the studied innovative small enterprises are characterized by a strong entrepreneurial orientation of the all analyzed components, which may indicate that the entrepreneurial behaviour of these entities goes beyond existing management models;

– more than half of the surveyed enterprises over the past three years (2017-2020) recorded an increase in turnover, employment, profits and productivity, which could affect the development of these entities in various areas, including improving quality, introducing new management methods, production modernization;

– entrepreneurial orientation (as the combination of proactivity, innovation, risk, autonomy, competitive aggression) shows notable correlation with enterprise growth (as the combination of turnover, employment, profit and productivity);

– the main directions to improve management of Ukrainian small enterprise growth in connection with entrepreneurial orientation are profit and productivity advancing considering risk and proactivity issues; furthermore, managers should notice the correlation between innovations and productivity, autonomy, aggressiveness and turnover;

– analysis of the innovations types impact on the development of the enterprise showed that the most significant impact has technological innovations, particularly information technology.

Sustainable development of SMEs can be achieved by entrepreneurs themselves, without any government support. We can see many examples on the Ukrainian market, then small enterprises leading by managers with strong entrepreneurial orientation have excellent growth potential and are socially responsible. However, in crisis, SMEs feels undisputable risks and need some help to stay sustained. During pandemia, the Ukrainian government secures SMEs' financial risks, which arose due to quarantine constraints. We believe that this research can be helpful both to SMEs and the government as the basis for developing and changing policies on small business growth and innovations.

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Theoretical grounds of labour demotivation diagnostics in the light of eighth SDG[1]

Bohdan-Petro Koshovyi[*], *Ilona Petryk*[**], *Andrii Yevstakhevych*[***], *Ira Von- Nahy*[****]

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Abstract. The eighth SDG concerns decent working conditions. A crucial role in supporting this SDG has a sustainable business. In this article, we have considered labour demotivation in the light of the eighth SDG. We stressed the importance of improving the diagnostics system of demotivation of labour for companies that want to increase profits and be socially responsible. During the literature review, we found a lack of research on labour demotivation and diagnostics. Therefore, we analysed the diagnostic systems' composition and substantiated the main stages, criteria, and functions of the diagnostic system of labour demotivation. We also discussed the prospects of integrating demotivation diagnostics into the enterprise management system. The results of this study can be the basis for further empirical analysis of labour demotivation and can be helpful for internal HR policies improvement.

Keywords: sustainable development goals, eighth SDG, labour demotivation, HRM

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[*] Bohdan-Petro Koshovyi, PhD, Head of the Department of Demography, Labor Relations and Social Policy, Lviv University of Business and Law, Kulparkivska str., 99, 79021 Lviv, Ukraine, e-mail: qqbkqq@gmail.com (corresponding author), ORCID: https://orcid.org/0000-0001-8550-0028

[**] Ilona Petryk, DSc, Associate Professor, adiunkt, Faculty of Finance and Information Technology, University of Finance and Law, Czesława Tańskiego 5, 43-382 Bielsko-Biała, Poland, ORCID: https://orcid.org/0000-0002-2171-8180

[***] Andrii Yevstakhevych, PhD, lecturer, Department of Business Economics and Information Technology, Lviv university of business and law, Kulparkivska, 99, 79021 Lviv, Ukraine, ORCID: https://orcid.org/0000-0003-1058-5359

[****] Ira Von- Nahy, Dr. med., Fachärztin für HNO-Heilkunde, Chiemgauerstraße 144, 81549 München, Germany, ORCID: https://orcid.org/0000-0002-2748-7766

1. INTRODUCTION

Modern enterprises value their authority and worry about the impact they have on the environment. However, within the company can mature processes that will negatively affect the brand and market position. One of the threatening phenomena may be the demotivation of labour. The eighth goal of sustainable development (SDG) is to ensure sustainability. We seek to explore at a theoretical level the content, features and possibilities of identifying work motivation in a particular enterprise.

This study is important given the international importance of work and the related problems arising from work's social and psychological nature.

The main stages of development of the labour demotivatioт concept correlate with the progress of the motivation of human labour activity. The science of motivation in its development has gone through several stages (Tripathi, N., & Ghosh, V., 2017). In ancient times the motivation was performed mainly through violent rather than rewarding methods. Currently, motivation gets diverse forms, depending on owners and managers' knowledge and wishes.

A sustainable enterprise cannot function in current economic conditions without proper theoretical and methodological support for the construction of mechanisms for motivating employees (Bajo Sanjuán, A., González Álvarez, M., & Fernández Fernández, J. L., 2013). Human labour and labour motivation are the drivers of economic progress, the prosperity of the individual enterprise, and the economy. This recognized thesis has recently lost its weight due to macroeconomic instability, the complication of the financial condition of many enterprises due to the prolonged economic recession, which usually leads to a weakening of attention to the human factor (Tomlinson, J., 2011).

F. Herzberg, a scientist whose name is associated with the emergence of the doctrine of demotivation, noted the expected results of economic and social research using his theory (Herzberg, F., Mausner, B., & Snyderman, B. B., 2017). He drew attention to a study by R. Praxam, conducted in 1982 based on textile enterprises in Bombay. Research has shown that employees receive too little satisfaction from the content of work. Shortly after the study was completed, textile workers went on strike, and after a 21-month downtime, the state had to transfer the plants to state ownership. F. Herzberg noted that when an employee seeks pleasure solely in hygiene, he begins to strike or abandon motivators and leans towards hygienic factors. This thesis emphasizes the importance of an in-depth study of labour demotivation as a threat to enterprise security and sustainable development.

1.1. Literature overview

The problem of labour demotivation today remains poorly understood. Among the prominent scholars of the past, F. Herzberg addressed demotivation directly (except for this term). In almost every scientific work devoted to staff motivation, there is a mention of the two-factor theory substantiated by F. Herzberg. The popularisation of F. Herzberg's theory was facilitated by his position on a two-stage algorithm for forming an effective employee motivation system. First, it is necessary to eliminate demotivating factors and introduce or strengthen motivation (Juariyah, L., & Saktian, I. R., 2018). Nevertheless, despite considerable attention to his "two-factor theory of motivation", the problem of demotivation of labour is practically unexplored in current economic conditions.

Svietlov, BT, & Boldyriev, OP (2011), analysing innovative approaches to the formation of competitive labour market infrastructure, emphasise the need to consider the demotivation of labour as one of the critical issues.

At the present stage, scientists focus on solving such scientific problems as the essence of labour demotivation, staff demotivation and demotivators (Pera, R., Menozzi, A., Abrate, G., & Baima, G., 2021; Bukhari, H., Thaheem, MJ, Musarat, MA, Alaloul, WS, & Altaf, M., 2021; Yadav, M., & BaniAta, H., 2013). In addition, demotivation can be a specific state of personality that forces a person to misbehave under certain conditions (Ohlig, J. et al., 2021), thus distorting traditional behavioural patterns).

Very few researchers have directly considered demotivation. Bohdan, N.N. &

Mohylevkyn, E.A. (2004) formulated the author's understanding of the essence of demotivation. They identified the stages and the main detrimental consequences for the company due to the growth of demotivation processes. Dulzon AA (2010) considered demotivation in parallel with the need to ensure quality change management. He believed that mistakes in the implementation of organisational change lead to increased motivation. However, the term "demotivation" is used as the antithesis of motivation. Gligor, D. M., Pillai, K. G., & Golgeci, I. (2021) noted the urgency of increasing attention to motivation in today's globalisation and business informatisation.

In motivational management, the problem of demotivation processes is considered Nazaryshyn, R.O. (2003). He researched the motivation and demotivation of industrial personnel, substantiated the need to overcome demotivation processes to motivate the quality of work, and the feasibility of "anti-demotivation management" as a new management direction. For example, Riznyk, V. V. (2010) noted that if motivation is a process of inner awakening of a person to achieve goals, then demotivation can be described as a process resulting from a person's inner desire to act decreases. Diefenbach, S., & Müssig, A. (2019) described the shortcomings of control systems that lead to demotivation at the application level. Oyedele, L.O. (2013) described the process of demotivation at the organisational level and at the level of the HRM system research provided by García-Campayo, J., Puebla-Guedea, M., Herrera-Mercadal, P., & Daudén, E. (2016) and Carroll, V.P., Lee, H.L., & Rao, A.G. (1986). On the example of medical organisations, demotivation was studied by Szabo, S. et al. (2020). For group work, the problem of demotivation was considered by Eddy-U, M. (2015). Yadav, M., & BaniAta, H. (2013) described some demotivation factors. Factor analysis of certain aspects of demotivation was performed by Munir, R. I. S., & Rahman, R. A. (2016). Green-Demers, I., Bouchard, S., Forest, G., & Yelle, M. (2008) studied psychological aspects of demotivation. The connection between demotivation and sustainable development of the organization was revealed by Gab Allah, A. R., Elshrief, H. A., & Ageiz, M. H. (2020)

Researchers rarely consider demotivation as a threat to sustainable entrepreneurship. Therefore, it is likely that management staff will ignore the need to overcome the demotivation of work due to poor financial security or lack of appropriate qualifications (Kuruba, M., 2019). In conditions of limited scientific support, the problem of labour demotivation can be perceived by managers as an inconvenience that can be tolerated while funding is limited.

The lack of a systematic approach to the evaluation of demotivators is noticeable in scientific sources. We note the methodological inaccuracy in quoting several demotivators. Thus, leadership style, ignoring ideas and initiatives are demotivators characteristic of management and those manifested in external human behaviour, and therefore have a demotivating value (Weinberger, L. A., 2009). Lack of a sense of belonging to the company, a sense of personal and professional growth (Ghosh, S., 2010) are already internal demotivators of the employee, lack of resources - an external objective demotivator of the environment.

In our opinion, the lack of a classification of demotivating factors in combination with the lack of appropriate caution can lead to ignoring other important demotivators in the process of practice management. In the case when the manager does not know the categories (such as external or internal demotivators or long-term or short-term demotivators, et cetera), but specific examples of demotivation in the company over time may be a situation where known demotivators have been eliminated, and productivity does not increase due to the active action of unknown to the head demotivators (Wilkinson, A., Redman, T., & Snape, E., 1994).

Demotivation has a subjective nature and occurs under the influence of external and internal factors and negatively affects the desire, willingness, and ability of the employee to perform their duties and tasks and achieve organizational goals. Demotivation influences their acceptance decisions regarding one's position in the workforce, organization, change of place of work, committing illegal actions towards the organization or colleagues, provoking or participating in conflicts and other issues related to work (Gundry, L.K., Kickul, J.R., & Prather, C.W., 1994).

So, we asked the following research questions:

RQ_1: What is the content of the system of diagnostic demotivation of labour?

RQ_2: What are the main stages of diagnosis of labour demotivation?

RQ_3: What criteria and functions of the system of diagnostics of demotivation of work are essential?

2. METHODS

This article presents the results of theoretical research. We relied on the theory of motivation and took into account the general principles of personnel management and our own experience in this area. The source base was research on motivation and demotivation of work. This study has the following structure. First, we briefly described the importance of diagnostic systems for the enterprise. Then we revealed the stages of diagnosis of labour demotivation, which can become the system's backbone. We also described the criteria and functions of the system of diagnostic demotivation of labour, which will facilitate its faster implementation in the work of enterprises. Finally, we discussed the prospects of integrating demotivation diagnostics into the enterprise personnel management system for sustainable development.

3. RESULTS

3. 1. The content of the system of diagnostics of labour demotivation

Subjective features of personnel management in the context of enterprise management are the subject of many scientific discussions. However, to date, the transition from the objective plane of the controlled environment of entrepreneurial activity to the subjective dimension of labour relations is often accompanied by unjustified generalizations or excessive attention to some factors of labour behaviour to the detriment of others. At the same time, the study of labour demotivation as a threat to the enterprise's sustainable development cannot cover several subjective factors. After all, any objective actions of management can damage the motivation system and cause demotivation of work not because of their imperfections or lack of experience, skills, abilities of managers but in connection with how employees will react to these actions (Berger, I.E., & Mitchell, A.A., 1989).

Depending on the strategic guidelines of the enterprise, different models can be used. However, to substantiate the basics of forming a system for labour demotivation diagnostics, we should consider the existing scientific approaches to interpreting HR diagnostics. Thus, based on the study of Artiukh-Pasiuta, O. V. (2013), diagnosis is the process of studying the system's current state, establishing causal relationships between its elements, analysing and evaluating the system according to specific criteria, and identifying prospects for its development.

Diagnosis of the threat of demotivation of labour on explicit grounds is similar to the diagnosis of a crisis (Batorski, J., 2011). In our opinion, the purpose of the system of diagnostics of labour demotivation is to monitor demotivation processes and phenomena and manage them to prevent the growing threat to the economic security of the enterprise.

3. 2. Stages of diagnostics of labour demotivation

In the following, we will combine theoretical considerations into several essential stages in diagnosing labour demotivation.

I. Analysis of external and internal factors that provoke the emergence of demotivation of labour (Michaelson, C., 2005). At this stage in the arsenal of the researcher or manager should be the latest theoretical and methodological developments of both general diagnostic nature and information about the features of a particular system (enterprise) and its subsystems, which will adapt methods of collecting and analysing information to specific needs and resource potential of the enterprise (including financial and labour).

Analysing demotivation factors requires proper objectivity (Makridakis, S., Assimakopoulos, V., & Spiliotis, E., 2018). Obstacles of a subjective nature can question the reliability of the source information, which will affect the effectiveness of activities to overcome the demotivation of labour. Recognition of existing problems both at the macro level and in the internal environment is

often opposed by those who may have underestimated the phenomena of the objective world, which pose a real threat and cause labour demotivation. Overcoming this should be purposeful work both to build an independent system of analysis of objective phenomena and to overcome employees' resistance, in particular by changing the organisational culture in the direction of recognition and intensified work on their own mistakes.

At this stage, the information-analytical nature of the activity (Selart, M., Tvedt Johansen, S., Holmesland, T., & Grønhaug, K., 2008) necessitates the development of additional tools and its implementation, as well as the improvement of knowledge and skills. The analysis of the factors of the labour demotivation should include the elements of other information technologies to simplify management activities and improve its efficiency, which will not require significant additional resources.

Labour discipline is also essential (Liestiani, NL, Perizade, B., Hanafi, A., & Zunaidah, Z., 2019), namely the ability of responsible employees to analyse on time and in whole, not to ignore difficulties, to look for new ways to improve methods of analysis and presentation of the received information.

II. At the stage of identifying shortcomings and problems, there is an initial reassessment of ideas about the state of labour demotivation considering the data obtained at the first stage and preliminary information about the state of the enterprise. Of particular importance at this stage is the correct construction of the system of evaluation criteria, which will eliminate the subjective component and generally positively affect the entire diagnostic system.

Moreover, organisational culture becomes especially important (Martinez, E. A. et al., 2015). An objective attitude to the identified shortcomings is possible provided that all employees, without exception, treat their work responsibilities responsibly.

Elimination of shortcomings is a consequence of the purposeful improvement of the personnel management system of the enterprise in order to improve management, improve the socio-psychological, motivational climate, minimise inefficient use of time and resources of the organisation. Instead, problems often occur during the operational management of the enterprise and require tactical measures, making specific management decisions in a limited time (Khodadadi, A., Fakhari, P., & Busemeyer, J. R., 2017).

To identify shortcomings leading to labour demotivation, managers should compare the HR management system of the analysed enterprise and the industry leader. Detection of shortcomings that provoke the demotivation of work can be done based on cognitive maps, SWOT analysis, brainstorming, et cetera.

To identify problems inside the HR management, formal and informal indicators could be helpful. Formal indicators include those obtained by analysing the results of the enterprise, holding meetings, conferences, processing complaints and suggestions, analysing feedback on the enterprise. Informal can be assessed in personal communication with employees and consumers. So, the responsible employee should be hired depending on their communication skills.

III. At the stage of developing proposals to address the problems and shortcomings associated with the demotivation of labour again comes in handy the latest methodological apparatus, which should accurately assess the costs necessary to normalise the situation (eliminate or reduce demotivation) and their effectiveness (Conciarelli, A., 2014).

Appropriate proposals can be multifaceted and largely depend on such related factors as corporate culture, personnel policy, management styles traditionally adopted in the enterprise, and others. These factors must be taken into account because the best of the proposals may break down into inconsistency with traditional management ideas about approaches to solving the problem of work demotivation, based on deep experience and knowledge of all the intricacies of enterprise management (Rotemberg, J. J., & Saloner, G., 1993).

The best way of proposal making is to conduct a collective discussion of existing problems. Differences in worldviews and qualifications of different employees can be helpful to resolve issues that are beyond the competence of the manager who makes the final decision. However, building an effective

system of collective nomination and discussion of proposals is not an easy task and can be implemented only in the context of a democratic organisational culture.

The lack of communication channels at this stage threatens to increase the threat of demotivation of labour. Elimination of the proposals of ordinary employees, who often suffer the most from the demotivation of work, will not bring the expected result (Schwenk, C. R., 1995). Regarding organisational communications, there is a large amount of research in modern science.

At this stage, it is imperative to monitor the work of external consultants, if any, as their findings may often be inconsistent with the actual state of affairs in the company, which can lead to misinterpretation of ways, methods and means to reduce the threat of demotivation.

IV. The stage of making and implementing a management decision to solve the labour demotivation should be performed in close cooperation of all parties to the process (Owen, D., 2015). Although the diagnostic system is primarily a tool for providing the latest reliable information, it is the decision-making process that translates its functioning from the theoretical-informational to the praxeological plane, involving all employees in discussions of possible decisions. This approach is possible with the consistent democratisation of the process. Furthermore, this approach will avoid an essential obstacle in overcoming the demotivation of labour - the lack of communicative support for decision-making and implementation.

At the same time, the democratisation of the decision-making process on specific aspects of the threat of demotivation of labour and its overcoming should not mean collective responsibility. However, the implementation of the individual decision of the head is greatly simplified if it is agreed and supported by the majority of staff and consumers of educational services (Simon, H. A., et al. 1987).

Inseparable from the decision-making process is the process of their implementation, which is why we considered it appropriate to combine these two processes into a single stage. The transition from theorising to the practical implementation of measures to overcome the demotivation of labour is a prerequisite for strengthening the economic security of the enterprise (higher education institution) in the field of personnel management.

The stage of decision-making and implementation does not finalise the diagnostics but leads to a new round. Indeed, a diagnostic system that does not function continuously and cyclically cannot be considered suitable for solving highly complex problems that arise in the field of labour demotivation as a threat to the economic security of the enterprise.

3. 3. Criteria and functions of the labour demotivation diagnostics

The system of diagnostics of labour demotivation as a threat to sustainable development should consider several diagnostic criteria. Such criteria we propose to include:

– the company's attitude to the risk group in the field of personnel safety;

– the level of economic security of the enterprise;

– the value of the personnel safety indicator;

– actual resources for threat prevention;

– rescue reserves in case of threat;

– the level of attracting additional resources to overcome the threat;

– the effectiveness of rescue management.

The diagnostic system should perform several functions (Turner, J. R., 2006). We distinguish the most critical functions: informational, analytical, guiding, identification, warning, regulatory, consulting. Of these functions, when it comes to the threat of demotivation of labour, the most important seems to be a warning.

The priority of the preventive function follows from the purposeful nature of the system for diagnosing the threat of labour demotivation. Ensuring the proper performance of the warning function by the diagnostic system cannot occur without the implementation of other functions. Thus, the information function allows the person responsible for decision-making on a particular path of development of processes that can be reborn in demotivation to receive information

about the current state of affairs in the enterprise and quickly navigate in a changing environment.

The role of the information function in preventing the threat of demotivation of labour is prominent. Without accurate information about the current state of affairs, it is difficult to objectively assess the existing risks and take the necessary measures to prevent the threat. Therefore, the information function is supplemented by analytical. Such an addition is especially relevant when a large amount of information needs to be appropriately evaluated to make the necessary decision. The analytical function in the diagnostic system can be formally assigned or performed directly by the person who makes decisions based on the obtained data.

With the growing number of employees, the complexity of technical and technological production processes, the formal consolidation of the analytical function, taking into account the universal method of information analysis is inevitable because spontaneity, subjectivity in the analysis of diagnostic information can lead to different decisions and disharmony in the operation of individual departments. However, in the process of such transformations, we should not forget about the consistency and harmony of the diagnostic system.

Within the analytical function of particular importance is a well-formed arsenal of indicators and indicators, which are used to assess the information coming into the diagnostic system. The indicators and indicators of the diagnostic system are connected with its function as identification.

The identification function of the diagnostic system can apply in general to all threats when it comes to the sustainable development of the enterprise. In fact, in the process of implementing this function, individual threats and probabilities are identified, as well as the severity of the consequences and the cost of overcoming their occurrence. A diagnostic system that deals with only one significant threat should provide a clear answer to whether the events fall under the general picture of the demotivation process.

Given the above and monitoring the practice of managing a private higher education institution, we note that the construction of a quality system for diagnosing demotivation of labour and its effective functioning largely depends on the effectiveness of the personnel management system in general. Thus, diagnostic systems created for purposes other than detecting the threat of work demotivation (diagnostics of quality, staff efficiency, performance indicators, et cetera) simplifies the task of building an effective system for diagnosing work demotivation. At the same time, the diagnosis of demotivation can not arise by itself in isolation from the strategy of personnel management in the enterprise. In ensuring the overcoming of the threat of demotivation of labour, it is expedient to profess not a revolutionary but an evolutionary path. Staffing the process is also essential.

Given the ultimate goal of business management with a view to sustainable development, a diagnostic system that protects against the threat of demotivation of labour must be integrated into other subsystems of enterprise management.

4. DISCUSSION

We consider prospects for further integration of the demotivation diagnostics through a generalized perception of the enterprise's sustainable development strategy. In the context of overcoming a wide range of threats that arise in doing business, ignoring the demotivation of labour is unacceptable. At the same time, the system of diagnosing the threat of labour demotivation may be suitable for diagnosing related threats (related to labour regulation, labour discipline, social and labour relations). Furthermore, as it develops, this system will become suitable for diagnosing threats related to personnel management and other spheres of enterprise management (finance, marketing, production, technical and technological spheres, et cetera).

In addition to "geographical" integration (with other diagnostic systems), improving the diagnosis of demotivation of labour involves strengthening the identification of the objective patterns of deterioration of economic security of the enterprise in connection with demotivation and subjective. In the unity of the objective conditions of management and the subjective world of the employee, it is possible to achieve much better results in overcoming the threat of demotivation of labour.

Thus, in the end, the system of diagnosing labour demotivation in its implementation can provide solutions not only to current problems of reducing the quality of education due to the threat but also to provide a systemic effect, which is another argument in favour of its implementation in enterprise management.

Limitations

This research is theoretical and aims at popularizing the research in the field of labour demotivation. Therefore, the implementation of these recommendations should be carried out after their empirical verification.

5. CONCLUSIONS

In this study we proved that the system of diagnosis of the threat of labour demotivation should focuse on the assessment of objective processes and phenomena of the real world and the subjective world of the employee. Thus, this study demonstrates the existence and relevance of two approaches to overcoming labour demotivation as a threat to the economic security of the enterprise on the path of sustainable development. The first approach is subjective and is based on assumptions about the dynamics of the internal structure of employee motives, changes in their weight following changes in environmental conditions and the decisive influence of internal motives on employee behaviour and thus - the quality of work that determines the eighth goal of sustainable development. The second approach is objective and is based on causal links between external influences on employee behaviour and changes in this behaviour. It does not exclude internal motives but primarily considers their manifestation in the employee's actual behaviour. Comparing the obtained results with the existing developments in enterprise management, personnel, labour, we conclude that these two approaches are entirely consistent with current trends in attempts to explain the labour behaviour of employees and the peculiarities of its change and impact on it by managers.

The results of this study may be the basis for further empirical research on labour demotivation and valuable for the development of internal policies for enterprise development to achieve the eighth goal of sustainable development.

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Current challenges for sustainable forestry management in Ukraine: production, taxation and investments issues

Orest Furdychko[*], Oksana Drebot[**], Oleg Yaremko[***], Volodymyr Bondar[****], Mariya Vysochanska[*****], Lyudmila Sakharnatska[******]

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Abstract. Ukraine's forestry has been experiencing systemic political, economic, social, and environmental problems for many years. This article aims to find new ways to balance production, taxation, and forestry investment to ensure sustainable development. We sought answers to three main questions: Does the modern mechanism of state regulation and forestry financing in Ukraine meet sustainability requirements? What changes will the critical problems of forest ecosystems arise in Ukraine in the long run? What are the prospects for the development of investment in forestry in Ukraine? To answer these questions, we conducted exploratory analyses of taxation and investment in forestry management. Then, we developed a multifactorial forecasting model to predict forest ecosystems' restoration state by 2035. Using the model, we characterized the relationship between ecological and economic factors for reforestation in the border regions of Ukraine. Finally, we analyzed the coefficients of forest capacity, yield and dynamics of afforestation. According to the results, we proposed: 1) to separate the functions of standard-setting and forest inventory from the function of forest land management; 2) to separate the function of economic activity and control over the implementation of forestry development plans; 3) to stimulate public control and increase effective monitoring of anthropogenic load, forest use and rehabilitation; 4) to improve the organizational and institutional management mechanism as a component of forest production which is the key to improving the forestry sustainability.

Keywords: sustainable forestry, forestry management, forestry production, taxation, investments

[*] Orest Furdychko, Doctor of Economics, Doctor of Agrarian Sciences, Professor, Academician of NAAS of Ukraine, chief researcher department of landscape protection, biodiversity conservation and nature protection Institute of Agroecology and Environment management of NAAS, 12 Metrological Str., 03143 Kyiv, Ukraine, ORCID: https://orcid.org/0000-0002-1108-7733

[**] Oksana Drebot, Doctor of Economics, Professor, Academician of NAAS of Ukraine, Director of Institute of Agroecology and Environment management of NAAS, 12 Metrological Str., 03143 Kyiv, Ukraine, ORCID: https://orcid.org/0000-0003-2681-1074

[***] Oleg Yaremko, PhD in Economics, Ternopil Oblast Department of Forestry and Hunting, 5a Bagataya Str., 46008 Ternopil, Ukraine, ORCID: https://orcid.org/0000-0003-4619-0527

[****] Volodymyr Bondar, PhD in Economics, Institute of Agroecology and Environment management of NAAS, 12 Metrological Str., 03143 Kyiv, Ukraine, ORCID: https://orcid.org/0000-0002-1531-3208

[*****] Mariya Vysochanska, PhD in Economics, Deputy Director for Research and Innovation, Institute of Agroecology and Environment management of NAAS, 12 Metrological Str., 03143 Kyiv, Ukraine, e-mail: mariya_vysochanska@ukr.net *(corresponding author)*, ORCID: https://orcid.org/0000-0003-2116-9991

[******] Liudmyla Sakharnatska, PhD in Economics, Deputy Dean for Educational Work of the Faculty of Economics, Uzhgorod National University, Universytets'ka St, 14, 88000 Uzhhorod, Ukraine, ORCID: https://orcid.org/0000-0002-5863-4917

1. INTRODUCTION

One of the Sustainable development goals is to ensure sustainable forests management (United Nations, 2015). This goal concerns biodiversity and the ability of governments to ensure effective policies, particularly in the area of sustainable forestry (Sobkowiak, M., Cuckston, T., & Thomson, I., 2020).

Today in the forest sector in most regions of Ukraine, the state of forest ecosystems does not meet environmental and economic standards. Therefore, the balanced use of forest resources requires a forest management organizational and institutional system, which involves the market transformation of the forest industry. Under such conditions, for the development of a market economy at the stage of its formation, it is necessary to increase the efficiency of forest ecosystems, improve the quality of forest products, the competitiveness of domestic timber producers, increase revenues from the market of forest products, replenish the State and local budgets for development forest and other sectors of the economy.

Every year both the initiative and the support of the state for forestry production decrease, but the tax burden increases, the number of working capital decreases, the price of forest products decreases, credit conditions become inaccessible to most enterprises. Every year both the initiative and the support of the state for forestry production decrease, but the tax burden increases, the number of working capital decreases, the price of forest products decreases, credit conditions become inaccessible to most enterprises. Erler, J. (1997) rightly noted that processes in forestry are usually not sustainable, for their assessment should be considered in addition to economic factors, environmental, social and ergonomic "compatibility". Similarly, Johansson, J. (2018) emphasized the growing demand for interdisciplinary research on sustainable forestry from the standpoint of social sciences, natural resources policy and practical management. Rout, S. (2010) substantiated the institutional approach in the study of forest management but, at the same time, stressed that institutions alone are not always sufficient to achieve sustainable results. Finally, we agree with Burt, G., Mackay, D., & Mendibil, K. (2021), who emphasized: "Land, forest and forestry policies continue to evolve and economic, social and environmental challenges are emerging in response and opportunities".

The problems as mentioned above provides the necessity of ensuring a balance of both forestry and forestry production with the use of economic, ecological, social and legal components in market conditions:

– the economic component aims to assess the financial and economic potential of forestry enterprises; it has to reflect a systems approach if we pay attention to the essence of effective management. The structure of this approach should include such elements as mission, objectives, evaluation criteria of the objectives within its target block. In the context of the functional block, it should include planning and organization of activities, accounting and control of achieved results;

– the ecological component aims at increasing the ecological potential of forest ecosystems; increasing their resistance to negative natural influences and technogenic load; introduction of a fee-based forest use instrument, which will be based on normative legal acts;

– the social component aims at maintaining the infrastructure in the settlements located in the wooded area; consideration of the social consequences of forest planning and management process;

– the legal component aims at improving environmental legislation and environmental standards in the process of economic reform.

This paper aims to clarify the links between sustainable forest management, taxation, investment, and institutional transformation.

1.1. Literature Review

The issue of sustainable forestry is interdisciplinary and has a broad background. Gillespie A. J. R. (2017) points out that forestry is an interdisciplinary industry that combines environmental, economic and social dimensions. The science of sustainable forestry has been developing since the mid-1960s in parallel with the anthropocentrism establishing and the sustainable development emergence (Brown, P., Pröbstl-Haider, U., & Koch, N. E., 2016). Sahide, M. A. K., et al. (2020)

emphasized that governments worldwide promote social forests as part of their stated commitment to sustainable development and social justice.

However, Uibrig, H., Hilbrich, A., & Hutter, G. (2014), studying the current forest management practice against the background of the broad problem of rural land management, noted the spread of a technocratic approach the presence of concomitant problems of sustainable development. Insufficient orientation of forestry on the principles of sustainability has been known since the 90s. In 1993, Saxena, K.G., Rao, K.S., & Purohit, A.N. noted gaps in sustainable forest development standards related to the opposition of economic and environmental interests (Saxena, K.G., Rao, K.S., & Purohit, A.N., 1993). Wood, P. J. (1996) also stressed the importance of institutional transformations to disseminate good forest management standards for a particular country. Over time, the idea of sustainable forestry gained momentum, and already in 2008, Wintle, B.A., & Lindenmayer, D.B. emphasized that more than 200 million hectares of forest in the world are certified as harvested in compliance with the principles of sustainability (Wintle, B.A., & Lindenmayer, D.B., 2008).

The idea of sustainable forestry is now quite popular. Douglas Brodie, J. et al. (2016) explain this idea as "forest management to meet society's current needs for forest resources… without compromising their accessibility to future generations". Boyle, J. R., et al. (2016) share the same view and emphasize the importance of creating and maintaining sustainable forests and developing recommendations to overcome uncertainty about sustainable forestry.

Evaluation and monitoring of sustainable forest management policy are necessary conditions for long-term conservation and sustainable development of forest ecosystems and resources Montgolfier, J. de. (1999). At the same time, Vierikko, K. et al. (2010) emphasized that the selection of indicators assessing forestry's sustainability always depends on the socio-cultural context and biogeographical factors.

Cooperation between the state, organizations and local communities is vital for sustainable forest management (Pokharel, R. K., et al., 2015). Johansson, J. (2018) noted that achieving sustainable development in forest management systems depends on the state's initiation of cooperation processes and various voluntary initiatives.

The financial analysis of forestry in Ukraine from a sustainable approach was carried out by Ievdokymov, V. et al. (2021). However, their conclusions apply to a greater extent to forestry enterprises. Unfortunately, researchers of financial aspects of forest management are often abstracted from issues of sustainable development.

Fiscal policy towards forestry should be dynamic, responsive to market and technological changes (Hansen, C.P., & Lund, J.F. (2018). Lund, J.F., et al. (2014) explored the issues of beneficiaries of forest taxation and some social aspects Chhetri, B.B.K., Lund, J.F., & Nielsen, Ø.J. are insignificant compared to the personal benefit of households, which showed limited potential for redistribution of benefits within the current taxation system.

In the example of Western Australia, Nery, T. et al. (2019) studied the transformation of approaches to investment in forestry and the impact of tax benefits on the implementation of development policies. West, T. A. P., et al. (2021) emphasized the riskiness of investing in forestry and justified ways to reduce risks by diversifying forestry regimes.

Hardaker, A. (2018) justified the significant role of government support for forestry investment subsidies due to the weak influence of markets on the creation of new forests. Ludwig, A. et al. (2021) focused on the link between public policy, social innovation and investment to address social issues related to forestry.

For forest management in market conditions, in addition to reliable information on the availability and status of use of forest ecosystem components, it is necessary to have a system of assessment indicators that would characterize the level of financial regulation and take into account destructive ecological and economic changes in the forest sector.

We ask three main research questions that we will try to solve in this paper:

RQ_1: Does the modern mechanism of state regulation and financing of forestry in Ukraine meet sustainability requirements?

RQ_2: What changes will the critical problems of forest ecosystems arise in Ukraine in the long run?

RQ_3: What are the prospects for the development of investment in forestry in Ukraine?

2. METHODS

The theoretical basis of the research consists of fundamental provisions of economic theory, system theory, the economics of natural resource use and environmental protection. In addition, we took into account the works of domestic and foreign scientists on environmental, economic mechanisms for managing forest products based on market economy protection.

First, we investigated the structure of forestry financing in Ukraine. Second, we conducted exploratory analyzes of taxation and investment in forestry management. We determined the tax burden on the enterprises of Regional Forest and Hunting Departments of Ukraine on forestry land with open data. We have described the legal framework for state regulation and financing of forestry in Ukraine. Further, we developed a multifactorial forecasting model to predict the state of forest ecosystems restoration by 2035. Using this model, based on data from the State Statistics Service of Ukraine, we characterized the relationship between ecological and economic factors for reforestation in the border regions of Ukraine. Finally, to assess the prospects for investment in forestry in Ukraine and analyzed the coefficients of forest capacity of forest products and forest yield of forest products and dynamics of afforestation cost coefficients and cost-effectiveness of forest fire protection.

Conducting the research, we used the following research methods:

– an economic and statistical method (the processing of statistical data in assessing the quantitative dependence of various phenomena and the production of forest products)

– methods of correlation and regression analysis (the study of the impact of forestry activities)

– the mathematical modelling (the establishment of the optimal production and industry structure of forest enterprises)

– the abstract and logical method (the theoretical generalizations and formation of conclusions)

3. RESULTS

The high efficiency of forestry management is to ensure profitability in using all resources and valuable properties of forest ecosystems. However, effective management of this process is impossible without fiscal policy as a means of financial regulation of the economy, including forestry, which is carried out through economic levers (taxes and public expenditures), i. e. through their transformation and effective use (Furdychko O.I. et al. 2019).

As we see from Table 1, a part of the payment of taxes is charged for the particular use of forest resources to the State Budget from 2010 to 2019. Therefore, every year it tends to increase by 253.3 million UAH.

Table 1

Dynamics and structure of financing of state enterprises of the State Agency of Forest Resources of Ukraine for 2010–2019

Indicator	Years								Deviation +/-
	2010	2012	2013	2015	2016	2017	2018	2019	
Expenditures									
The State Agency of Forest Resources of Ukraine, total, million UAH	613,60	657,22	695,59	462,14	137,45	219, 64	274,10	327,69	-285,92
Share in the State Budget, %	*0,199*	*0,159*	*0,166*	*0,079*	*0,021*	*0,028*	*0,029*	*0,032*	*- 0,167*
Including forestry, million UAH	374,93	602,20	640,57	412,72	79,85	123,94	132,85	145,48	- 229,45
Share on forestry, %	*61,1*	*91,63*	*92,09*	*89,31*	*58,09*	*56,40*	*48,40*	*44,30*	*- 16,80*
Consumption, million UAH	503,21	530,77	119,36	115,98	126,74	186,96	256,52	271,05	- 232,16
Share, %	*82,01*	*80,76*	*17,16*	*25,10*	*92,21*	*85,10*	*93,50*	*82,70*	*0,69*
Development, million UAH	110,38	126,45	576,23	346,16	10,71	32,68	17,57	15,93	- 94,45
Specific weight, %	*17,99*	*19,24*	*82,84*	*74,90*	*7,79*	*14,80*	*6,40*	*4,86*	*- 13,13*
Revenues									
Rent for special use of forest resources to the State budget, million UAH	156,60	182,50	201,00	334,80	431,40	461,90	541,60	409,90	253,3
Share in the State budget, %	*0,061*	*0,049*	*0,057*	*0,089*	*0,083*	*0,075*	*0,058*	*0,040*	*- 0,021*
Rent for special use of forest resources to the local budget, million UAH	14,00	82,40	105,50	212,90	309,20	456,00	480,60	748,50	734,50
Share in the local budget, %	*0,020*	*0,093*	*0,114*	*0,239*	*0,257*	*0,267*	*0,182*	*0,198*	*0,178*
Taxes and contributions paid to the Consolidated Budget, million UAH	1151,50	1372,20	1498,60	1972,70	3159,60	4207,90	6211,50	6245,60	5094,10
Share of tax payments and contributions, %	*0,378*	*0,317*	*0,349*	*0,444*	*0,485*	*0,538*	*0, 576*	*0,583*	*0,205*

Source: calculated by the authors according to the laws on the State Budget of Ukraine (2010–2019) and data of the State Agency of Forest Resources of Ukraine.

The rent for the special use of forest resources has rapidly increased by 734.5 million UAH to the local budget compared to 2010. Likewise, the payment of taxes and contributions has increased by 5,094.1 million UAH to the Consolidated Budget. Thus, all the indicators have a positive trend of increasing revenues to the State and Consolidated Budgets; this made it possible to identify revenues and expenditures during the study period. Nevertheless, the most significant of them, represented in Table 1, is the development and management of forestry and taxes, which the financial and social position of economic entities of the State Forest Agency of Ukraine depends on.

According to the analysis, it is necessary to consider aspects of the impact on production, namely: climatic, weather and relief ones. Therefore, taxes and fees should be correlated for forest management so that the more unfavourable the climatic conditions, the lower the tax burden (Figure 1).

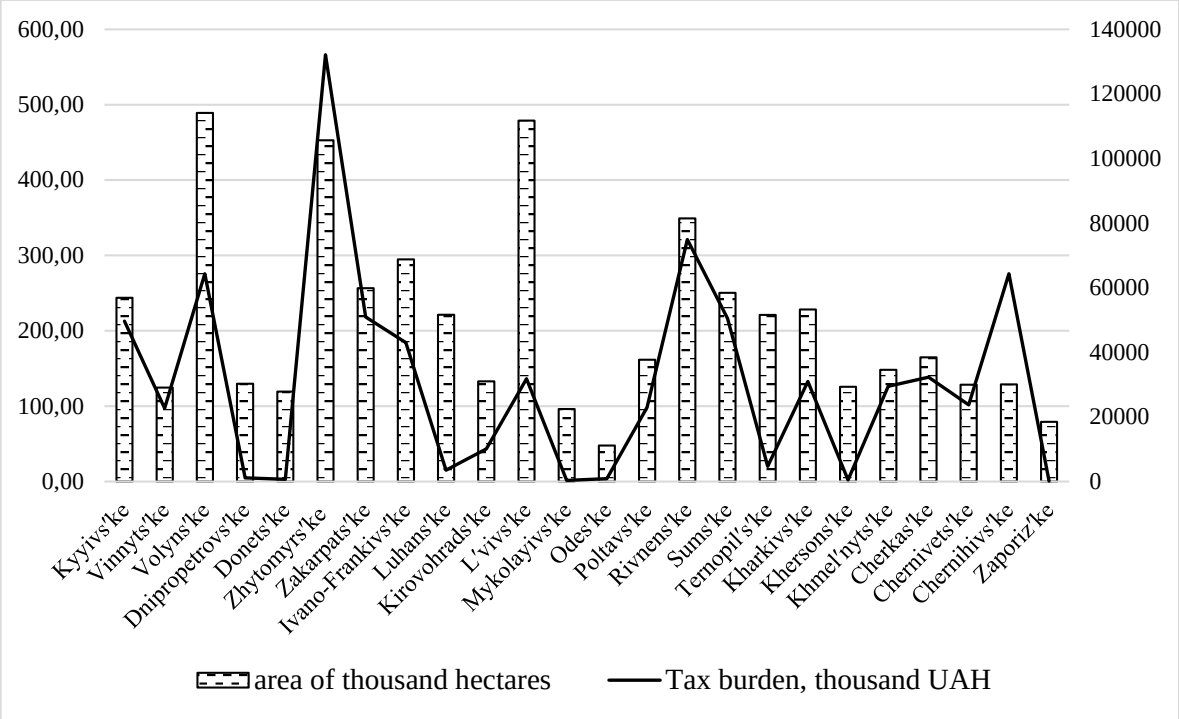

Figure 1. Dynamics of the tax burden of the enterprises of Regional Forest and Hunting Departments of Ukraine on forestry land for 2019

Source: calculated by the authors.

The central part of the taxes of the forestry enterprise is the only social contribution, which is the lion's share of budget revenues not only in Ukraine but also in the Steppe, Forest-Steppe, Polissya and Carpathian areas. The rent for the particular use of forest resources is on average 29.8 % for Ukraine; the value-added tax is 20.6 %; the corporate income tax is 6.3 %; personal income tax is 15.4 %. A particular part of the tax is on salaries, which companies pay for full-time employees. On the other hand, such a tax as rent for the special use of forest resources stimulates the efficient, rational, and environmentally balanced use of forest resources. Since 2015 there have been positive changes when the State Budget of Ukraine received all revenues from forestry enterprises. It is a change in the regional direction to centralized funds (Dulik, T.O. and Aleksandriuk, T.Yu. 2016).

According to M.V. Rymar and H.Ya. Il'nyts'ka-Hykavchuk, one of the main reasons for the irrational use of forest resources is the imperfection of the financial mechanism, the lack of investment in reforestation and other environmentally oriented measures. Therefore, as forestry carries out environmental activities and forest resources produce positive internal and external effects, stimulating forest management should be included to provide the

industry with the necessary financial resources as part of the financial mechanism (Il'nyts'ka-Hykavchuk, H.Ya. and Rymar, M.V. 2006).

Measures that increase productivity and improve the quality of forests, their protection, conservation, and reproduction are financed from the State Budget and the resources of enterprises, institutions, and organizations. According to Yu.V. Volynchuk and I.V. Bakalejko, an essential element of increasing financial flows to forestry enterprises is the establishment of a regional fund for reproduction, protection and conservation of forests, which can simplify the movement of financial flows in some way following their purpose (Volynchuk, Yu. V. and Bakalejko I.V. 2014).

The primary sources of financing for forestry development are State and local forest users' budgets and other sources, including international organizations and foreign investors. According to article 98 of The Forest Code of Ukraine (The Forest Code of Ukraine, 1994), expenditures on increasing productivity, improving the quality of forests, their reproduction and protection are financed from the State Budget and the own resources of enterprises, institutions and organizations of forestry and forest production. Expenditures on increasing productivity and improving the quality of public and communal forests, their protection, conservation and reproduction are financed through the earmarking of funds from the State and local budgets to implement State and regional (local) forestry programmes. Today, attracting investments has been minimal, as the state has not created appropriate conditions for the formation of institutional support for attracting investments of foreign governments, domestic financial credit, and business structures.

We have selected ecological and economic indicators such as investments in the rational use of natural resources, environmental tax, gross regional product, restoration of forest ecosystems to calculate the forecast multifactor model, which provides for the relationship between the ecological and economic system of forestry development (Table 2). The forecast model makes it possible to assess the impact of investment on the rational use of natural resources to restore forest ecosystems. A multifactorial forecasting model was built based on statistical indicators to determine the correlation, which predicts the state of restoration of forest ecosystems by 2035.

As shown in Table 2, the investments in the rational use of natural resources (thousand USD) increased in 2017 compared to 2000 by 45.3%, the environmental tax increased by 65.6%.

There is a high correlation between the proposed criteria and the efficiency of forest reproduction, which depends on several factors. Firstly, the time dependence: a forest has a natural reproduction property in the absence of external factors; secondly, the forest reproduction also depends on the investment in natural resource use, the environmental tax and gross regional product (GRP). The high level of correlation makes it possible to assume that the given data can be used to build a predictive model using linear multifactor regression, which characterizes the ecological and economic parameters. As a result, the equation was constructed:

$$Y = k_1 \cdot cor_1 \cdot T + k_2 \cdot cor_2 \cdot ln(I) + k_3 \cdot cor_3 \cdot ln(E) + k_4 \cdot cor_4 \cdot ln(V) + k_5, \quad (1)$$

where Y – reforestation, thousand hectares; T – time in years; I – investments in the rational use of natural resources, thousand USD; E – environmental tax, thousand UAH; V – GRP, thousand UAH; cor_1 – cor_4 – correlation coefficients selected by correlation analysis; $k_1 - k_4$ – model weight coefficients; k_5 – compensating component.

Table 2

Statistical data of Ukraine for the construction of a forecast model for the restoration of forest ecosystems, thousand hectares

Criteria	Years												2000-2017
	2000	2005	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
Investments in the rational use of natural resources, thousand USD	5587,41	7941,59	12584,49	6562,93	4465,02	5246,58	3160,83	4487,45	2872,03	1516,48	910,97	1065,17	4522,24
Environmental tax, thousand UAH	2634,03	5060,36	21069,18	17484,24	17464,83	41493,83	25297,79	39721,58	41869,41	44556,03	60217,91	64441,92	6 807,89
Reforestation, thousand hectares	2336,33	3430,16	4308,91	4019,5	3417,5	3623,16	3830,42	3919,58	3724,083	4122,5	4252,42	4668,58	2332,25
Gross regional product, thousand UAH	3611,83	10081,42	20935,58	20970,17	24508,92	30130,75	34313,67	35489,00	40792,25	52963,5	62958,75	67625,50	64013,67

Source: formed by the authors based on the statistical data (State Statistics Service of Ukraine 2017, Statystychnyj schorichnyk Ukrainy za 2018 rik, *2019*).

The least-squares method (LSM) was used to find the values of the coefficients. This method takes as an estimate of the parameter values that minimize the sum of the squares of the residuals for all observations:

$$\hat{k} = \arg\min_{\beta} \sum_{i=1}^{n} \left| y_i - \beta_0 - \sum_{j=1}^{k} X_{ij}\beta_j \right|^2, \quad (2)$$

where $\hat{k}$ – the vector of estimates of the values of the parameters $(k_1, k_2, \ldots, k_M)$; y_i – data that are evaluated; X_{ij} – input data (*Mayboroda, R. 2007*).

Using the least-squares method, the weight coefficients and the compensating component are calculated based on the initial data. After substituting them into the formula, we obtain the equation:

$$Y = 237461 \cdot T + 840382 \cdot ln(I) - 399929 \cdot ln(E) - 478082 \quad (3)$$

We established the relationship between ecological and economic factors for reforestation in the border regions of Ukraine. Furthermore, we found the correlation of the reforestation indicator (thousand hectares) according to the following indicators: investments in the rational use of natural resources, environmental tax, gross regional product. According to the model estimations, if current forest regeneration trends continue, investments in natural resource management will gradually reduce, and the ecological tax will rise to 88,790 thousand UAH in 2035. Therefore, the developed model makes it possible to predict the restoration of forests (thousand hectares) in the border regions by 2035 (fig. 3).

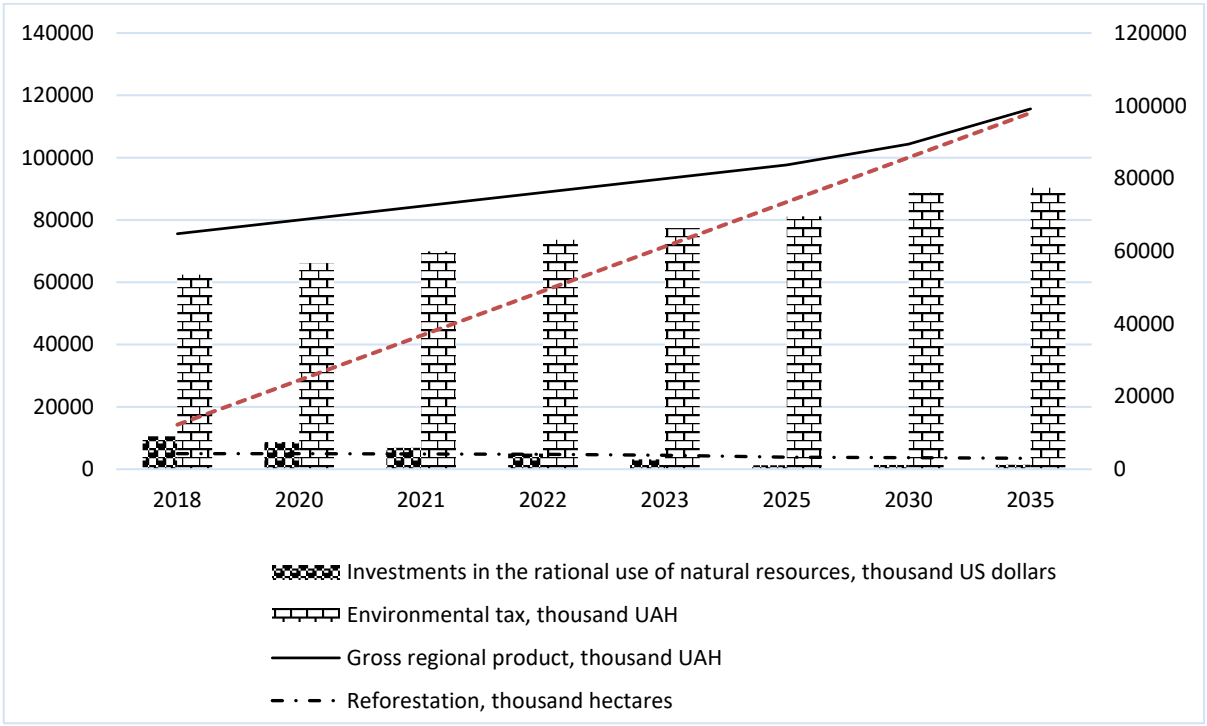

Figure 3. Construction of forecast indicators for the restoration of forest ecosystems

Source: calculated by the authors based on statistical data (Statystychnyj schorichnyk Ukrainy za 2018 rik, 2019 and Official site of the State Statistics Service of Ukraine, 2019).

When investing, one should consider the integrated impact of investing in the regeneration of forest resource potential. Unlike other sectors of the economy, forestry produces significant positive ecological and social effects, which can significantly exceed the economic effect. Thus the forest industry is significant for society in creating favourable living conditions, the positive impact of forests on the environment, et cetera (Zakon Ukrainy, 2004).

Torosov, A.S.; Zhezhkun, I.M.; Zuiev, Ye.S., (2011), studied the diagnosis of the financial condition of forestry enterprises, focus on the following indicators: liquidity and solvency (total coverage ratio, quick liquidity ratio, absolute liquidity ratio, estimated solvency ratio); financial stability (coefficient of concentration of own capital, coefficient of financial dependence, coefficient of the structure of attracted capital, coefficient of long-term attraction of borrowed funds).

Tkachiv, S.M. and Nykytiuk, P.A., (2017), analyzed the financial and economic indicators of forestry, using quantitative indicators, in particular: the total area of land in use and the area of deforestation; the volume of forestry products; the forest reproduction area; the financial and economic indicators (the volume of sales of forestry products; the funds directed to forestry).

Nestoriak, Yu.Yu. (2009), analyzing the economic efficiency of forestry activities uses the following indicators: the cost of felling; the revenues and labour efficiency in forestry; the effect of forest growing. However, all the mentioned approaches do not consider the specifics of the forestry enterprise and do not determine the qualitative indicators of its activities.

A particular disadvantage is that the available sources of information do not cover statistical data for the calculation or analytical evaluation of forestry and production activities. However, in our opinion, it helps analyze such indicators indicated in Table 3. After all, the analysis of harvesting of forest products involves evaluating the fulfilment of harvesting activities by the forestry enterprise.

Table 3

Systematization of forestry production indicators

Group of coefficients	Indicator
The coefficient of produced forest products	Volume of harvested liquid wood, m3. Actual deforestation, hectare Tax burden, thousand UAH
The coefficient of forest capacity	Volume of harvested liquid wood, m3. Actual deforestation, hectare
The coefficient of the tree *yield* of restoration of forest plantations	Actual volumes of harvested wood, m3. Reforestation of permanently managed forests, hectare
The coefficient of relative annual growth of wood	Volume of harvested liquid wood, m3. Reforestation of permanently managed forests, hectare
The coefficient of conservation of the nature reserve fund	Reforestation of permanently managed forests, hectare Afforestation on permanent used lands, hectare Deforestation and reforestation, hectare
The coefficient of expenditures on the protection of forest ecosystems	Volume of forest products (works, services), million UAH Forest fire protection, hectare
The coefficient of expenditures on afforestation	Afforestation on permanent used lands, million UAH Volume of forest products (works, services), million UAH
The coefficient of reforestation of forest plantations	Volume of forest products (works, services), million UAH Reforestation of permanently managed forests, hectare

Source: formed by the authors.

Through the correlation analysis, we have researched the extent of correlation between the indicators of forest capacity and forest yield of forest products using a linear graph. As a result, the share of variation in forest capacity tends to increase. The equation of this linear trend has the form y = 0,9248x-1828. The reliability of the approximation is R^2 = 0.546 (fig. 4).

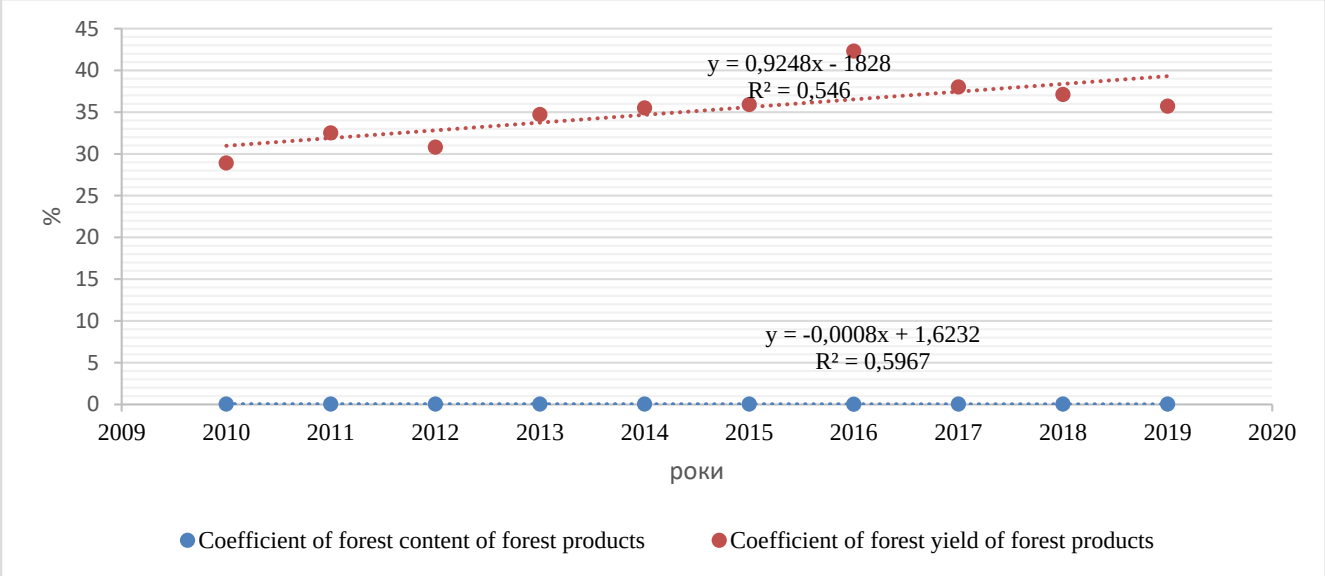

Figure 4. Dynamics of coefficients of forest capacity of forest products and forest yield of forest products

Source: formed by the authors.

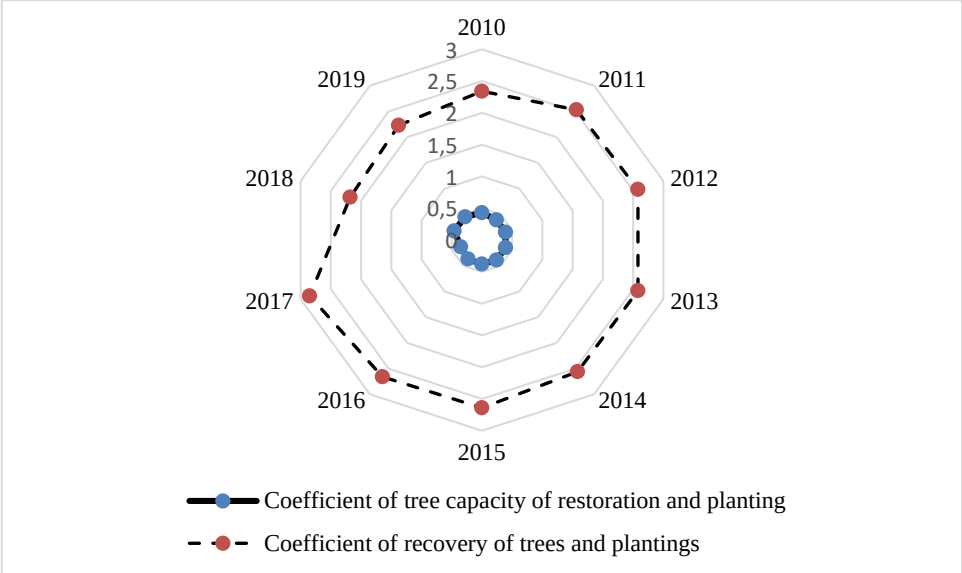

Figure 5. Dynamics of coefficients of forest capacity and produced forest products

Source: formed by the authors.

Figure 6 shows that the highest costs are for forest fire protection and the costs of afforestation tend to decrease every year. Thus, the rational ratio of unproductive costs to measures to minimize was the costs of forest protection from fires, i. e. 1 UAH of funds invested in forest protection from fires is 0.55 UAH of lost forest from fires.

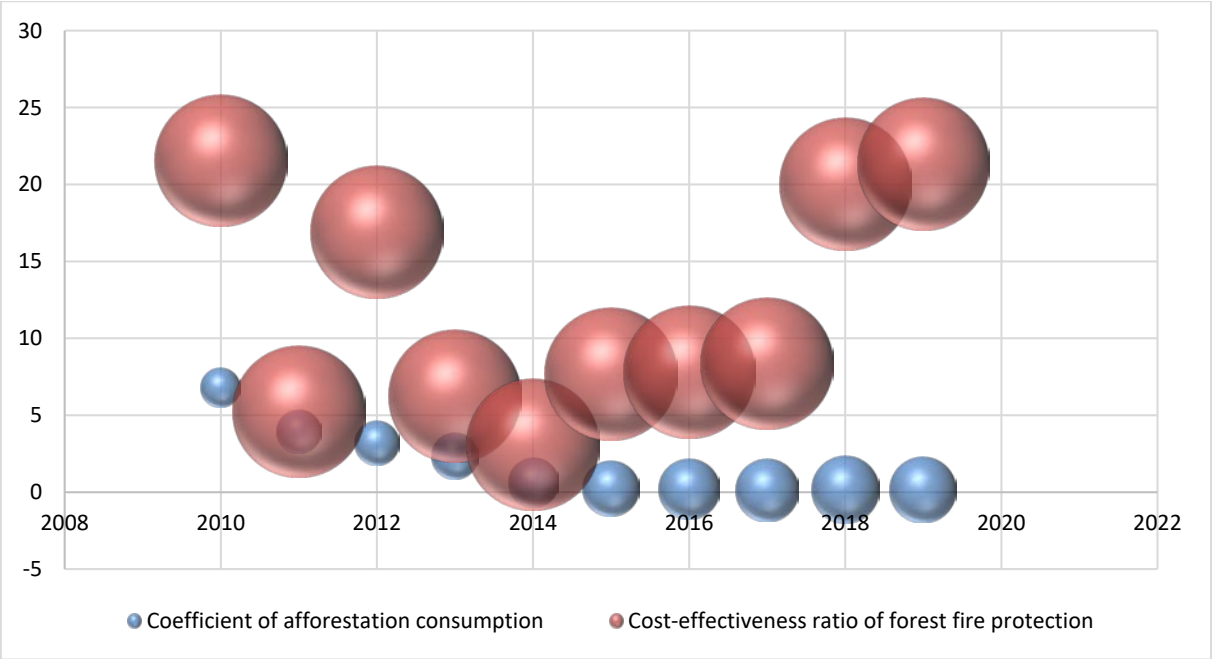

Figure 6. Dynamics of afforestation cost coefficients and cost-effectiveness of forest fire protection

Source: formed by the authors.

Calculation of the coefficients of analytical indicators allows assessing the effectiveness of investments in forestry, planting, fighting fires and illegal logging.

It is possible to assess the quality of such measures in correlation with the volume of harvested liquid wood and other types of forestry products, which is a robust analytical basis for assessing the effectiveness of the forestry enterprise.

For a detailed description of the dynamics of the structure of indicators of the volume of harvested liquid wood, the actual felling of wood and the tax burden, polynomial functions of the second-order were obtained (Fig. 7).

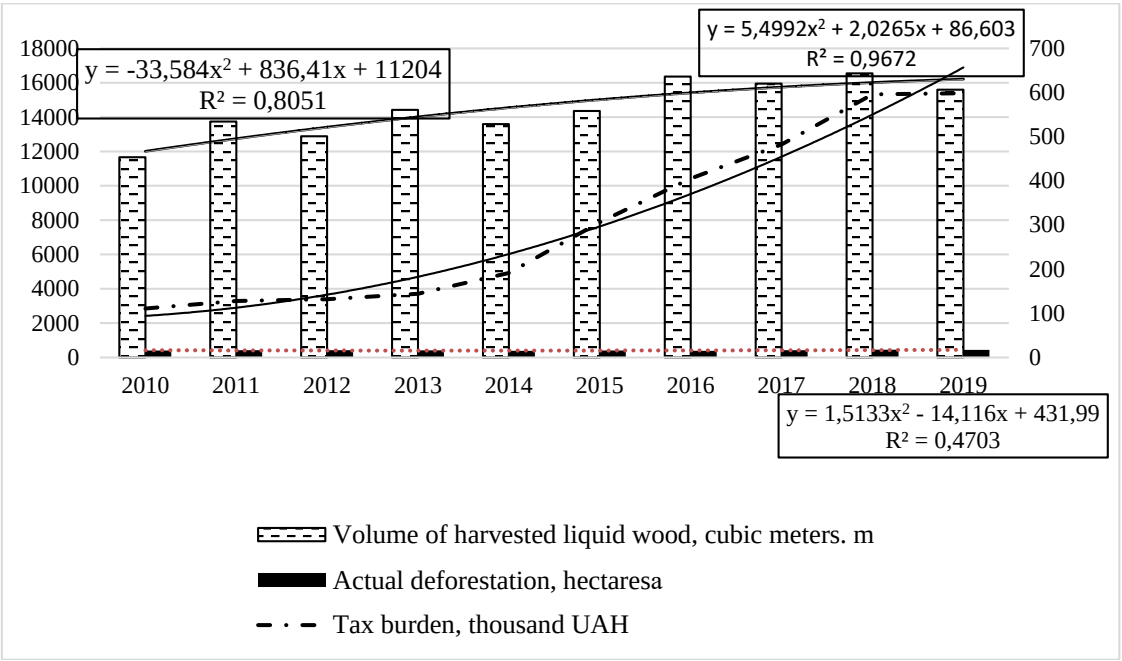

Figure 7. Dynamics of coefficients of the produced forest products

Source: formed by the authors on the basis of statistical data and data of the State Agency of Forest Resources of Ukraine.

Ecological and economic content of the obtained result is as follows: in 2019, the tax burden increased by **13.0245** (thousand UAH).

The average value is determined by the formula:

$$Y_1\ (x_{mid}) = 10{,}998\ x_{mid} + 2{,}0265;$$

$$x_{mid} = \frac{10(10+1)/2}{10} = 5{,}5$$

$$Y\ (5{,}5) = 10{,}998*5{,}5+2{,}0265 = 62{,}5155 \text{ (thousand UAH)}$$

The results show that, on average, during the study period, the tax burden increased by **65.5155** thousand UAH per year.

The derived function of the volume of harvested liquid wood $\mathbf{Y_2}$:

$$Y_2 = 67{,}168x - 836{,}41.$$

After all, for 2019:

$$(x_{mid} = 1):\ Y_2 = 67{,}168*1 - 836{,}41 = -769{,}24\ (m^3).$$

Ecological and economic essence of the obtained result from the volume of harvested liquid wood decreased by ***769,24 m³***.

The average value for the analyzed period was:

$$Y_2 = 67{,}168*5{,}5 - 836{,}41 = -466{,}99\ (m^3).$$

On average, during the study period from 2010 to 2019, the volume of harvested liquid wood increased by approximately 466.99 m3 per year. In order to compare the calculations obtained based on the volume of harvested liquid wood, an assessment of chain growth trends. The calculations of the tax burden for the study period are in fig. 7. As we see from fig. 7, the rate of liquid wood exceeded tax revenues, including rent for the special use of forest resources, i. e., payment for the use of forest resources, which negatively characterized the filling of the local budget.

We calculated approximation coefficients to show a relatively high quality of the constructed models (R2 = 0.8664) (fig. 8).

For each received function, a derivative is defined that characterizes the acceleration of reproducible processes in forestry. The derivative function of reforestation of permanently owned forests, (y):

$$Y = 172{,}54x + 1334{,}4x$$

where *(x=1):*

$$Y(1) = 172{,}54*1+1334{,}4 = 1\ 506{,}94 \text{ (hectares)}$$

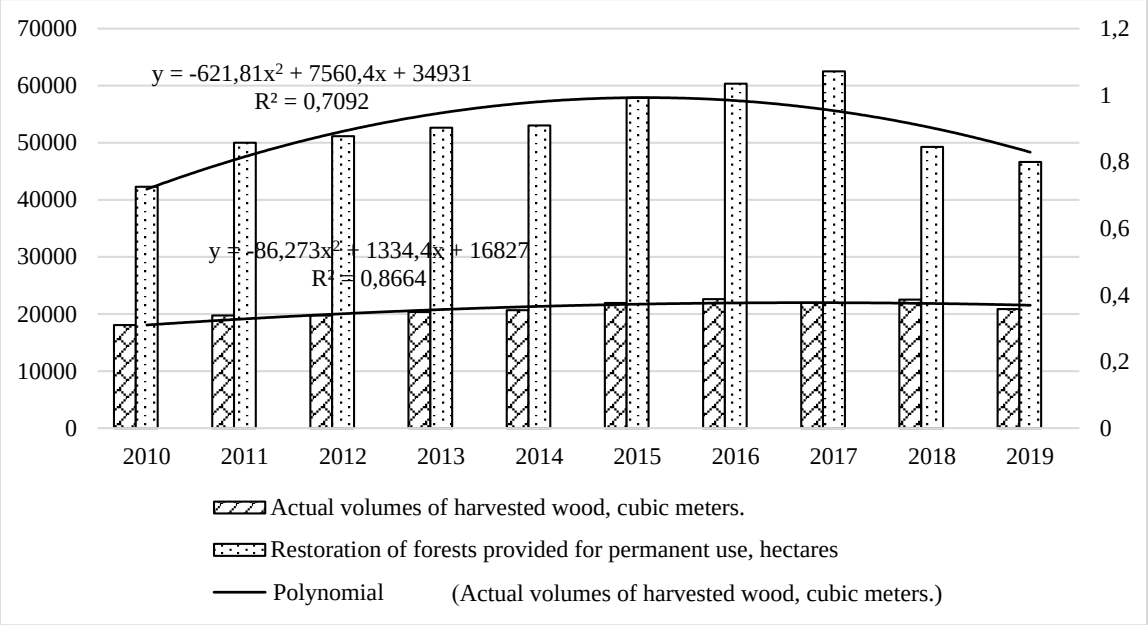

Figure 8. Dynamics of reforestation coefficients

Source: formed by the authors on the basis of statistical data and data of the State Agency of Forest Resources of Ukraine (Statystychnyj schorichnyk Ukrainy za 2018 rik, 2019; Official site of the State Statistics Service of Ukraine, 2019 and Public report of the State Agency of Forest Resources of Ukraine for 2019).

The ecological and economic significance of the obtained result: for the studied period in restoration of forests for permanent use increased by 1,506.94 hectares.

The formula determines the average value:

$$Y_1\ (x_{mid}) = 172{,}54x_{mid} + 1334{,}4$$

$$x_{\text{mid}} = \frac{10(10+1)/2}{10} = 5{,}5$$

$$Y\ (5{,}5) = 172{,}54*5{,}5+1334{,}4 = 2\ 283{,}37 \text{ (hectares)}$$

The results show that during the study period the tax burden increased on average by 2,283.37 hectares per year.

The derivatives function of the actual volumes of harvested wood $\mathbf{Y_2}$:

$$Y_2 = 1\ 243{,}62x - 7560{,}4$$

After all, for 2019:

$$(x_{cep} = 1)\text{: } Y_2 = 1\ 243{,}62*1 - 7560{,}4 = -6\ 316{,}78\ (m^3)$$

The average value for the study period is:

$$Y_2\ (5.5) = 1\ 243{,}62*5{,}5 - 7560{,}4 = 720{,}49\ (m^3)$$

According to the obtained results, from 2010 to 2019, the amount of harvested wood increased by about 2,283.37 hectares per year. In order to compare the calculations made based on the volume of harvested wood, we evaluated the chain growth trends. The calculations of reforestation for the study period are in fig. 8. As shown from fig. 8, the

rate of timber harvesting exceeded the restoration of permanently managed forests, which negatively characterized the dynamics of reforestation in forestry and forest production.

Using correlation analysis, we have determined that the amount of harvested timber is 75 % of the regeneration of forests for permanent use R2 = 0.8664. As we can see, there is a close statistical relationship. The calculated approximation coefficients show the adequacy of the constructed models and their high correlation. The derivatives have been calculated from the above functions, which characterize reforestation efficiency indicators over time and the corresponding growth rates, including forestry development.

4. DISCUSSION

The regulation of ecological and economic problems of forestry production is a complex issue that calls for research and a relatively wide range of components of the mechanism of ecologically and economically oriented management of forestry. Therefore, we recommend the government consider the following steps to improve the control process and secure sustainable forestry management: the separation of the functions of setting standards, planning, forest inventory from the function of management of forestry lands; the delineating the management and monitoring of forestry plans, standards and limits; the development of an effective mechanism of preliminary public control (compliance of plans, strategies, programs, et cetera with the interests of the population) and absolute control (control over the activities of state forest enterprises, associations through reports on their activities for a certain period); the introduction of forest certification will provide an opportunity to obtain independent objective control and evaluate the activities of forest enterprises. It will also increase public confidence and allow access to international markets for certified products.

Today the world is more interconnected than ever before. After all, improving access to technology and knowledge is an essential means of exchanging ideas and developing innovative activities in the context of environmental protection (Global Sustainable Development Goals by 2030).

The financial support of the investment environment for the development of the forest sector is an essential component of the relationship between the industry, state, consumers of forest products, and the environment (Antonenko, I.Ya., 2011). The institution of state ownership of forest lands and forest plantations should be recognized as a critical institution in the institutional structure of financial support of the investment environment for the development of the forest sector. This institute is fundamental for forestry activities. However, the current institutional structure for financing the investment environment for sustainable forestry does not meet the new challenges of economic transformation.

There are a large number of systemic contradictions and pitfalls due to the low degree of adaptation to the modern market realities of institutions inherited from the command system of central administration, as well as the weak ability to actively participate in the reproduction process of institutions, resulting from transformational changes (Volynchuk, Yu.V. and Bakalejko, I.V. 2014). The budget financing for the development of the forest sector, both directly and indirectly, has a significant impact on the volume of investment revenues in forestry, as 1) the state directly finances investment in forestry; 2) the state can stimulate private sector investment in forestry through the establishment of tax benefits, grants and soft loans; 3) the state is responsible for implementing the policy of stimulating private investment (Labenko, O.M. and Ivolha, I.H. 2013).

5. CONCLUSIONS

Our research has shown that crucial ecological problems are currently associated with specific characteristics, such as:

– the slow implementation of financial mechanisms in the forestry development, as well as the attracting funds to local budgets through the sale of forest products;

– the imperfection of the current environmental legislation;

– the lack of an incentive mechanism for innovation and investment in forests and environmental protection.

The deliverables include the qualitative assessment of the conformity of the forest management system with the basic design parameters and the interaction between subsystems and elements; the assessing the impact of individual institutional and economic changes on its social, economic and environmental performance. The qualitative assessments describe the completeness and viability of new and modified elements of sustainable forest management.

The study established the relationship between ecological and economic factors for the restoration of forest ecosystems. It examined the degree of correlation of the indicator of restoration of forest ecosystems on such indicators as the investments in the rational use of natural resources, the environmental tax, gross regional product.

In order to secure sustainable forestry in Ukraine, we propose to 1) separate the functions of standard-setting and forest inventory from the function of forest land management, 2) separate the function of economic activity and control over the implementation of forestry development plans, 3) introduce public control and increase effective monitoring of anthropogenic load, forest use and rehabilitation, 4) improve the organizational and institutional management mechanism as a component of forest production which is the key to improving the forest economy.

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