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BEHAVIORAL ECONOMIC MODEL OF ENVIRONMENTAL CONSERVATION IN HUMAN RESOURCE MANAGEMENT

Viktor KOVAL[1]
Global Change Research Institute of the Czech Academy of Sciences, Prague, Czech Republic

Dmytro HAVRYCHENKO
Odesa State Medical University, Odesa, Ukraine

Liliya FILIPISHYNA
Admiral Makarov National University of Shipbuilding, Mykolaiv, Ukraine

Iryna UDOVYCHENKO
Sumy Regional Institute of Postgraduate Pedagogical Education, Sumy, Ukraine

Liudmyla PRYSTUPA
Khmelnytskyi National University, Khmelnytskyi, Ukraine

Inesa MIKHNO
National Aviation University, Kyiv, Ukraine

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Abstract

Purpose. The study analyses a sustainable behavioural model in natural resource management that could have a positive impact on the environment and create conditions for rationalizing economic behavior through strategic resource management.

Design. It examines the current influence of conservation on individual behavior, reflecting how behavior depends on social norms, habits, and individual choices, as well as the potential for correcting behavior using predictable scenarios. To enhance eco-friendly

1 Corresponding author: victor-koval@ukr.net

relationships, it is suggested to develop and implement a step-by-step scenario, starting with individuals and gradually increasing interaction by incorporating state-of-the-art digital technologies and considering conservation. When engaging individuals in environmentally friendly economic behavior, it is proposed to create conditions that allow them to choose their roles and utilize their potential to the fullest, fostering a sense of fulfillment and increasing interest in further environmental development.

Findings. The study determined that biopotential decreases over time, and the curve of biopotential and human potential index has a steeper negative angle, leading to a point of no return when the population experiences stress. Highlighting this negative reality to people is crucial for correcting their behavior. Negative examples are effective in changing consumer behavior.

Originality. For each group behaviour, a specific schedule of further actions can be created to adjust consumer behavior towards the consumption of ecological and economic products that increase the biocapacity of the territory. It has been established that with a 12% change in consumer orientations towards environmental friendliness, it is possible to stabilize biocapacity by implementing scenarios for environmental behavior and leveraging the psychology of natural resource conservation.

Keywords: *behavioural model; environmental conservation; HRM; resource management.*

JEL Codes: *D03, E61, L83, O15*

1. Introduction

Changes in the behavioral response and the development of business entities' advantages are primarily caused by social, physiological, psychological, and economic factors (Pasupathi, 2001). However, when performing certain functions and making choices, business entities mainly rely on experiences or preferences formed during the life cycle. The response to stimuli and dynamism in acquiring new knowledge contribute to the development of the behavioral model (Park et al., 2001). The analysis should consider behavioral responses and predict the response to stimuli based on age restrictions to make the research results more relevant.

Nowadays, machine learning methods can identify interdependencies between indicators when analyzing extensive data and create behavioral models to adjust human behavior when correlation is detected. Multiscale modeling can check whether the correlation is causal, and when mechanisms are detected, combining machine learning with Bayesian methods can quantify the uncertainty, creating a target function and optimizing resulting data using a combination of research techniques (Alber et al., 2019).

1.1. Theoretical Framework

Despite the numerous research methods, predicting the behavior of society is quite challenging, especially in periods of rapid changes when social trends can determine future transformations and create dynamic collective behavior. However, it is predictable, and the creation of a sustainable behavioral model for society is possible with the growth of social relations (Dakin, & Ryder, 2020).

The formation of certain aspects of economic behavior and traditions specific to corresponding communities in a given territory has also affected consumption patterns, which are differentiated by region and have features, seasonality, and popularity among consumers. In addition to historical choices, there is the psychological choice of the individual, influenced by territorial factors. Analyzing this can reveal trends and sustainability in the behavior of certain groups, influenced by cultural imprints and gender factors.

As different regions also had different natural resources, it led to the establishment of principles of interaction with the ecosystem, markets, and logistical links. Lower-income countries mostly became resource and commodity-dependent, while high-income countries focused on technological production, the purchase of raw materials, and the rational use of resources. Rational use of resources is also based on appropriate human and personnel management (Clayton, & Myers, 2015).

Although the interaction with nature always had uncertainty (according to game theory), and forecasts were relevant for a short period of time, indicating a large number of external impacts on systems, high-income countries were characterized by sustainable behavior formed with the target function of improving the life quality of their own population. The psychology of sustainable business behavior in developed countries relied on environmental friendliness and risk reduction, while natural resources management was continually optimized to ensure their rational use.

When analyzing behavioral responses at the macroeconomic level, we can observe processes arising from the concept of the international regime, allowing us to consistently analyze changes in public policy and human resource management based on behavioural models (Keohane, 2019).

1.2. Originality

This study examines scenarios that could change individual behavior and contribute to the rational management of the environment. The scenario should be built based on a multi-stage model, which would bring the goal closer with each subsequent iteration. Furthermore, the study focuses on the model of the formation of sustainable group behavior and the current state of the ecosystem in Ukraine.

1.3. Purpose

The purpose of the research is to form sustainable behaviour in society, which would create conditions for minimizing anthropogenic impact on the ecosystem, analyse human behaviour, and highlight the main factors influencing consumer demand, which contributes to the improvement of environmental sustainability.

2. Literature review

Behavior in the human resource management system can be considered as a dynamic system, with each micro-level system striving to achieve stability. The analysis of economic components in the human resource management system involves optimal planning of tasks to maintain the system's viability at minimum expenses while ensuring stability and the ability to plan (Golpîra, & Tirkolaee, 2019). From an economic perspective, an increase in the uncertainty of economic behavior per standard deviation unit reduces financial stability by 2.66-7.26% of the average value. The negative impact of economic policy uncertainty on financial stability is more pronounced in countries with higher competition, lower regulatory capital, and smaller financial systems. However, the number of institutions and diversification can mitigate the negative impact of instability, although unpredictable situations can still occur (Phan et al., 2021).

Utilitarian purchases, i.e., purchases of necessities, are less dependent on crises and societal stresses, while non-essential goods (i.e., hedonic purchases) are more sensitive to crises, and consumer behavior regarding non-essential goods can be influenced by depression or other psychological factors (Di Crosta et al., 2021). Environmental instability correlates with the risk and psychology of nature conservation, which has become increasingly relevant in the last decade. It reflects the relationship between human beings and nature, revealing the concept of human values and the environment and aspects of social production (Kieft, 2021).

Psychological characteristics of individuals shape their economic behavior and subsequently affect society by developing certain behavioral responses, which can create a stable set of responses to certain stimuli in the future. Therefore, studying the psychology of nature conservation is crucial for developing the next generation's commitment to establishing a green economic system and preserving natural resources (Clayton, & Myers, 2015).

Currently, central banks and financial authorities have begun to develop scenarios of climate stress tests to assess the financial system's vulnerability to climate changes (Battiston et al., 2021). This highlights the fact that balancing environmental and economic development is not only a priority on the national market but also a global trend.

As balancing environmental and economic development is one method of reducing social risk, the formation of sustainable behavior is influenced by external factors, which should be analyzed when making decisions and promoting the rational use of the natural

environment. To derive solutions in systems with high uncertainty, matrix methods and game theory, along with Bayesian criteria, can be applied to analyze various natural systems (Long, 2011).

Furthermore, to predict society's behavior when interacting with natural systems, scientists have developed a scale of ecological behavior that allows estimating individuals' ecological attitudes and forming groups of people based on their propensity for certain actions. However, the development of sustainable environmental behavior remains an open issue, especially considering the increasing global problems and environmental risks faced by humankind (Bartuseviciene et al., 2023).

Based on research conducted in Malaysia, several additional tools can be created to improve the environment and regulate drinking habits. One such tool is public procurement, which can be directed towards promoting environmental friendliness. This would create a market for environmentally friendly goods, and consumers would have a constant example of environmental friendliness, which, with significant purchases, could foster sustainable consumption (Yee et al., 2021). Since public procurement in Ukraine is currently conducted through information systems, this tool could be effective there as well. Studies have shown that changing consumption patterns can have a positive impact on sustainable development, and there is a correlation between innovation and environmental growth, implying that digitalization can influence consumer preferences (Rehman Khan et al., 2022).

With consumption changes, products are also replaced, making it advisable to use a survey method to analyze the presence of "green" brands. The research shows that respondents did not previously attach much importance to environmental friendliness, but green practices now have a positive impact on the formation of green brands and consumers' psychological habits. Therefore, marketing activities introducing green technologies are important, and statistical data confirm this correlation (Khan et al., 2022).

3. Methodology

The regularities of social development reflect each era of humankind's existence and share common features across different periods. Decision-making mechanisms have evolved, transforming the tools used to achieve certain goals, but the overarching purpose of creating a harmonious and comfortable environment for the existence of specific groups of people has remained constant. This purpose has often determined trends and shaped leadership during various periods.

In the context of decision-making modeling, it was traditionally viewed as a function dependent on the accumulated experience of individuals and external influences, particularly feedback resulting from specific actions taken. The architecture of collective behavior was based on the cumulative actions of each individual and followed a hierarchical structure of interaction. The execution of a scenario was dependent on the outcome of the previous action. In other words, the problem was reduced to the concept of dynamic

programming, where a controllable process can be divided into stages.

If we assume that the control process can be divided into a certain number of steps (n), meaning that decisions are made sequentially at each step, and the control moves the system (S) from the initial state (s0) to the final state (s*), then a set of step-by-step controls constitutes the control for achieving this transition.

Let Xk represent the control at the k-th step (k = 1, 2, ..., n), and the dependent variables Xk satisfy certain restrictions, making them admissible. Then, we can impose the restriction that the state Sk of the system at the end of the k-th step depends solely on the previous state Sk-1 and the control at the k-th step Xk (without considering previous states and controls). Here, Sk denotes the state of the system at a specific period of time, and Sk-1 represents the state of the system in the previous period.

The above-stated statement can be represented in the form of state equations:

$$s_k = \varphi_k (s_{k-1}; X_k), k = \overrightarrow{1;n} \quad (1)$$

The equation described represents a dynamic model in which each subsequent element is determined based on the previous change. The entire process is divided into stages, and it consists of separate planes forming a system of feasible solutions.

The target function, representing the efficiency of the controlled operation, depends on both the initial state and the control:

$$Z = F(s_0, X) = f_k (s_{k-1}; X_k), k = \overrightarrow{1;n} \quad (2)$$

Then, using Bellman equation $Z_n^* (s_{n-1})$, the maximum of the target function is the maximum of the efficiency indicator of the n step given that the system S was in an arbitrary state sn-1 before the last step and the control was optimal $Z_n^* (s_{n-1})$ at the last step (Yankovyi et al., 2021).

In a multistep process, the target function is the sum of target functions in each step, with the allocation of resources being proportional to the previous state of the system.

When developing a specific scenario, which is modeled, each state has a zero point according to certain indicators. When modeling the behavior of society and adjusting its choices, we start with the initial state of the individual when they are not yet familiar with the product or situation but intend to change some external conditions for themselves (Fig. 1). It is crucial for the control object to involve the individual in the execution of the scenario, which should become common through the dissemination of information. An important factor for proper involvement is the individual's desire to change, and this requires creating the necessary psychological and emotional conditions for decision making. Such conditions often coincide with periods of instability and increased risk when a person begins to change their usual rhythm and preferences in various aspects of life to stabilize their existence.

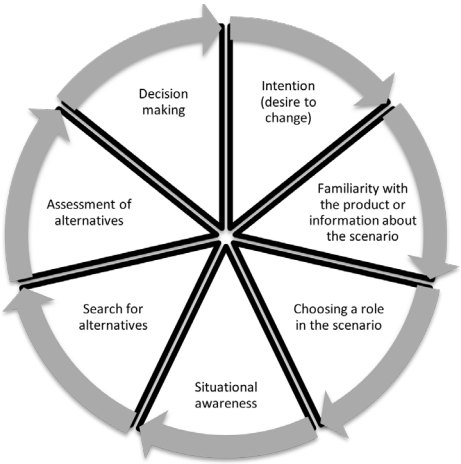

Figure 1. Step-by-step model of the individual's behavior during changes in order to adjust the results of the scenario implementation.

In mass management tasks, individual awareness of their role in the scenario and their desire to obtain necessary information to make informed decisions are essential aspects. Incomplete presentation of information about the product or the next steps is one method of drawing attention to the scenario. By providing incomplete information, individuals are encouraged to engage independently by seeking additional information and selecting a role in the scenario. This process often involves obtaining information from various sources, with varying levels of reliability, which serves as an impetus for choosing a role in the scenario.

For instance, in a political change scenario, each citizen of the country first realizes their own perspective based on the information they receive. They then analyze the actions of other citizens and make decisions regarding the next steps, which involve implementing the scenario through decision making, leading to changes in certain indicators of the system.

A research example involved tasks related to completing a certain scenario assigned to individual students or groups of university students. In one case, the outcome of the scenario was known, while in the other, it was not. The task given to each student was to convince a "conditional friend" to buy 1 kg of kiwi instead of 1 kg of beef as quickly as possible.

The maximum number of questions in the scenario was 20, with each subsequent step determined by questions that the student or group had to answer with a yes or no. During this exercise, the students felt like managers in a game, although the task was actually set by the teacher, allowing for a certain degree of flexibility in managing the team. The scenario, if constructed correctly, should have led to the "conditional friend" changing their consumption habits. The average results of the study, conducted on 150 students, are presented in Table 1.

Table 1. Scenario metrics for environmental behaviour modification

	Alone		**Group**	
	The result of the scenario is not known	he result of the scenario is known	The result of the scenario is not known	he result of the scenario is known
Number of iterations	12,1	18,9	11,2	10,1
Scenario completion time	6 min 45 sec	4 min 20 sec	7 min 15 sec	6 min 30 sec

Table 1 reveals that the best-performing scenario is the one with an unknown outcome, while the largest number of iterations was made by students who played the game with a known scenario on their own. From these results, it can be inferred that when players have additional information about the outcome of the scenario, they may lose attention and interest, leading to faster completion with less analysis and reading. However, this also results in a high number of iterations, indicating lower player performance. On the other hand, the group of students takes longer to complete the scenario, but they show better results in terms of the number of iterations, indicating that they analyze their decisions more thoroughly. Therefore, introducing certain changes to a known scenario could be done by not revealing the full information about the system's performance but only partially indicating the parameters to be improved to capture the player's attention better and create conditions for its implementation and free choice. In group scenarios, having a team leader can encourage other members to follow the scenario and improve the results.

Group control involves making decisions according to the modeled scenario by a defined group of people, involving new members in this model and following the next iterations to optimize the model's target function.

The model with several control objects and adjustments in the execution of the scenario is more complicated. If we divide the group into subgroups with different control agents whose actions are coordinated, it results in a step-by-step scenario and the overall effect of its implementation. When adjusting the scenario with structural changes, it is possible to develop a new scenario, considering the changes and creating a new independent starting point to investigate mutual influences and involvement of individuals.

The scenario implementation graph (Fig. 2) is defined by the length of the critical path and will have certain weights, which can be considered in the model of adjusting the behavior of individuals as the cost of moving to a certain stage of the scenario for an individual. The sum of expenses will provide information about the cost of implementing this scenario. The situational model can be represented as a tree when there are choices in taking each step, leading to the fulfillment of the final goal of the control object.

Therefore, a graph scenario will be constructed, where vertices represent states of the subject striving to change, and arcs represent actions with weights illustrating the cost of involving the individual in the next step.

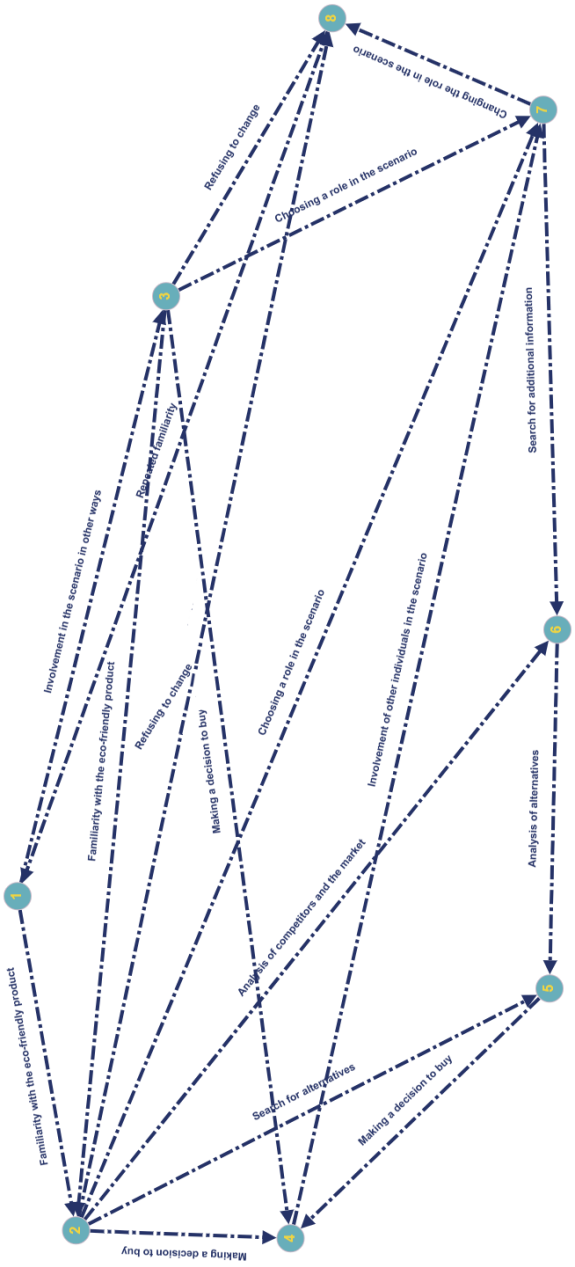

Figure 2. Case of the graph scenario of purchasing a certain eco-friendly product.

Figure 2 illustrates that adding more connections between the vertices would not be the optimal plan for the producer. Therefore, additional psychological incentive conditions are created to minimize the vertices and increase the probability of purchase (vertex 4).

As a result, the optimal path for the manufacturer will be 1-2-4, while this path, being the shortest for the buyer (customer), will have the highest cost or will be acceptable with additional incentives, such as increasing the perceived risk of buying similar products.

Creating a high-risk scenario leads to changes in the benchmarks and weights of the graph, where comparative advantages shift in favor of products that fulfill primary human needs, such as life preservation and safety. Introducing eco-friendly goods during periods of stress becomes favorable for the producer if the price of similar goods remains the same, as the buyer will choose the product that is perceived as safer for their well-being.

When a product is introduced to the market, the end point for the buyer becomes an unconscious purchase based on psychological and emotional sustainable choices, driven by their experience with the product over time. Ranking businesses higher by increasing safety and environmental performance creates the conditions for unconscious choices, increased trust, and the formation of behavioral responses, which can influence the development of common trends and the management of groups of people.

Optimizing company operations should prioritize emotional marketing as a tool for entering new markets and creating a sustainable behavioral model in human resource management. The buyer should be attracted through emotional excitement, leading them to respond to the stimulus by purchasing the product.

Emotional marketing has the potential to create additional motivation for consumers to get acquainted with a product or scenario, transforming the market to absorb products with psychologically acceptable properties that drive trends. Over time, the concept of emotional priority should evolve into an established spatial and temporal system of consumer choice based on the consistent selection of a product or scenario. This will contribute to the formation of behavioral patterns and preferences in the market.

4. Results

The development of conservation psychology involves establishing positive connections between events and objects, creating indifference to the future, and fostering compliance with environmental behavior in daily life. Figure 3 illustrates a scheme representing the stages of this process.

An important aspect in the development of conservation psychology is the establishment of positive connections between events and objects, the creation of indifference to the future and compliance with environmental behavior in daily life according to the following scheme (Fig. 3).

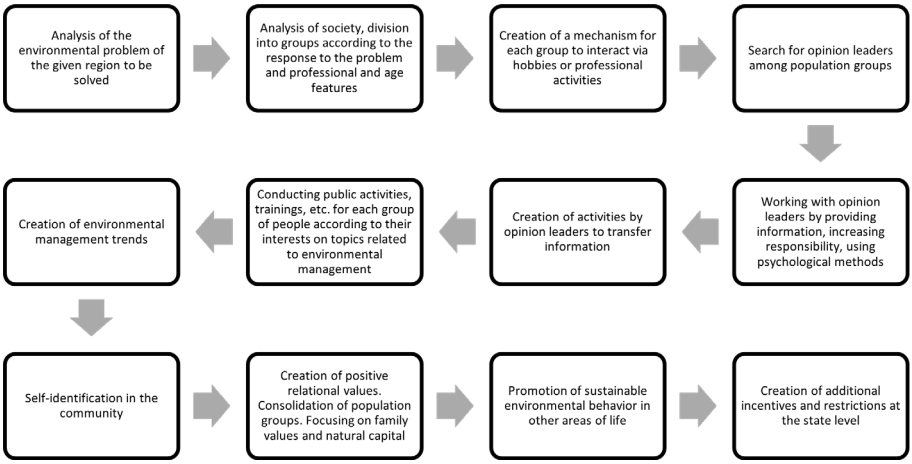

Figure 3. A model of creating sustainable behavior based on the concept of conservation.

According to the model, understanding the relationship between human beings and the external environment evolves through stages of familiarization, perception, and observance, ultimately leading to the development of sustainable behaviors. To achieve this, it is essential to create scenarios tailored to each group of people based on their specific characteristics and areas of high sensitivity. Understanding the behavioral patterns of individuals in these groups allows for the identification of particular areas where informative influence can be more effective. Selecting appropriate tools to impact sensory areas and creating conditions that strengthen desired behavior is crucial in this process. The joint use of psychological and economic management plays a significant role in influencing individuals' behavioral responses and serves as the foundation for creating a development scenario. Regular and comprehensive information processes and consultations are necessary to define interests in specific areas of professional activities throughout life.

Scenarios should contribute to the sustainability of choices within industries and form groups of people based on shared time and interests. The survey of 100 respondents in Kyiv highlights that stress factors can lead to changing consumer preferences, resulting in more chaotic purchases and less time spent analyzing the usefulness of products.

As a result, buyers tend to purchase goods that are characterized by lower prices and have a visually appealing appearance. A model of changing consumer habits under stress, with war as a stressor, was developed, revealing that when consumers are given information about the environmental friendliness of a product, their initial reaction is often based on emotional perception (63% of respondents). After one informational lecture on the environmental friendliness of goods, 37% of respondents showed illogical conclusions, which can be attributed to the individual's past social constructs, resistance, and unwillingness to further investigate the usefulness of goods. In contrast, 63% of respondents had a

reaction based on the emotional impact at the present moment, leading to the formation of acceptance. With continued information exposure (the second 20-minute lecture on environmental friendliness), a new goal was formed for the individual based on rationalizing available resources and preserving the environment. Continuous information exposure and external incentives led to a group reaction after a week of exposure, resulting in a change in orientation towards environmental friendliness.

This demonstrates the significance of well-structured information campaigns and incentives in influencing consumer behavior positively, especially under stress, and promoting sustainable choices. Figure 4 illustrates how emotional and economic management can lead to the development of sustainable behavior, reinforcing ecological thinking, and promoting the choice of environmentally friendly goods or scenarios.

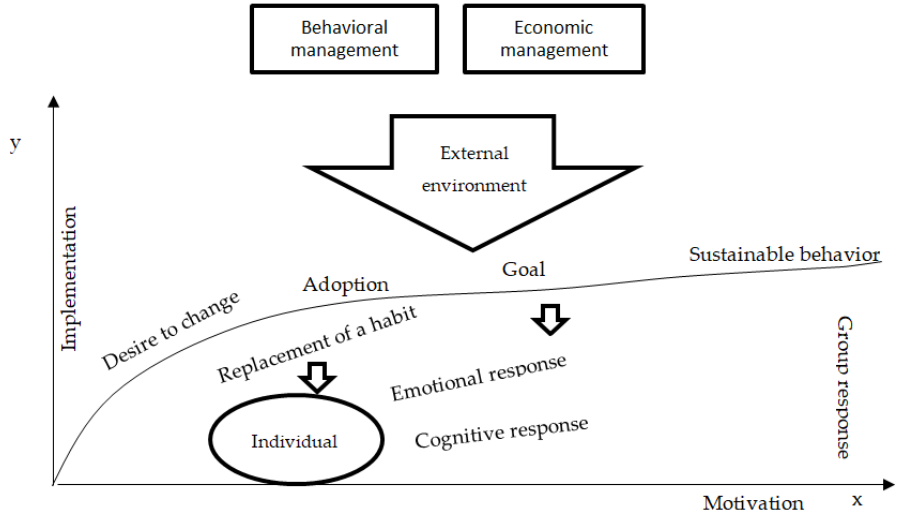

Figure. 4. A sustainable behaviour model with a combination of behavioral and economic management.

Rapid adaptation to changes is essential due to the impact of the digital economy, technological advancements, and constant progress. The concept of sustainable behavior is time-limited and should be in constant dynamics to keep up with social progress. As the external environment changes, individuals may need to learn new scenarios that are more acceptable and relevant. When creating scenarios for situational development, continuous analysis of external factors and social trends is necessary to understand how they may influence consumer choices. Social and economic incentives for change can include decreases in individual efficiency, external influences, and the individual's own desire for improvement. Motivation from external sources can be a significant factor in the formation of sustainable consumption. The presence of motivation is a fundamental factor affecting

consumer choice when forming adaptive behavior.

The concept of sustainable behavior of individuals can correlate with the concept of image in the formation of groups that support a particular reasonable behavior. The image plays a significant role in determining sustainable behavior, and brands can be used as additional motivational tools, particularly in developed countries.

When many groups support environmentally friendly trends or actively engage in predicted scenarios, government tools can be involved to consolidate society and use public state institutions to increase confidence in the proposed changes. This shift to the national level involves expanding the tools of influence on consumer choice.

A positive effect on the environment is achievable through the creation of a national greening program, permanent public procurement with a focus on environmental friendliness, and a transparent system indicating the environmental footprint of goods. While this may require additional costs for manufacturers to research and publicize the results, it can lead to a more environmentally friendly competitive market.

When moving from individual consumption to group consumption, it is important to study general trends as the number of imitators of certain information can lead to changes at the national level.

The role of planned scenarios plays a crucial part in shaping environmental behavior. In the production process, various roles can be identified, where stable behavioral responses can be clearly distinguished. The structure of creating a socially beneficial product with negative impact or residues is observable, and each process has its process coefficient (aij) and activity result (Xj).

Calculating the negative impact or residues (Zj) for each process highlights the negative anthropogenic influence. If $Zj>Xj*aij$, it becomes necessary to change behavioral responses and adjust societal roles, along with the technological processes that humans interact with. Informing individuals about the consequences of their actions is essential, as any expectation of negative outcomes can lead to additional stress. This model bears resemblance to the production model often employed in cybernetics. To promote environmentally-oriented consumption, producers should indicate the environmental effects of goods' production and consider the environmental footprint of the entire process, aspects that were not previously accounted for in the balance sheet model. When designing a balance model, which typically contains (m*n) values, we can observe a linear structure of the system:

$$
\begin{aligned}
X_1 &= a_{11}X_1 + a_{12}X_2 + \ldots + a_{1n}X_n + Y_1 \\
X_2 &= a_{21}X_1 + a_{22}X_2 + \ldots + a_{2n}X_n + Y_2 \\
&\text{---------------------} \\
X_i &= a_{i1}X_1 + a_{i2}X_2 + \ldots + a_{in}X_n + Y_i \\
&\text{---------------------} \\
X_n &= a_{n1}X_1 + a_{n2}X_2 + \ldots + a_{nn}X_n + Y_n
\end{aligned}
\qquad (3)
$$

where aij are technological coefficients, Yi are final products n; Xj are gross products n. When forming the balance sheet model, which in general contains (m*n) values until the 21st century, environmental factors and results were mostly absent.

However, this system lacks consideration of environmental results (Z), which can be appropriately included in the matrix equation:

$$Y = (E-A)*X-Z \quad (4)$$

In this equation, X represents the column vector of production volumes, Y represents the column vector of final products, A represents the matrix of technological coefficients, and E represents the unit matrix.

Environmental results (Z) form a matrix that determines the expenses related to ecological environment restoration when an enterprise (or industry) operates at a certain technological level relative to the coefficient aij.

The ecological footprint (Z), often measured by the area of productive land needed to naturally neutralize production residues per individual basis for a country, can be used as an indicator of environmental results. In such cases, the balance model is reduced to comparing the ecological footprint and the Human Development Index, which serves as an integral indicator (United Nations Development Programme, 2023). In other words, sustainable development is only achievable if there is a balance between the ecological footprint and the Human Development Index concerning other countries.

Ukraine's Human Development Index in 2022 was 0.773 and illustrating long-term progress in three main dimensions of human development: long and healthy lives, access to knowledge, and a decent standard of living. This indicates a negative trend, as it is 0.02 less than in 2021. The negative trend is likely to continue if military operations persist. Restoring this indicator to its pre-war level will require a comprehensive solution to existing problems caused by the destruction of infrastructure, public institutions, migration processes, distance learning at education institutions, and the decline in the level of security and income of the population.

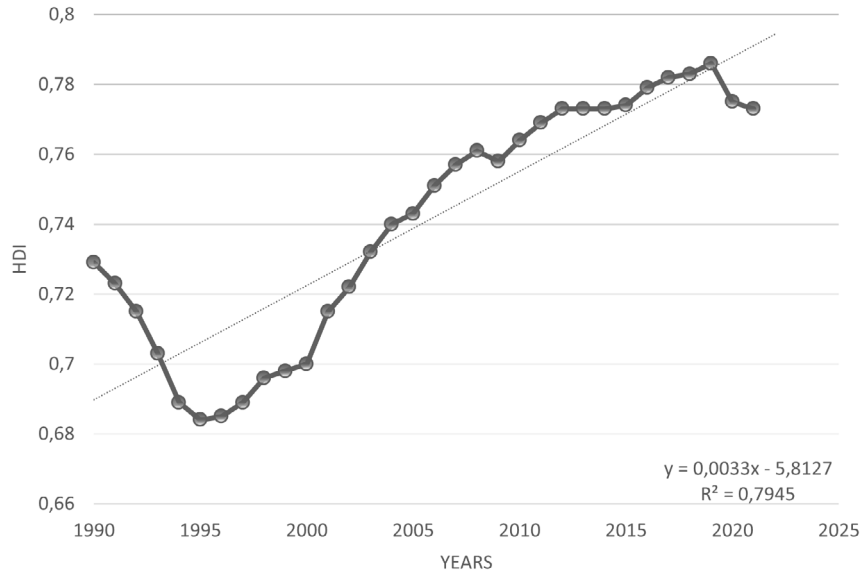

Figure 5. Ukraine's Human Development Index on the timeline (United Nations Development Programme, 2023).

Figure 5 illustrates the relationship between the HDI indicator and the political and economic state of the country, as well as its stability. It shows that when there is stable environmental growth and no additional stress factors impacting Ukraine during a specific time interval, there is an increase in the HDI indicator. This suggests that the stable behavior of business entities and the external environment positively influence the overall HDI, making Ukraine's scenario as a country belonging to the high human development category more predictable.

Furthermore, transitioning to technologies with a reduced ecological footprint leads to an improvement in the target function for the country. This highlights the importance of adopting environmentally friendly technologies to enhance the country's overall performance and development:

$$Y^* = f(\text{HumanDevelopmentIndex-Ecologicalfootprint}) \rightarrow \max \quad (5)$$

These indicators can be calculated for both countries and specific regions, enabling an analysis of the balance between these indicators across different spatial entities. One such indicator is used to assess the impact of the human footprint on the biocapacity of the territory, providing insight into the ecological and economic level of the country's development.

To achieve a balance at the individual level, certain measures are considered effective, including reducing the rate of reproduction, transitioning to a plant-based diet, abandoning individual vehicles, rational use of available resources, and promoting green technology. At the macro level, this involves transitioning from a resource-based (traditional) economy to a green economic system.

The balance between these indicators serves as the foundation for designing a sustainable behavioral model, currently shaping Industry 5.0, which is sought after for implementation in European countries (Arsawan et al., 2023). This model incorporates digitalization, human-centeredness, innovations, and further integrates principles of the green and circular economy (Global Footprint Network, 2023). By aligning these factors, countries and regions can work towards sustainable development and harmonious coexistence with the environment.

Figure 6 illustrates that Ukraine had a relatively high biocapacity compared to countries like Brazil and China, where a significant portion of land is built up or dedicated to large industrial facilities, resulting in a lower biocapacity per person. However, in 2023, the situation in Ukraine has changed drastically, and its biocapacity has decreased by at least half, based on our calculations. It is crucial to implement measures to restore the biocapacity within a minimum of 6 years to return to its pre-war state, considering the adoption of new technologies with minimal negative anthropogenic impact.

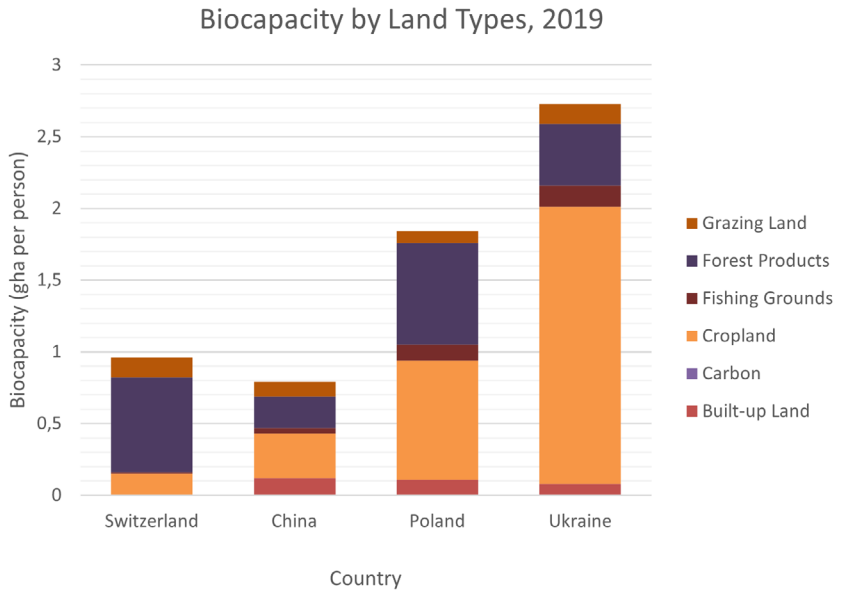

Figure 6. Biocapacity (gha per person) in 2018 by countries (Global Footprint Network, 2023).

In 2022, Europe faced an ecological deficit situation, indicating excessive utilization of natural resources and displaying a negative trend in development (Fig. 7). This highlights the urgency for sustainable practices and policies to address ecological imbalances and foster more sustainable growth and resource usage in the region.

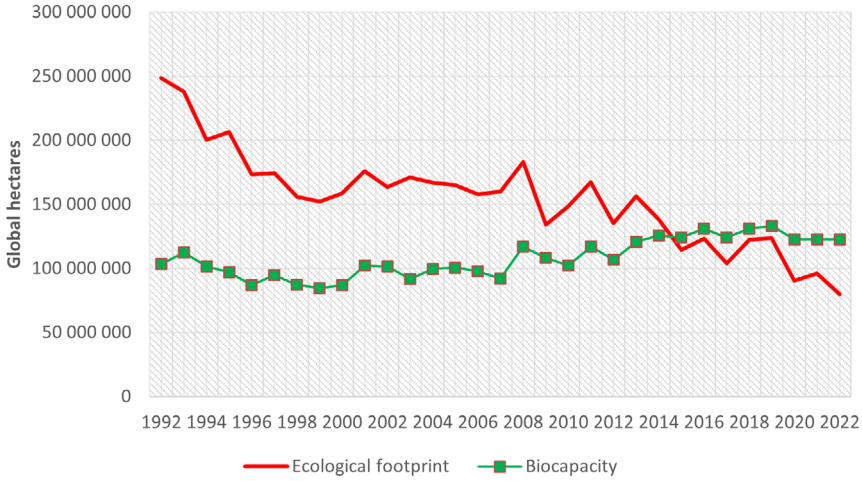

Figure 7. Ecological footprint compared to biocapacity (gha) on the time interval (Global Footprint Network, 2023).

Figure 7 illustrates a significant shift in indicators in 1992, coinciding with geopolitical changes marked by the collapse of the Soviet Union. During this period, a new industrial society emerged, characterized by social consumption, expanding markets, knowledge sharing, and the simultaneous construction of new resource-intensive enterprises. However, this development also had accumulating negative impacts on the environment, leading to the emergence of new trends in an eco-friendly society as an alternative approach to shaping the future and creating ecological reserves. Visualizing and analyzing negative scenarios resulting from unsustainable environmental management is crucial when developing general scenarios for promoting desired behavior.

Following the formation of a group reaction (Fig. 4), driven by continuous information influence and the emotional acceptance of changes by consumers, the number of stakeholders increases through word of mouth and the involvement of new group members. This serves as the foundation for an environmentally oriented society. A positive aspect lies in the formation of memories evoking childhood experiences and reflecting the ideal state of the ecosystem, which fosters the perception of eco-products. These scenarios, persistently present in memory, become the basis for the economic behavior of societal groups and, if observed in developed countries, they become achievable and hold greater value for

individuals. Strengthening these memories through recalling events or purchasing eco-friendly goods at the group level further reinforces actions taken by society, enhancing the value of changing consumer behavior.

A survey was conducted among 150 respondents living in Kyiv to explore the main factors that can drive sustainable behavior and encourage the adoption of environmental values. The primary method of stimulating such behavior was the economic approach. For instance, 52% of respondents expressed their willingness to change regular habits to eco-friendly ones if they were provided with environmental material incentives. Entrepreneurs, in particular, were ready to change their production technology and calculate their ecological footprint if offered significant incentives that could significantly impact their company's income. The data suggest a correlation between environmental behavior and economic incentives, indicating that greening is indeed stimulated by such incentives.

In the absence of economic incentives, other approaches can also influence behavioral changes. For 17% of respondents, the main reason for changing their guidelines was the imitation of the behavior of close family members, while 10% were influenced by societal behavior and accepted social norms. For 9% of respondents, changes in environmental legislation could drive behavioral changes, although some may still exhibit reluctance due to their perception of the legal system.

This indicates the need for systematic work in developing scenarios to promote changes in consumer habits towards environmentalization. Illustrating negative scenarios for the population, constantly reminding them of the reduction of biocapacity resulting from economic activities, and considering the ecological footprint could encourage 8% of respondents to change their habits, reflecting society's sensitivity to global environmental issues. Other reasons for changing consumer habits were less significant, each accounting for less than 5% weight, suggesting their variability based on the region. As a result, the main tools for influencing behavioral scenarios towards greening may involve changes in family values, social behavior, legislation, and the presentation of negative scenarios resulting from continued ecosystem exploitation.

A desirable scenario for the formation of an environmentally oriented society and changes in consumer habits would be the realization of Society 5.0, which emphasizes digitalization, human-centeredness, innovations, and a transition from traditional resource-based economies to green economies in European countries.

The priority now is to build Society 5.0, a desirable global implementation, especially for reconstructing territories after the war. To create ecological reserves, it is essential to implement continuous control over human activities and strengthen public and state institutions to ensure compliance with rules and requirements outlined in the development plans of European countries (Global Footprint Network, 2023).. Achieving a step-by-step transformation of all existing systems in Ukraine is possible by uniting everyone towards a common goal based on sustainable behavior, with each citizen striving to improve the quality of life in the country and adopting socially sustainable behavior through the knowledge gained from their individual life activities.

In this context, the proposal is to adopt the project-dynamic organization of Ukrainian enterprises, incorporating strict rules and accountability for environmental management to create ecological reserves and balance the environmental impact and profits of companies. This goal should receive widespread attention from modern mass media and Internet sources, backed by opinion leaders and public organizations, to establish a unified system of an environmentally-oriented society (Kovshun et al., 2021).

To implement the strategy of creating a system of sustainable public behavior, potential mechanisms should focus on modernizing the educational sector and minimizing corruption in the country by enhancing public awareness. Currently, the formation of sustainable behavior is influenced by the following factors: Hedonism and the individual's desire for success and purpose; decision-making guided by emotional and psychological factors; and the aspiration to build a comfortable and stable environment to fulfill one's goals, leveraging the maximum potential of individuals.

Based on the aforementioned characteristics that shape an individual's perception, strategies for further development should focus on increasing the adaptability between indicators that require change, promoting the development of sustainable behavior. We anticipate that the continued global events will indicate a growing awareness of environmental impact and an increased drive to achieve ecological and economic balance. This can be accomplished by restructuring individuals' social lives, rationalizing their activities, and fostering a desire for stable existence (Kovshun et al., 2021). When constructing a sustainable model of eco-friendly behavior, constant examination of the influence on control groups of individuals is necessary, with ongoing adjustments to the influencing model. It is essential to provide alternative choices to individuals, allowing them to exercise their freedom and independence, while motivating them to make decisions that align with the predicted scenario.

Addressing the lack of necessary information for decision-making in Ukraine, we propose reorganizing modern research institutes for environmental and economic analysis to enhance efficiency, following Switzerland's example, where each region has its specific monitoring structure, considering its unique characteristics. The general system of penalties and regulations applies to each citizen. Specific indicators of environmental and economic development should be established for each populated area, documented in strategic documents that synchronize with each other to depict the actual situation in the respective territory (Zhen et al., 2019).

To achieve the goal of sustainable behaviour, the following actions should be taken: stimulating the implementation of planned scenarios, promoting social development, reducing population differentiation, encouraging interaction between all business entities with quick response capabilities, providing positive examples to illustrate necessary changes, and minimizing state-wide risks and instability through eco-innovation, digital transformation, and smart technologies (Khan et al., 2023). Further studies should investigate the implementation of sustainable behavior scenarios within established groups of people. It is desirable to select a control group of the same age within the same enterprise or an

already formed group team based on their field of activity or preferences.

5. Conclusions

The issue of irrational use of natural resources and the reduction of ecological reserves is currently relevant worldwide, including Ukraine, where the anthropogenic impact has become global due to military operations and will have consequences for many years during the reconstruction. To accelerate development, it is suggested to create conditions for the establishment of a sustainable behavioral model and a balance between environmental and economic potential by employing psychological, emotional, and economic influence. Achieving the best results involves building a flexible system scenario for future events based on the principles of dynamic modeling. Each scenario can be divided into steps, where the maximum target function is achieved by optimizing the performance indicators of each subsequent step, considering the system's state before the last step (Sn-1). In this approach, the next step of the scenario can change based on the changes in the previous one, aligning with the main trends of our time, such as increasing system dynamics, connections, response channels, and innovation implementation.

When creating and testing a specific scenario, it is essential to involve the psychological and emotional aspects of individuals and other elements of the system to establish the role of each participant. This allows individuals to draw conclusions based on their own experiences and involve other individuals in the scenario role. To achieve an environmental and economic balance, individuals should be fully engaged in ecological and economic projects or modernize their businesses using environmental standards to enhance the quality of life for the population.

The subsequent steps in the scenario will be determined by individuals involving groups of people and fostering sustainable behavior in society. With the increasing influence of social media and digitalization, emotional and visual contact plays a significant role in information perception, which should have a motivating effect to promote sustainable behavior with frequent reminders of the designated roles in the scenario.

In creating an environmentally-oriented society, it is crucial to involve opinion leaders for specific groups of people who can interpret the next steps of the scenario using information sources and consistently emphasize the positive impact of implementing those steps on the country's macroeconomic activities. This encourages individuals to fulfill their potential to the maximum extent possible. Studies have shown that visualization of negative scenarios can raise awareness among 8% of residents and influence their habits, while changing habits within the immediate environment can affect 17% of respondents. To establish Society 5.0, characterized by increased responsibility for its existence and striving to optimize available resources, it is necessary to redefine the values and guidelines of each citizen and increase the biocapacity while considering the ecological footprint.

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