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SYSTEM APPROACH TO EFFECTIVE TRANSFORMATION AND MANAGEMENT DEVELOPMENT OF A DIGITAL ENTERPRISE

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СИСТЕМНИЙ ПІДХІД ДО ЕФЕКТИВНОЇ ТРАНСФОРМАЦІЇ ТА КЕРОВАНОГО РОЗВИТКУ ЦИФРОВОГО ПІДПРИЄМНИЦТВА

The study draws attention to the fact that the processes of maximizing the benefits of sustainable development effects are effective when obstacles to the development of digital entrepreneurship are detected and overcome on time. The author draws attention to the fact that it is in unity such processes can form a systemic approach to the effective transformation and management of the development of digital entrepreneurship, which is currently lacking. In particular, it is necessary to assess the impacts on sustainable development that determine the benefits achieved through the managed transformation of digital entrepreneurship. Along with the main manifestations of the three-dimensional effects of sustainable development, the course of measures of controlled transformation can create several anti-Gymmond effects. The article is aimed at the development of a systematic approach to effective transformation, contributing to the managed development of digital entrepreneurship. The study proved that the More O'Ferral-Jenks diagram has a structure within which it is possible to explain the impact of each anti-Gymmond effect on the transformation of digital entrepreneurship and conclude that there are prerequisites for its development. The preconditions for the optimal transformation of digital entrepreneurship are determined using two-dimensionality (two-dimensional points, two-dimensional functions, and two-dimensional transition states). Two-dimensionality can identify and explain the effects of anti-Gymmond effects on these processes as precisely as possible. Two-dimensionality formed by reflection of interactions of p-values of Gymmond and cost evaluation of anti-effects, considered in relation and interaction. Indicators are examined based on their movement over time. This makes it possible to achieve systemic, in the identification of ways of effective transformation. The preconditions for the optimal transformation of digital entrepreneurship are determined using two-dimensionality. The contents of the chart form the ability to identify transition states of anti-Gymmond effects.

У межах дослідження звернено увагу на те, що процеси максимізації вигод від ефектів сталого розвитку ефективні при своєчасному виявленні та подоланні перешкод на шляху розвитку цифрового підприємництва. Звернута увага на те, що саме у єдності такі процеси можуть сформувати системний підхід до ефективної трансформації та управління розвитком цифрового підприємництва, який наразі відсутній. Зокрема, необхідна така оцінка впливів, що наявні у площині сталого розвитку, що визначають переваги, яких можна досягти або які можна досягти за допомогою керованої трансформації цифрового підприємництва. Поряд з основними проявами тривимірних ефектів сталого розвитку, хід заходів керованої трансформації може створити кілька ефектів анти-Геммонд. Відтак Стаття спрямована на розробку системного підходу до ефективної трансформації, що сприяє керованому розвитку цифрового підприємництва. За результатами дослідження доведено, що діаграма Мора О'Феррала-Дженкса має структуру, в рамках якої можна пояснити вплив кожного ефекту анти-Геммонда на трансформацію цифрового підприємництва та зробити висновок про наявність передумов для його розвитку. Це дозволяє добитися системності, щодо визначення шляхів ефективної трансформації. Передумови оптимальної

трансформації цифрового підприємництва визначаються з використанням двовимірної розмірності, яку формують двовимірні точки, двовимірні функції, та двовимірні перехідні стани. Доведено, що саме домірність може ідентифікувати та пояснити впливи ефектів анти-Геммонда на процеси розвитку цифрового підприємництва якомога точніше. Двомірність, утворена відбиттям взаємодій р-величин Геммонда і вартісною оцінкою анти ефектів, розглянутих у відношенні та взаємодії. Показники досліджуються на основі їх руху з часом. Кожен з ефектів анти-Геммонда має прагнути до переходу до рівноважного стану (в якому його вплив на сталий розвиток відсутній). Саме максимальне наближення до рівноважного стану формує найбільш сприятливі передумови для оптимальної трансформації цифрового підприємництва та його розвитку. Зміст діаграми Мора О'Феррала-Дженкса формує здатність ідентифікувати перехідні стани ефектів анти-Геммонда.

Key words: system approach; anti-Hammond effect; sustainable development; transformation.
Ключові слова: системний підхід; ефект анти-Геммонда; сталий розвиток; трансформація.

SETTING THE PROBLEM IN GENERAL AND ITS RELATION TO IMPORTANT SCIENTIFIC OR PRACTICAL OBJECTIVES

Processes of maximization of benefits from the effects of sustainable development are effective in the timely identification and overcoming of obstacles to the development of digital entrepreneurship. In unity, such processes can form a systemic approach to the effective transformation and manage the development of digital entrepreneurship. In particular, the sustainable development impact assessment identifies the benefits to be achieved. Impact assessment for sustainable development identifies the benefits achieved. So, it is possible if we all digital entrepreneurship transformation managed. Along with, the main manifestations of the three-dimensional effects of sustainable development, the course of measures of controlled transformation can create several anti-Gymmond effects, that are most significant for their overlap. Term anti-Gammend originally referred to the analysis of More O'Ferral-Jenks diagrams, which formed the ability to determine the behavior or behavior change of a particular system based on the Gymmond postulate. It's proposed to use the term "anti-Gymmond effect" to denote such characteristic features in the development of digital entrepreneurship, accompanying the three-dimensional effects of sustainable development, but as a result, opposite to predictable measures of managed transformation (which are anti effects). The postulate of Gymmond, in this case, can be considered a hypothesis, according to which there are always transition states, on which it is possible to prove the presence of phenomena that can create obstacles or preconditions for the development of digital entrepreneurship. The transition between these two states is a movement between optimality and suboptimal through small changes in the effect structure. In addition, when minor changes are possible in the transition state due to the appearance or disappearance of anti-Gymmond effects.

ANALYSIS OF RECENT STUDIES AND PUBLICATIONS

There are a number of studies that address the problem of forming an approach to the evaluation of the three-dimensional effects of the sustainable development of digital entrepreneurship. In particular, these are the works of Beletsky V.S., Adamovskaya V.S., Sytnik L.S., Lavruk V.V., and Full S.V At the same time, it is problematic that the outlined scientific sources focus exclusively on the identification, assessment, and adjustment of interrelated economic, social and environmental effects, leaving aside the peculiarities of the development of digital entrepreneurship. The processes of managed development of digital entrepreneurship accompany numerous transition states (transformations). Through this transformation, it is possible to identify phenomena that can create obstacles or preconditions for development.

The article is aimed at developing a systematic approach to effective transformation, which contributes to the managed development of digital entrepreneurship.

PRESENTATION OF THE MAIN MATERIAL OF THE STUDY WITH FULL JUSTIFICATION OF THE OBTAINED SCIENTIFIC RESULTS

The emergence of anti-Gymmond effects has been identified by us as a movement towards a sub-optimal transformation of digital entrepreneurship. This movement is possible if, within the framework of the measures of managed transformation, there are the following actions: reorganization or re-profiling of production (operational) activities; increase of the technical and economic level of individual enterprises, plots, plots; redirection to a region with the potential for backward logistics.

The following list of actions within the framework of managed transformation measures makes it possible to identify the features that give rise to the effects of the anti-Gymmond manifesting itself through the spheres: (1) employees downsizing due to loss of jobs; (2) continuous training of staff; (3) need for psychological adaptation to changes in working conditions; (4) limited availability of goods of the required quality at the regional level; (5) increased environmental pollution; (6) increased anthropogenic impact; (7) complex technical care of new equipment; (8) use of new technologies and new equipment. According to the scope of the triune effects and actions of the controlled transformation measures, a significant range of anti-Gammend effects was identified. The nature of the anti-Gymmond effects manifests itself through the lens of a reactive system that is formed by multiple functions in two coordinate planes (which reflect the nature of the anti-effect and its cost expression). Therefore, the effects of anti-Gymmond can be investigated using the More O'Ferral-Jenks diagram. This two-dimensional diagram formalizes 1) the nature of the appearance, deployment, or attenuation of the anti-Gymmond effects in cost and other terms; 2) the nature of the impact of the anti-Gymmond effect structure on the dynamics of digital enterprise transformation, underlying its development.

Each of the anti-Gymmond effects is available not only when its deployment or attenuation does not result in numerical values for its valuation (this only indicates the impossibility of applying classical algorithms for their valuation). The basis of the anti-effect separation can be the formation of obstacles that close access to the optimal transformation and development of digital entrepreneurship. The range of such obstacles to the optimal transformation of digital entrepreneurship is unique for every anti-effect. However, the removal of obstacles always

has a cost, which creates opportunities for applying specific valuation algorithms.

The system of algorithms for identification of the deployment and attenuation processes of the anti-Gymmond effects is determined by the individual steps that need to be performed to form the Gymmond p-values characteristics (to explain the content of the anti-Gymmond effects) and for cost evaluation (to measure anti-Gymmond effects in cost terms). Algorithms for identification of the deployment and attenuation processes of the anti-Gymmond effects by the basic Gymmond values are highlighted by the analysis of scientific research [8; 1; 2; 7] and given in tables 1. If Gymmond p-values don't provide a high correlation with the cost evaluation of the anti-Gymmond effects, they should be revised. Values shall be selected that demonstrate the greatest possible link to the valuation of anti-Gymmond effects.

Table 1. Algorithm system to the identification of the deployment or attenuation of anti-Gymmond effects processes according to the basic Gymmond p-values (or x)

Anti-Gymmond effects	basic Gymmond p-values and their identification algorithm
employees downsizing due to loss of jobs	Rate of change in the average number of employees
continuous training of staff	Rate of qualification or retraining of employees
need for psychological adaptation to changes in working conditions	Rate of psychological adaptation to working conditions
limited availability of goods of the required quality at the regional level	Rate of regional availability of goods of the required quality
increased environmental pollution	Rate of environmental pollution
increased anthropogenic impact	Quantitative characteristics of air pollution, water pollution, etc.
complex technical care of new equipment	Rate of equipment upgrade in the reporting period
use of new technologies and new equipment	Rate of new technology and equipment used in the reporting period

Source: formed by the author.

The indicated values should be selected to explain as much as possible the anti-effect principle within a single algorithm. This is because the list of Gymmond p-values must be chosen so as to correlate with the valuation of the anti-Gymmond effects. Only the unity of the Gymmond p-values and the anti-Gymmond effects cost evaluation determine the content of the O'Ferral-Jenks diagram. The system of algorithms of identification of the processes of deployment and attenuation of anti-Gymmond effects on their cost evaluation is selected on the results of analysis of scientific researches [8; 1; 2; 7; 4; 6; 10] and are given in the tables. 2.

The More O'Ferral-Jenks diagram should contain models that reflect the relationship between numbers x and y, which can determine the prerequisites for the optimal transformation of digital entrepreneurship. This is because the algorithms presented in tables 1 and 2 are focused on the identification of the relationships between the current and initial values of the indicators and fixing:

1) the deviation from the equilibrium position (at which the anti-effect is absent);

2) deviations between the initial and current values of their motion.

In connection with the need to provide a systematic approach to determining the prerequisites for the optimal transformation of digital entrepreneurship in the More O'Ferral-Jenks diagram (which provides the representation of the change of the anti-Gymmond effects as an integral set), it is important to solve the problem of lack of algorithms of identification of the processes of deployment or attenuation of the anti-Gymmond effects on a p-value of Gymmond (x) and their cost evaluation (y).

The lack of algorithms is due to the fact, that:

1) the presence of a set of values x and y and their known functions. It is problematic to choose one of the functions, and the fact that its action (solution) needs to impose additional conditions, under which the variable of the function will have a certain value at a certain point. Additional conditions unknown;

2) the presence of conditions under which all x and y change in time under the action of forming numerical parameters. Therefore, the processes of deployment and attenuation of anti-Gymmond effects by Gymmond p-values and their cost evaluation should be identified by the value of the unknown function XY.

According to the outlined, identification of prerequisites for the optimal development of digital entrepreneurship must be carried out by specifying the anti-effect changes within the models, which are suitable for describing the transition processes as functions — their actual (known) or possible (unknown) states. Important models that can be a core of the O'Ferral-Jenks diagram.

Scientific literature [3; 9] describe economic processes with unknown functions use: correlation models; differential models; Integra-differential models; linear programming models. The properties of the models, when determining the prerequisites for the optimal development of digital entrepreneurship, lead to the conclusion that the More O'Ferral-Jenks diagram should be formed by the content of differential models using a multi-step method. Although the methods of solving such equations are quite varied, we recommend using multi-step methods. They allow finding a large number of types of equations with a large number of unknown functions. Parallel differential equations for y and x should be formed, allowing the solution of a huge number of types of equations according to forecasts to be correct [5]. This is possible by usual differential equations of the state of x(t) use; the partial differential equations of the state of the function y(t) use. The solution to each equation is a function differentiated n times until it satisfies the equilibrium condition. The equivalence position is the state of the function, in which there are all the conditions for the optimal development of digital entrepreneurship (since there are no anti-Gymmond effects).

Correlations between the differential equations for x and y are necessary. The presence of correlations indicates the predictability of the relationship used to determine the prerequisites for the optimal development of digital entrepreneurship. Determining the prerequisites for the

Таблиця 2. Algorithm system to the identification of the deployment or attenuation of anti-Gymmond effects processes according to the cost evaluation (y)

Anti-Gymmond effects	Cost evaluation algorithm	
	classical	specific
employees downsizing due to loss of jobs	staff reductions cost	If x does not lead to numerical values for the cost evaluation anti-Gymmond effects, it's determined by the cost of removing the barriers that block access to optimal transformation and development of digital entrepreneurship.
continuous training of staff	training, retraining of employees cost	
need for psychological adaptation to changes in working conditions	costs of psychological adjustment to working conditions	
limited availability of goods of the required quality at the regional level	logistics costs	
increased environmental pollution	pollution of the environment costs	
increased anthropogenic impact	anthropogenic impact costs	
complex technical care of new equipment	equipment maintenance costs	
use of new technologies and new equipment	costs of reproduction and use of new technologies, equipment	

Source: formed by the author.

optimal development of digital entrepreneurship can best be realized through the More O'Ferral-Jenks diagram. The diagram provides a two-dimensional mathematical description of the transformation and prerequisites of the development of digital entrepreneurship by the differential equations of changes of all types anti-Gymmond effects. The anti-effects description is formed according to the algorithms of identification of processes of deployment or attenuation of anti-Gymmond effects — on p-values of Gymmond and their cost evaluation.

Suggest that the overall look and content of the More O'Ferral-Jenks diagram remain unchanged. In such conditions, the diagram is formed by measures of managed transformation (with differentiation by-products, works, and services of the entrepreneur). The components of such a diagram are:

1. Two-dimensional points are two-dimensional observations by y (identifying changes in the cost evaluation of anti-Gymmond effects over time) and x (identifying changes in Gymmond ?-values over time). Two-dimensional points are observations in time.

2. A two-dimensional function consisting of two-dimensional points. The two-dimensional function reflects the differential equations yt, which relate to differential equations xt in the basic form F(chut), based on a single data series (consisting of a name, a list of values x, and a list of values y).

3. A two-dimensional transition state, which is the movement of a single data series over time to the equilibrium state or from the equilibrium state. Possible movement: along the diagonal towards the upper corner, if the effect is unfolded; perpendicular diagonally towards the lower corner of the effect coagulates.

CONCLUSIONS FROM THE STUDY

The More O'Ferral-Jenks diagram has a structure within which it is possible to explain the impact of each anti-Gymmond effect on the transformation of digital entrepreneurship or to conclude that there are prerequisites for development. The preconditions for the optimal transformation of digital entrepreneurship are determined using two-dimensionality (two-dimensional points, two-dimensional functions, and two-dimensional transition states). Two-dimensionality can identify and explain the effects of anti-Gymmond effects on these processes as precisely as possible. Two-dimensionality formed by reflection of interactions of p-values of Gymmond and cost evaluation of anti-effects, considered in relation and interaction. Indicators are examined based on their movement over time.

Each anti-effect of the change of values needs to move to the equilibrium state (along with the line F(xt)). This forms the most favorable prerequisites for the optimal transformation of digital entrepreneurship and its development. In addition, for transition states, it is possible to distinguish groups y: which do not correlate with large positive Gymmond ρ-values and for which it is difficult or impossible to predict further movement XY to an equilibrium state. The correlation should be maximized to provide the prerequisites for the optimal transformation and development of digital entrepreneurship on such XY (Gymmond's p-values should be revised). A separate group is distinguished by y, which correlates with ?-Gymmond values and for which the further movement of XY to the equilibrium state can be predicted with a high degree of accuracy. To provide the preconditions for the optimal transformation and development of digital entrepreneurship XY move must strive to achieve the equilibrium state.

Prospects for further research in this direction. The contents of the chart form the ability to identify transition states of anti-Gymmond effects.

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