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Research Article

The Model of Achieving a Balanced Balance between Economic Efficiency and Ecological-Social Responsibility of Digitalized Enterprise

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Abstract

The application of the latest digital technologies changes the ways of thinking of entrepreneurial behaviour and motivation of decision-making, principles of organization of their functioning, so the purpose of work is to form a model of achieving a balanced balance between economic efficiency and environmental and social responsibility of the digitized enterprise, determining the scientific bases for managing such processes. Methods of grouping and formalization, structural-logical and qualitative system analysis and synthesis were used in the research process. The model of achieving a balanced equilibrium is a process of harmonizing the activity of an existing (undesirable) state and achieving an equilibrium state through gradual transformations. The mechanism of control of transformation processes contains information, resource and formative levels of management. The logical-structural matrix contains the main problems and the expected results of balanced development.

***Keywords*:** Digitization, Balanced development, Socio-ecological-economic development, Responsibility of the enterprise.

1. Introduction

The world is undergoing rapid changes along with the development and application of the latest technologies that have permeated the processes of generating, transmitting, storing, analyzing and managing information, which has made it an essential resource. The use of digital technologies, digital complexes and systems changes the ways of thinking in entrepreneurial behavior and motivation of decision-making, the principles of organization of work of enterprises and creates conditions for conducting balanced ecologically and socially responsible development of enterprises with achievement of economic efficiency is the undisputed direction of modern harmonization of activity of enterprises. Enterprise digitization is the driving force behind such interconnected dimensions as scale, volume and speed, which together create complex economic and social consequences, dramatically changing the nature of the enterprise. The development of a balanced business determines the promotion of inclusive growth, consistent economic growth with social integration and the environment. This encourages the provision of the right conditions for the balanced development of digitized enterprises through the provision of business development services, information provision, and access to technology and financial resources, which will help to create value chains.

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2. Materials and Methods

The problems of achieving a balanced harmonious development of enterprises have recently come under the scrutiny of domestic and foreign scientists. Currently, there are various interpretations of balanced development, the general criterion of which is the threefold concept of sustainable harmonized development, that is, a balanced approach that ensures stable economic activity, environmental responsibility and social development of the enterprise. For the most part, the writings of scientists have covered the conceptual foundations and mechanisms of forming a strategy of balanced development at the national and regional levels. Among the scientists who study the issues of sustainable development of the enterprise, it should be noted works of Seroka-Stolka, Sarmento, Butnariu, Satyro et al. But in the process of achieving a balanced development of enterprises in the process of digitization of their activities, there are a number of problems of theoretical and applied nature that need to be addressed.

The purpose of the work was to formulate a model of achieving a balanced equilibrium between economic efficiency and environmental and social responsibility of the privatized enterprise, which led to the following tasks: to determine the scientific basis for managing the transformation processes in the process of transition of the enterprise to a balanced equilibrium; to form a system of tools for implementing the control mechanism.

In the process of research, the methods of grouping and formalization, structural-logical and qualitative system analysis and synthesis were used to deepen the theoretical foundations of achieving a balanced balance between economic efficiency and environmental and social responsibility of the digitized enterprise.

3. Results and Discussion

ICT solutions pervade the economy and society, being an important driving force for improving the performance of not only telecommunication (TE) but also enterprises in many other areas of economic activity (Valinejad et al., 2018; Temesvári et al., 2019; Maeng et al., 2020; Elazhary, 2019; D'Amato et al., 2019). ICT innovation, technology change, transformation of society, culture and economy all influence the transformation of the content of people's work activities, requiring rapid development of TE staff in new information decisions. These conditions lead to the need to develop a model of achieving a balanced balance between economic efficiency and environmental and social responsibility of the privatized enterprise (Figure 1).

Today's TE activities have three interconnected systems: economic, social and environmental (Seroka-Stolka, 2014; Sarmento et al., 2007; Santis et al., 2016; Sievers-Glotzbach et al., 2019; Ramasanov et al., 2019; Romero et al., 2017; Gruner et al., 2017). For the most part, TEs seek to profit economically from the activity by fulfilling only basic (legally defined) rules on social and environmental commitments. Consider such a level of development of the TE system as the initial one, which can be mathematically represented as:

$$S_0 = f(\{Econ_0\}; \{Soc_0\}; \{Ecol_0\}), \quad (1)$$

where $\{Econ_0\}$ is the economic subsystem of TE; $\{Soc_0\}$ - social subsystem of TE; $\{EcoL_0\}$ is an environmental subsystem of TE.

Changes in the type of TE development require globalization, information, and digital trends, i.e., the change in TE is caused by a change in associated conditions, which requires co-evolutionary development, which should mean the coordinated development of different subsystems and interdependent changes in their elements within a single system of TE functioning.

Thus, in order to ensure the balanced development of TE, it is necessary to implement convergent TE models of activity / development in the operating conditions, which requires considerable resources and fruitful cooperation of enterprises aiming, for example, to create a common infrastructure. Micro-level resources representing TE resources can be represented as a set of property resources (assets) $\{r_{pr}\}$, financial and investment resources $\{r_{fin/inv}\}$, energy resources $\{r_{en}\}$, intellectual potential $\{r_{int}\}$, technical and technological resources $\{r_{t/t}\}$, external resources and information streams $\{r_{inf}\}$.

Resource micro levels can generally be represented as a result of the interconnection and activity of a set of TE resources:

$$R_{int} = f(\{r_{pr}\}; \{r_{fin/inv}\}; \{r_{en}\}; \{r_{int}\}; \{r_{t/t}\}; \{r_{inf}\}) \quad (2)$$

And the macro level is expressed by the totality of activities of external regulators $\{r_{reg}\}$, global digital trends $\{r_{dig}\}$ and the interconnection of TE with stakeholders $\{r_{st}\}$:

$$R_{ext} = f(\{r_{reg}\}; \{r_{st}\}; \{r_{dig}\}) \quad (3)$$

The total necessary resource provision for the co-evolutionary development of the TE system is represented by the aggregate resources of the internal and external environment of TE functioning.

$$R = f(\{R_{ext}\}; \{R_{int}\}) \quad (4)$$

Within each of these subsystems there is a transformation of resources to the results of activities and the transition from the initial level of development to a balanced (standard) in order to harmonize the activities.

The harmonization of activities should be understood as ensuring the transformation of the TE system from an undesirable state (S0) into a balanced equilibrium development by its gradual transformations $S_0 \rightarrow S_1 \rightarrow S_2 \rightarrow S_n \rightarrow S_{balanced\ development}$. Each such state of TE is characterized by an aggregate of economic, environmental and social subsystems and their components, which represent effects in the context of relevant areas of TE activity.

The transition of the TE system from one state to another occurs under the influence of balanced development management regulators (Butnariu et al., 2015; Melkonyan et al., 2017; Guandalini et al., 2019; Moldavska et al., 2019), which include tools for managing the resource and economic process at the micro level, as well as external regulators at the macro level. Each subsequent state of the system is determined by the previous state and the totality of the selected resources and results of activities in order to achieve balanced equilibrium development and obtain synergistic effect from the transformation of the system of functioning of TE.

The issues of balanced development of enterprises, and above all, TEs were intensified in the present period, during the period of large-scale digitization in the state and the need for enterprises to maintain balanced economic development of different spheres of economic activity, which took into account not only the economic effect of the main activity of enterprises, but also environmental management of social responsibility of a digitized enterprise. This necessitates the formulation of the scientific basis for the formation of a mechanism for managing transformational processes in the process of transition to balanced development in these conditions.

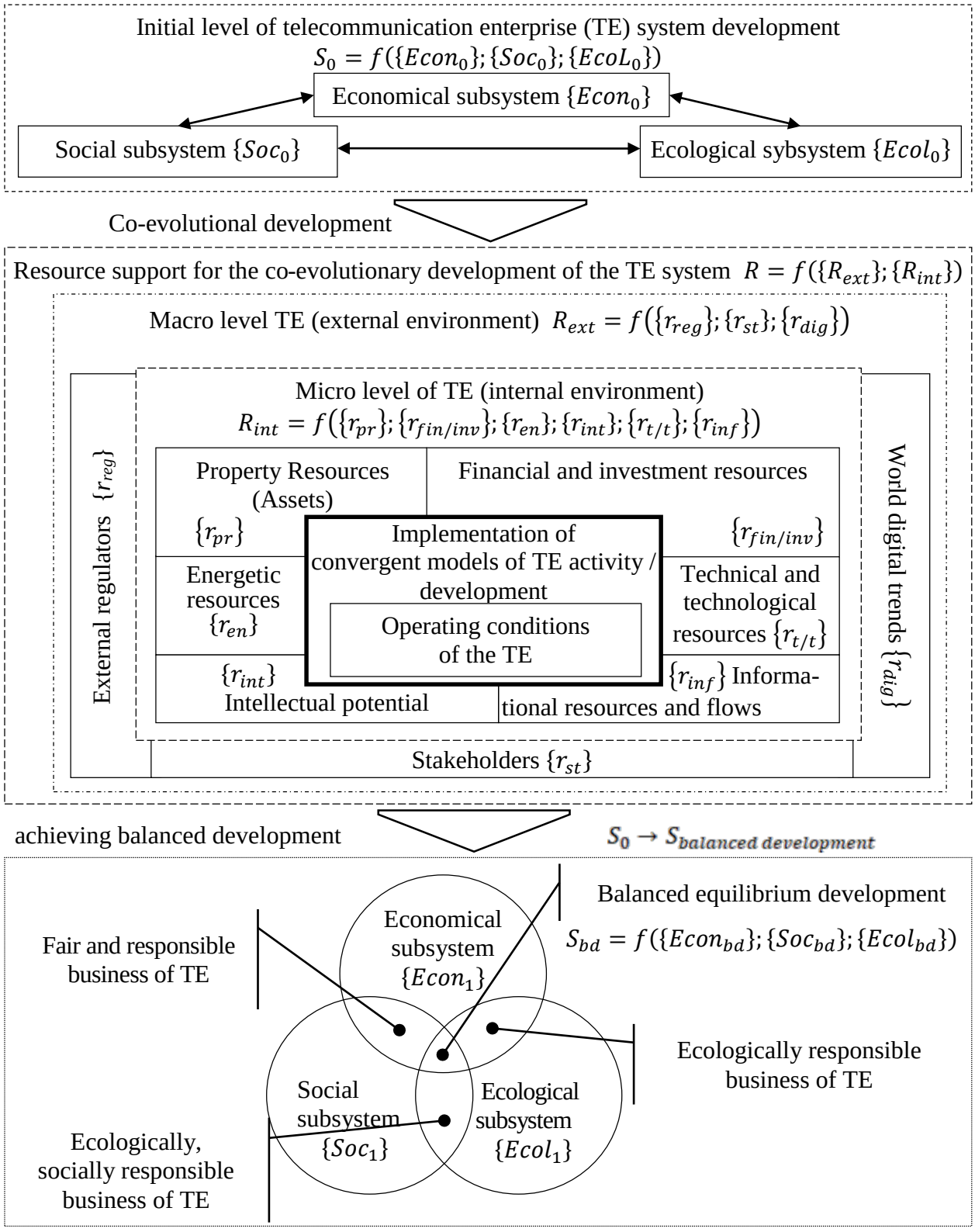

Fig. 1. A model of achieving a balanced balance between economic efficiency and environmental and social responsibility of a privatized enterprise * compiled by the authors

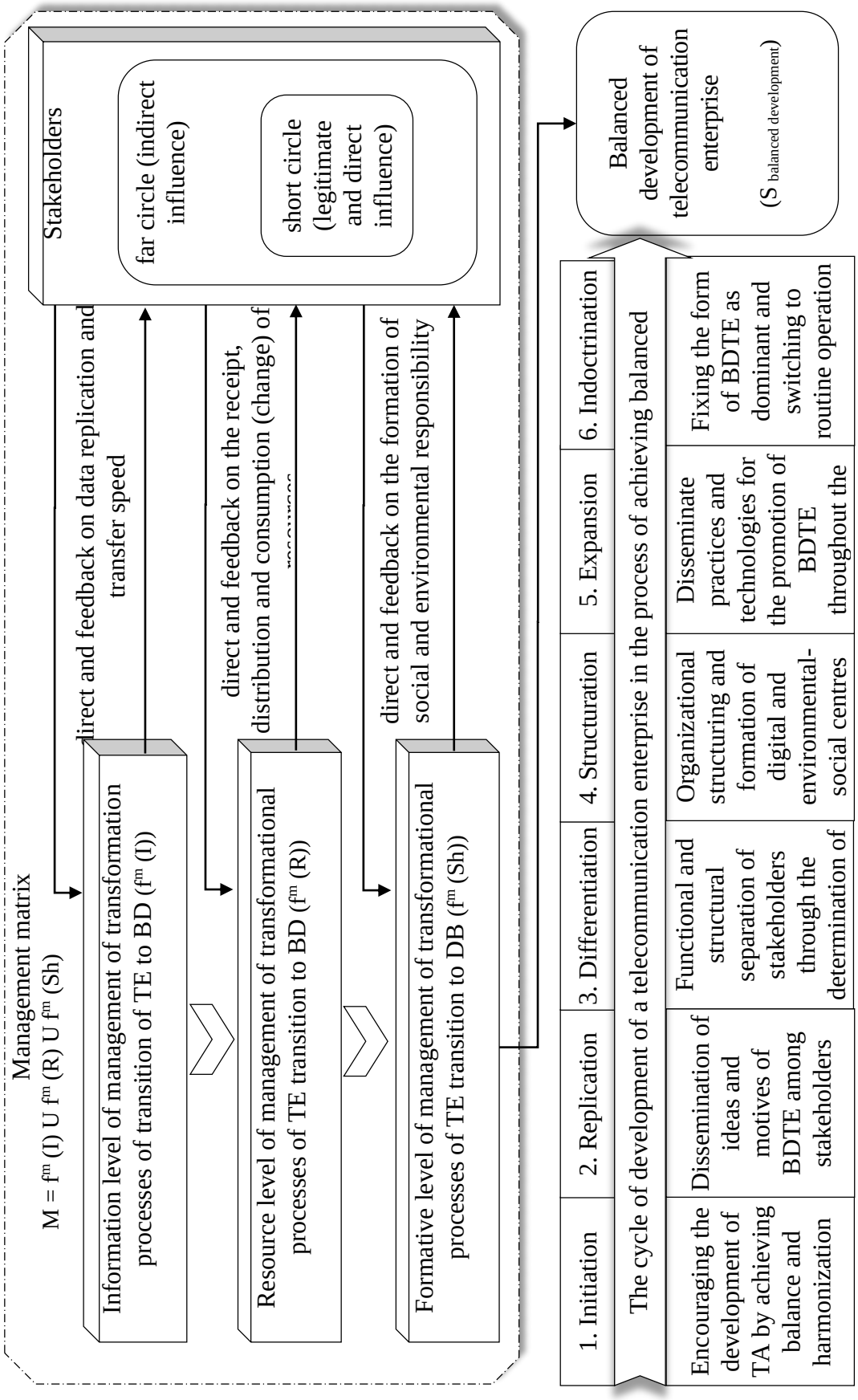

Fig. 2. The mechanism of management of transformation processes in the transition to a balanced development of a telecommunications enterprise (BDTE)

Thus, according to the author, the mechanism should consist of several interacting, interconnected and interdependent components (Figure 2).

– the sequence of stages of the development cycle of TE in the process of achieving balanced development: initiation, replication, differentiation, structuring, propagation and indoctrination;

– realization of these cycle stations at three interrelated levels of the management matrix: information (control of the process of control) $\left(f^m(I)\right)$, resource (material support of the control process) $\left(f^m(R)\right)$and formative (formation of the model of social - environmental responsibility and BDTE) $\left(f^m(Sh)\right)$;

– organization of the management process through the interaction of the information layer, mechanism objects and TE stakeholders, who receive and exchange information, quickly carry out its dissemination using the necessary resources and creating the envisaged form of development;

– implementation of the development management process by mutually inducing the activity of stakeholders, most of the immediate circle, acting as a driving force and making arbitrary motivated choices based on the information they possess;

– consolidation of the form of BDTE as dominant and transition to routine functioning as the completion of the development cycle.

The development cycle of a telecommunication enterprise in the process of achieving balanced development can be represented by the following stages:

1. Initiation – the definition of ideas and motives for development, which encourages TE to achieve balance and harmonization of activities in order to gain economic effect from the digitization of activities and convergent development and environmentally and socially responsible business.

2. Replication (creation of copies) – dissemination of ideas and motives of BDTE among the stakeholders, clarification of the necessary logistical preconditions for the transition to BDTE in the conditions of digitalization.

3. Differentiation – the functional and structural separation of stakeholders through the determination of the determinative (determining) nature of their subsequent.

activities in order to create and serve professional groups in the digital society. The uneven distribution of capital may be related to the geographical, denominational, resource, and political characteristics of the TE area. The induced induction (interaction) of TE stakeholders through "infection" and the creation of additional competition through the formation of a new capital centre under the influence of the spread of ICT and penetration into all processes of activity.

4. Structuring – organizational structuring and formation of digital and socio-ecological TE centres, support institutions, mechanisms for resource provision of balance and harmonization of TE activities.

5. Dissemination – the dissemination of new practices and technologies that contribute to BDTE across all of its affiliates and territories in order to attract new organizations and types of users and convergent partners to the network through the coverage of new types of content and throughput.

6. Indoctrination (transfer of the fundamental provisions of the belief system) – consolidation of the form of BDTE as dominant and the transition to a routine functioning, the final formation of the need for social and environmental responsibility in the minds of society with the reinforcement of the daily practice of using digital technologies in everyday life.

That is, effective management in the process of achieving balanced development at three interconnected levels of the management matrix and passing all stages of the development cycle of a telecommunication enterprise will lead to its balanced development:

$$M \to max = S_{balanced\ development} \quad (5)$$

By achieving a standard, balanced equilibrium development, TEs not only benefit economically, fulfill basic standards on social and environmental obligations, but also increase their level of responsibility to society.

The mechanism presented makes it possible to make a roadmap for the transition from the current state of development to a balanced one, and is a tool that needs conceptualization of a specific TE, setting up and using which will allow to make complex managerial decisions on the LRP with the possibility of making corrective changes in the conditions of digitalization and the need to implement convergence models.

The system of tools for the implementation of the management mechanism of the BDTE can be represented as a set of technological, organizational and economic management procedures, taking into account the principles of complementarity, economy, compromise, flexibility and resource efficiency, as well as determining the methods of influence and means of ensuring the process of management of information, organizational and financial nature.

It is advisable to carry out the management of the BDTE (Vlasova et al., 2016; Satyro et al., 2017; Han et al., 2018; Fischer et al., 2020; Tykkyläinen et al., 2020) through a set of such procedures as technological (determination of measures to influence the elements of operational activities of TE), organizational (definition of measures to influence the elements of control of TE and its economic process) and economic (definition of measures to influence the process of accumulation, distribution, redistribution and the use of financial resources). It is advisable to start forming a system of procedures for managing a BDTE by identifying problems in each area by comparing the actual state of development of TE with the reference one. At the same time it is necessary to take into account such principles of management of the BDTE as:

– complementarity – providing a positive effect of management actions in several directions at the same time;

– cost effectiveness – maximizing the effect of cost-effect ratio at minimum cost;

– compromise – eliminating differences and reaching a compromise: increasing the effect in one area should be of benefit to other areas;

– flexibility – the ability to change the management procedure with significant changes in operating conditions, taking into account certain available reserves;
– resource efficiency – planning of rational and efficient use of resources.
Methods of influence are a set of administrative methods (providing the necessary conditions for the functioning of TE with the use of organizational, administrative and disciplinary methods), economic (development of planned economic indicators of the future state of economic, environmental and social spheres and mechanisms to achieve them with the use of economic incentives) and social- psychological (application of specific ways of influencing the social processes of the workforce with the use of social plans, moral incentives and goals, methods of the formation of socio-psychological climate of labour collective) use the results of which is to create a control system in space and time to reach BD.
The process of management is ensured by means of information (use of a set of models and programs for working with databases of static, economic, commercial and other information), organizational (creation of effectively functioning functional elements of an organizational system) and financial nature (formation and efficient use of funds in sufficient size. on principles of self-sufficiency and self-financing).

4. Experimental

The logical and structural matrix for achieving a balanced socio-ecological-economic development of a digitized enterprise is presented in Table. 1. The components of such development, in accordance with the components, are sustainable economic and rapid social development, as well as preservation of favorable environmental conditions.
In view of the above, it is obvious that it is impossible to reach the standard level of all components of balanced development, which necessitates the ranking of priority goals of socio-ecological-economic development of the enterprise. Such a process will look like the solution of a multidimensional problem: in the first stages, the optimization of economic activity of one component is carried out, while observing the minimum necessary effects in the other. The most important is the sphere, the development of which should significantly affect the intensification of other components, taking into account the financial condition of the enterprise.
The activity of modern enterprises of various spheres of economic activity in one way or another requires the use of telecommunication services, in the process of rendering of which a mobile network is used, which a network of fixed radio stations is serving a small area, providing two-way radio communication with a subscriber in the area of its activity. In general, several such stations cover a large enough area to allow the subscriber to remain connected, even as he moves.
Over the period of its existence, the connection has moved from analogue to cellular, that is, from 1G "generation" to 5G, which are beginning to be introduced by developed countries of the world, and 6 generations, which standards are being developed today. At present, in Ukraine, 4G mobile communications cover a small number of settlements. However, in order for TEs and domestic businesses in various fields of economic activity to be able to balance their development and profit over current profits, TEs need to start deploying 5G mobile communications. The standardization of technology and solutions according to forecast data is expected to be completed by the end of 2021, but such local and test solutions are already in use in different countries.
The 5G standard (Temesvári et al., 2019; Maeng et al., 2020; Elazhary, 2019; D'Amato et al., 2019; Seroka-Stolka, 2014) includes mobile and fixed telephony services, high-speed Internet access and dedicated and corporate networks for the vertical sectors of the economy: transportation, medical and financial networks, which will improve the quality of use of existing high-traffic services.
5G is an advanced mobile broadband access coupled with increased communication intensities and low latency reliability, providing secure communications, less communication power consumption during signal processing, energy efficiency throughout the network, providing reliable coverage and infiltration, use of fewer base stations than existing telecommunication standards, etc. This makes the 5G standard one of the necessary components of digital transformation for both businesses and society as well as the development of the digital economy.
Thus, based on the use of 5G mobile communications in areas such as industry, transport networks, education, medicine, etc., will allow the use of spectrum infrastructures, antennas, the entire network and server part equipment to create a large number of subnets with various properties with their own priority applications (Table 1).

Table 1
New / additional 5G mobile communications capabilities in various fields of activity

Scope	New / added opportunities
Education	By leveraging the benefits of 5G mobile communications, it is possible to create virtual museums, models of the universe, the functioning of various organizations, etc. in virtual reality to improve the quality of competencies of future professionals.
Smart-cities	Due to the use of a large number of sensors on various objects (such as sensors monitoring lighting, sound, etc.), it is possible to transmit real-time information for security and law enforcement purposes in the city. For example, capturing suspicious or very loud sounds will automatically be transmitted to the Emergency and / or Law Enforcement Network. Immediate detection of damage to power lines will block the spread of these damage. The use of artificial intelligence video surveillance will allow for efficient traffic management and road load balancing, minimizing road congestion, regulating traffic lights in real time. Using artificial intelligence robots to travel tourists or people with disabilities.
Medicine	through the use of modern medical devices, it is possible to organize remote monitoring of patients, surgical and other operations using robots, especially in remote settlements on the basis of video chats with intensive data transmission, transfer of analysis results, for example, MRI directly to the doctor or patient database; online consultation with specialists in various fields, which is especially important for those who find it difficult to move.
Manufacturing	the introduction of the latest Internet of Things technology makes it possible to use industrial robots that perform a variety of functions instead of humans, as well as drones, which will prevent breakage in production areas; the possibility of more stable and accurate control of machinery, monitor the state of agricultural land in real time and adjust their support
Transport networks	through the introduction of appropriate software and through the use of sensors of different nature, it is possible to autonomously control vehicles of various kinds, to monitor the situation on the roads with the possibility of authentication of other vehicles, following the conference data exchange, especially in conditions of poor visibility, using augmented reality and navigation

*Note. * Designed by the authors.*

5. Conclusion

Thus, the paper builds a model of achieving a balanced equilibrium between economic efficiency and environmental and social
responsibility of a privatized enterprise, which is a process of harmonizing the activities of the existing (undesirable) state and achieving the equilibrium state through gradual transformations. The scientific bases of the mechanism of management of transformation processes in the process of transition to a balanced development in terms of the digitization of the activity are formulated, consisting of several interacting, interconnected and interdependent components of the management matrix, which contains information, resource and formative levels of management of these processes. A system of instruments for implementing the management mechanism has been formed and a logical and structural matrix for achieving a balanced socio-ecological and economic development of a digitized enterprise has been presented. Since the activities of modern businesses in various fields of economic activity in one way or another require the use of telecommunications services in the process of which uses the mobile network, the question arises the issue of deployment in the country of mobile communication standard 5G, which will facilitate a more accelerated transformation processes of digitalization and harmonization of enterprise development.

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Conflict of Interest

The author declares that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancy have been completely observed by the authors.

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