

# The evolution model of territories of advanced development based on the institutional-synergetic approach

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**Abstract.** Since 2015, for sustainable development of the territories and transfer of the country's economy to the advanced development, the country has been creating territories of advanced socio-economic development. At present, the status of TASED residents is granted to companies with technologies of the II-IV technological paradigms. To attract companies to the territory of higher value-added production (production of V and VI technological paradigms), appropriate institutional conditions must be created, as these productions develop in an environment that seeks change, has a global scale, individualization of production and consumption, high frequency of implementation in the production of new products, etc. The article presents a model of TASED evolution in terms of institutional-synergetic approach, which intertwines the characteristics of the required institutional conditions and environmental parameters with the level of technological development of key enterprises of a special territory, which allows launching the mechanism of self-development.

## 1 Introduction

Since 2015, the government has been trying to intensify business activity in the Far East, in mono-profile municipalities (hereinafter - a monotown) and closed administrative-territorial entities by focusing on the allocation of individual territories, granting them the status of areas of advanced socio-economic development (TASED). Government documents justify the creation of TASED by the need for comfortable living conditions for the population, sustainable development of territories, diversification of the economy of monotowns. To achieve these goals, the state provides TASED residents with tax benefits, a reduced rate of contributions to social funds and some other preferences. At the same time, scientists note that granting the territory the TASED status does not mean a rapid transition to a faster development trend [1].

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The classification of TASED by the potential of socio-economic development shows a variety of combinations of initial factors of each territory [2]. Thus, among 82 TASED monotowns, the socio-economic situation of 36 (44% of the total number of TASED created in monotowns) is characterized as difficult, 33 (40%) have risks of deterioration, and 13 (16%) have a stable socio-economic situation.

The border areas include 17 TASED located 10 to 200 km from the border with foreign countries. The majority of TASED (43 units or 52% of the total) are central. On the outskirts of the country, there are 22 TASED. The agglomeration includes 24 TASED (29%), and 48 TASED (59%) are located near the formed agglomerations (less than 100 km away). Ten TASED (12%) are located far from the centers of concentration of the population.

Territories differ in many parameters (geographical location, demography, living standards, etc.), although, they have to switch to a faster development trend in ten years.

Negative results of activities of one and low efficiency of other previously open territories with a special business regime [3], the complexity of the economic situation in the country, the serious backwardness of Russia's technological development from advanced countries, and the need to develop new development priorities [4] require an extraordinary approach to TASED management.

An approach of choice is an institutional-synergetic one, with a focus on positive synergetic effects in territorial development based on the creation of a coherent institutional environment. It is important to note that the creation of territorial development institutions must be strategic [5].

Institutional-synergetic management, considering the conditions of nonlinearity, uneven development, adjusts the mechanisms of self-organization of the territory, emphasizing the phase, structural transformations in the system, and creating conditions for various types of synergies in phase and structural dynamics.

## **2 TASED self-development mechanism based on the institutional-synergetic approach**

According to the institutional-synergetic approach, the management of socio-economic development of the territory includes the creation of conditions for launching self-development of the system, namely shifting the focus from external influences to the identification of a joker (leading factor) and triggers (key managing links), developing measures to activate them, forming, along with the channel of negative feedback (provides stabilization of the system), the channel of positive feedback (responsible for recording qualitative changes in the system and transfer the system to the next stage of evolution). Synergetics views the territory as an integrated open system that evolves nonlinearly and intermittently. Qualitative and structural changes underlie the phase transitions of the first, second, and third kind [6].

The TASED system develops, increasing the efficiency of functioning, changing qualitatively and structurally, based on changes of the II and I kind: the emergence of a new element in the system and assignment of new functions to the newly formed elements. Changes in the system begin with the accumulation of elements in the system, the growth of the system as a whole. These changes are classified as kind III changes (Table 1).

**Table 1.** Territorial development in terms of institutional-synergetic approach

Transformations	Stages	The essence of changes	Phase transition	Characteristics of the phase transition
Type III	Beginning of the transformation	Accumulation of elements in the system	Kind III	Quantitative changes at the lowest level
Type II	Continuation of changes	Emergence of new elements in the system	Kind II	Formation of new functions
Type I	Completion of the transformation	Emergence or reorganization of existing structures to perform the assigned functions	Kind I	Assignment of new functions to newly formed elements, structures

The beginning of change is phase transitions of the third kind (fluctuation, critical awareness of the need for change, etc.), which are difficult to recognize. However, the transformation of the system starts with them. In the future, new elements emerge in the system and a phase transition of the second kind takes place during the formation of new functions. The essence of the transformation is the need to ensure the relationship of the system-forming elements of TASED based on their consistency and order. These changes relate to phase transitions of the first kind. This transition is carried out after the assignment of all new functions to the newly formed institutional structures corresponding to the new level of the hierarchy. To determine the system-forming factors, which, when changed, generate phase transitions of the I, II, and III kinds, it is proposed to build a TASED evolution model based on S. Glazyev’s theory of technological systems [7], I. Ansoff’s models of competitive strategies [8], and F. Glazl. B. Livekhud’s dynamic development of enterprise [9] (Table 2).

**Table 2.** Characteristics of environmental parameters and the level of technological development of the territory of advanced socio-economic development

Parameter	The level of technological development of key TASED enterprises				
	II TP	III TP	IV TP	V TP	VI TP
B. Livekhud’s phase of development	Pioneer	Differentiation	Integration	Association	Creativity
Ansoff’s type of organization	Traditional	Production	Marketing	Strategic	Flexible
Level of environment variability	Recurring	Expanding	Varying	Leaping	Unforeseen
Technology change rate	Very slow	Slow	Moderate	Borrowing of technologies	Emergence of new technologies
<i>Parameters of external environment instability</i>					
Degree of openness of the system	Rejects changes	Adapts to changes	Looks for habitual changes, asynergism	Looks for changes, global scale	Looks for radical changes, creativity
External environment	Recurring	Slowly changing, predictable	Rapidly changing, predictable	Volatile, predictable	Volatile, partially predictable
Type of changes	Slower than the company’s reaction	Comparing with the reaction of the company	Comparing with the reaction of the company	Faster than the company’s reaction	Faster than the company’s reaction

**Table 2.** Continued

<i>Characteristics of the innovative development system</i>					
Frequency of introduction of new products into production	Rare	Low	Moderate	High	High

During its development, the system will undergo several phase transitions of the first kind, which occur abruptly due to the desire to streamline and stabilize the system, to reduce the gap of the first kind (gaps between the elements of the system). In terms of the institutional-synergetic approach in the TASED system, the gap will be the mismatch between the level of technology development of TASED residents and the existing institutional environment.

Initially, at the level of the territory, the TASED embryo is formed - resident enterprises, whose technologies will mainly correspond to the technological structure of the key enterprises of the territory. This is primarily because the institutional environment of the territory (staff training system, logistics, labor market, utilities, etc.), as a rule, are focused on the needs of key enterprises. Quantitative growth of TASED is a phase transition of the III kind. Competition for labor resources and markets will contribute to the transformation of the embryonic center into clusters, which will lead to the emergence of new functions for management components, which characterizes the phase transition of the second kind. The phase transition of the first kind begins from the moment of mastering the new functions of the critical number of TASED participants. The formation of a new structure in the system as it develops leads to a new-quality formation. Further, a new trajectory of development forms aimed at implementing the next large-scale level - the next model of TASED. Each TASED will evolve from the existing technological level of development of the territory to the next technological system.

Each large-scale level in the TASED system arises as a result of phase transitions of the second kind and has its "elementary bricks", which are the final structures of the previous level.

The model of TASED evolution takes the level of technological development of the territory as a system-forming factor because advanced development cannot proceed with outdated technologies. In this case, the replacement of technologies requires an appropriate industrial environment, which will reduce the transaction and transformation costs of the process of technological renewal [10].

### 3 The model of TASED evolution depending on the level of uncertainty of the external environment

Table 3 presents the general understanding of the progress of TASED given internal and external influences based on I. Ansoff and B. Livehud’s models.

**Table 3.** Model of evolution of territories of advanced socio-economic development depending on the level of environmental uncertainty

TASED development phase	Pioneer	Differentiation	Integration	Association	Creativity
Concept	Control of and rapid solution to the problem	Operational management	Tactical management	Strategic management	Innovative strategic management
Thinking of the project team (leader)	TASED – an operational management tool	TASED – a tactical tool	TASED – tactical thinking	TASED – a strategic tool	TASED – strategic thinking

**Table 3.** Continued

Main goal	Territory survival	Growth of the territory performance	Territory development	Qualitative territory development	Innovative territory development
Role of the leader	Operator	Tactician	Navigator	Strategist	Innovator
TASED performance criteria	Promptness	Relevance	Consistency	Adequacy	Coherence
Reaction to changes in the external environment	Ignored	Consideration of changes	Management of changes	Reflexive reaction	Synergistic effect

The “pioneer” TASED development phase corresponds to the second TP. The system-forming industries are mining and ferrous metallurgy. The second TP corresponds to the recurrent level of environmental variability, which is characterized by the rare introduction into production of new products, repetitive external environment, long product life cycle, the emphasis in product development is fixed on extending the life of the product.

The "differentiation" phase is characterized by an expanding level of environmental variability, which is coherent with the third TP. The system-forming industries are heavy engineering and electrical industry. The external environment is slowly changing and predictable, the system adapts to change. There is a low frequency of introduction of new products and product life cycle into production, slow pace of technology change, and imitation of technology change and a new type of products.

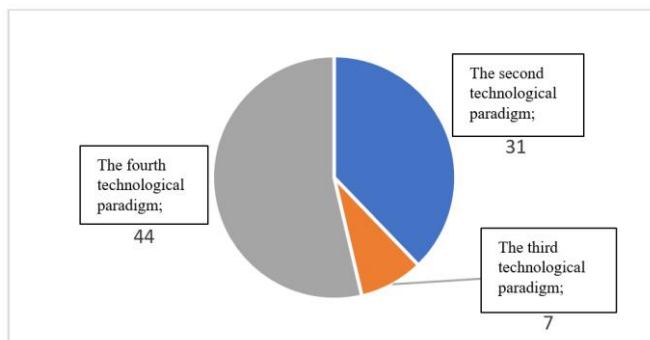
The fourth TP corresponds to the "integration" development phase, in which the system looks for habitual changes in a rapidly changing, predictable environment. The system-forming industries are machine engineering, non-ferrous metallurgy, oil refining, synthetic polymeric materials. There is a moderate rate of change in technology, the frequency of introduction of new products into the production and product life cycle; the emphasis in technology research and product development is made on their improvement.

The "association" stage of organizational development is when the issue of innovation, expansion of institutional forms and relations can be raised, and new institutional structures of innovative development can be created (at earlier stages they are created artificially). TASED begins to shape the external environment itself; the priority of the quality of growth, and not just the growth of quantitative indicators, is realized. In this phase, technologies of the fourth technological paradigm, such as electronics and microelectronics, information technologies, genetic engineering, telecommunications are organically created and developed.

There is a transformation of traditional or the formation of new types of high-tech territories, including an effective management system, innovative infrastructure in production and social sphere (housing, health, education, recreation, etc.) based on the active use of information and communication technologies.

The next stage is “creativity”, the least studied in domestic theory and practice, as there are almost no productions of the sixth TP.

Analysis of the specialization of 82 TOSED monocities revealed that in 26 of them the basis of the economy are machine-building enterprises, in 14 - chemical and petrochemical industry, in 14 - mining, in 10 - ferrous metallurgy, etc. Most town-forming enterprises of special territories use IV TP technologies. These are 44 territories or 53.7% of the total number of territories (Figure 1), which corresponds to the level of "integration" according to the proposed model of TASED evolution.



**Fig. 1.** Classification of 82 TOSED monotowns according to the level of technological development of a town-forming enterprise

Currently, one control model is proposed for TASED with different levels of technological development. The inconsistency of the management system with the technological potential hinders the industrial and socio-economic development of the territory. Development is also stalling due to gaps between the technological levels of existing enterprises in the territory and TASED residents. The analysis of technologies of the production enterprises with a resident status revealed a negative trend in some TASED: residents come with technologies of a lower level than in aboriginal enterprises. This situation is a strong indication of the degradation of the industrial development of the territory. Yes, there and then, such enterprises solve short-term problems - the attraction of investments, creation of new productions. But in the medium and long term, this is the way to "nowhere" - if in the 21st century, in the digital age, government preferences are given to enterprises whose technologies are based on automation and mechanized labor.

Another obstacle to the transfer of socio-economic development of the territory to the leading trend is the inconsistency of the existing development potential with the set goals. Analysis of the socio-economic development of TASED showed that most of them have a low-income base (low market capacity), problems with reproduction and retention (which entails a poorly developed labor market), etc.

The transition between levels can take a long time and be intermittent. Therefore, one of the tasks of the TASED team is to reduce time gaps based on the development of a control model with positive and negative feedback channels.

## 4 Conclusions

1. To attract companies to the territory of higher value-added production (production of V and VI technological paradigms), appropriate institutional conditions must be created, as these productions develop in an environment that seeks change, has a global scale, individualization of production and consumption, high frequency of implementation in the production of new products, etc.

2. The level of technological development of key enterprises of the territory is the main object of the TASED model and the main factor influencing its building. The driving force of the transition is the desire to streamline and stabilize the system, to reduce the gaps between the TASED elements (gaps of the first kind).

3. The solution to the problem of such gaps is directly dependent on the expertise of the TASED team, which must optimally design the structure and development processes in the system to translate them into self-organization and synergistic development.

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