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## **EXPLORING THE FUNCTIONAL POTENTIAL OF THE INSTITUTIONAL ENVIRONMENT UNDER CONDITIONS OF TECHNOLOGICAL CHANGE**

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The article presents a conceptual analysis of the functional potential of the institutional environment in the context of technological transformation, with particular emphasis on the interdependence between institutional norms and the dynamics of innovation-driven change. The author proposes a triadic model of institutional functions – coordination, distribution, and stimulation – as the foundation for uncovering the capacity of institutions to adapt to emerging technological trajectories and foster development that integrates efficiency with long-term resilience. It is argued that the realization of institutional functions plays a critical role in reducing uncertainty, ensuring equitable access to resources, and lowering transaction costs – all of which are essential for accelerating technological progress while maintaining internal systemic stability. The study introduces a functional differentiation into sub-functions within each core function, which enables a more detailed representation of institutional action mechanisms in an innovation-oriented environment, as well as the identification of potential dysfunctions that may impede adaptive responses to change. Special attention is paid to the cross-functional impact of key institutions, such as patent regulation, standardization, antitrust rules, property rights, and ethical norms. The analysis reveals their specific contributions to the formation of adaptive efficiency in conditions of technological dynamism and intensified global competition. The necessity of preserving a balanced interaction between the three institutional functions is substantiated as a prerequisite for maintaining the integrity of the institutional configuration and the sustainability of socio-economic transformation. The research is grounded in a system-functional approach that allows for the operationalization of institutional influence through the identification of its key criteria, mechanisms of action, and dysfunction risks. This provides a robust methodological foundation for future empirical measurement of institutional adaptation effectiveness, the development of relevant indicators of responsiveness to technological change, and the formulation of strategies aimed at enhancing institutional flexibility, inclusiveness, and innovation potential.

**Keywords:** institutional environment, adaptive efficiency of institutional environment, functions of institutions, sub-functions of institutions, technological change, coordination function, distribution function, stimulation function.

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### ***Introduction and problem statement***

As is well known, the institutional environment defines the framework of socio-economic development, since it is precisely through the system of formal and informal institutions – laws, norms, customs, traditions – that the behavior of individuals and collective actors is regulated, their interaction is structured, uncertainty is reduced, and the social space is organized. Institutions not only respond to change but also shape the trajectories of their course, acting as an active factor of stability, inclusiveness, and economic efficiency.

The generalization of classical and contemporary approaches makes it possible to formulate a key requirement for the institutional environment in the era of post-industrial transformations: it must combine resilience with flexibility, and justice with adaptability. As emphasized by Douglass North, sustainable economic development is based on the ability of the institutional matrix to adapt to evolutionary change [1, p. 83]. Institutions set the rules of the game, but at the same time, they must be embedded in the process of change: to learn, to adjust their mechanisms of action, and to adapt their functional logic to the dynamics of the environment. Thus, institutions are not an external shell of development; they constitute its internal infrastructure. Through the realization of their functions, institutions transform potential resources into concrete achievements, ensuring the capacity of society to respond to new challenges. In the context of post-industrial transformations, this role becomes particularly significant: it is institutions capable of flexible and consistent action under conditions of uncertainty that create the foundation not only for survival but also for sustainable development. As more recent studies confirm, institutional structures play a predominant role in sustaining long-term growth, beyond the effects of geography or integration [2]. Effective institutions do not replace other development factors; they create the conditions under which technology, knowledge, and capital can be realized with maximum productivity.

### ***Analysis and research of recent publications***

Considering the institutional environment as a system of interconnected economic, politico-legal, social, socio-cultural, ecological, and innovation-related institutions, namely, formal and informal rules, norms, procedures, constraints, beliefs, and customs operating within value-cognitive, normative-legal, and regulatory dimensions, and which, through their combined interaction, determine the vector of socio-economic development of society [3], we arrive at the conclusion that it is precisely through the functional interaction of these elements that the institutional

system's capacity to support adaptation to change is formed. The essence of any system, including the institutional one, is most fully revealed through the functions it performs in relation to other elements of the environment. Functions are not only manifestations of the stabilizing role of institutions but also evidence of their adaptive capacity: institutions coordinate, allocate resources, and shape incentives, and it is through these mechanisms that they determine the trajectory of socio-economic development. At the same time, functions are not necessarily positive: dysfunctional manifestations of institutions, such as inertia, resistance to change, and the reinforcement of outdated practices, can hinder adaptation and undermine the foundations of progressive development. Therefore, it is the clear differentiation of the functional roles of institutions that makes it possible to assess the capacity of the institutional environment to respond to the challenges of the time, especially technological ones.

The functions of the institutional environment and its role in meeting the needs of societal development were studied by the classics of institutionalism, who laid the groundwork for understanding the functional nature of institutions. Thus, T. Veblen emphasized the role of habitual behavior and established patterns [4], J. R. Commons – the importance of collective action [5], R. Coase – the significance of minimizing transaction costs [6], and D. North – the role of institutional uncertainty and historical evolution [1]. These ideas have been developed by contemporary scholars who complemented the functional picture of institutions with cultural, political, and evolutionary dimensions. International organizations, such as the World Bank, UNCTAD, and OECD [7] – [10], have transformed this conceptual legacy into practical recommendations for institutional reform, focusing on adaptability, inclusiveness, and effectiveness.

However, in our view, this issue remains far from resolved, and the list of functions of the institutional environment is far from complete. Most existing studies either define institutional functions in overly general terms, limiting themselves to basic coordinating or regulatory roles, or else too narrowly, from the perspective of individual sectors (economy, politics, law), without considering the systemic interaction between institutional mechanisms and the demands of a technologically dynamic society. Contemporary transformations give rise to new types of risks and necessitate institutional flexibility, the ability to respond swiftly, and long-term adaptability, yet these aspects remain underrepresented in classical approaches to the classification of institutional functions.

### ***The purpose of the article***

The aim of the article is to carry out a conceptual differentiation of institutional functions in the context of technological transformation, combining approaches from economic and institutional theory with contemporary perspectives of international organizations, and to improve the approach to conceptualizing the mechanism of institutional function implementation on the basis of structural-functional logic and a systems approach, with subsequent systematization of sub-functions, criteria, mechanisms, and potential dysfunctions.

### ***Presentation of the main research material***

Despite the absence of a unified classification of institutional environment functions in academic and applied literature, most conceptual approaches converge on the view that institutions perform fundamental tasks essential for structuring social interactions, coordinating economic behavior, ensuring predictability and stability, and supporting development. The comparison of the provisions of classical institutional theory [1], [4] – [6], modern interdisciplinary models [11] – [13], and the functional frameworks developed by international organizations (World Bank, OECD, etc.) [7] – [10], makes it possible to distinguish three integral functions that constitute the functional core of institutional influence: coordination, distribution, and stimulation.

The coordination function consists in organizing interactions among social actors, reducing uncertainty, and ensuring predictability. Institutions act as reference points for economic agents, defining acceptable forms of behavior and the expected consequences of their violation. Through systems of formalized and non-formalized rules, they create frameworks within which individual actions and plans may be aligned, thereby allowing for the formation of stable expectations regarding the behavior of other participants in interaction, which, in turn, reduces uncertainty and increases predictability of outcomes in the socio-economic environment. Its implementation involves the establishment and maintenance of a system of rules – both formal (laws, regulations, contracts) and informal (moral norms, traditions, social expectations) – that serve as behavioral guidelines for actors.

Coordination includes the creation of enforcement mechanisms (judicial system, police, antitrust institutions) and the institutionalization of linguistic, informational, and cultural codes (shared language, standards, reputational mechanisms) that ensure mutual consistency of actions. The successful performance of the coordination function ensures the stability of the social system, enables the reduction of transaction costs, and promotes the formation of trust.

In the context of technological transformations, this function becomes a foundation for adaptability, providing a common informational field, interaction rules, and predictable response mechanisms. As D. North noted [1, p. 36], stable institutional frameworks are a precondition for innovation dynamics precisely because of their capacity to coordinate expectations.

The distributive function of the institutional environment lies in regulating access to limited resources by establishing normative frameworks that outline acceptable behavioral strategies and fix the delineation of rights and obligations. Institutions do not merely restrict the opportunities of certain social groups, but simultaneously grant privileges to others, thereby rationalizing mechanisms for the allocation of economic, political, and social goods. This refers to a complex distribution system that includes not only financial redistribution instruments (taxes, transfers, social programs) but also mechanisms of political representation, legal protection, and participation in decision-making. Institutions set the rules by which the forms of participation in social life are defined: from access to employment and credit resources to mechanisms of electoral participation and policy formation. Effective implementation of this function ensures not only functional justice but also institutional legitimacy, reduces social tension, and fosters the formation of trust.

During periods of structural restructuring or technological transformation, when the risk of capital devaluation and rising inequality increases, the ability of institutions to redistribute resources fairly becomes a critical condition for maintaining social cohesion and preventing conflict. As emphasized in the World Bank report [7], the resilience of the institutional environment in times of change largely depends on how effectively it ensures the fair distribution of the benefits and costs of transformation.

The stimulative function of the institutional environment is manifested in the creation of conditions under which the benefits of economic activity increase through improved efficiency in the organization of transactions. A key outcome of this is the reduction of transaction costs, primarily those associated with exchange, and in particular, costs related to ensuring and enforcing contractual obligations. By performing this function, institutions create a predictable, legal, and procedurally stable field of interaction in which parties are able to coordinate their actions with minimal costs for coordination, monitoring, and enforcement. This effect is achieved not only through regulatory clarity and the stability of rules, but also through the formation of trust in the institutional order as a

guarantor of benefits arising from lawful behavior. When institutions provide impartial protection of property rights and a comprehensible system of sanctions and rewards, they set incentives that orient economic agents toward productive activity.

Thus, institutions not only structure market interactions but also create preconditions for strategic investment, innovation activity, and technological renewal. In this context, the stimulative function of institutions plays a critical role in ensuring the dynamism and openness of the economic system to long-term transformations.

The coordination, distributive, and stimulative functions form an interrelated system within which the institutional environment becomes capable of supporting adaptation to technological, social, and economic change. Their analytical differentiation

allows for a clear understanding of the mechanisms through which institutions influence development, the results they produce, and how they contribute to society's transformative capacity.

An institutional environment capable of supporting adaptation to technological shifts is shaped by the specific effects of individual institutions, each of which influences development trajectories in its own way. Each institution (law, patent, license, property right, contract law, antitrust law, standardization, data openness, norms of responsibility, ethical norms, etc.) not only sets the rules of the game, but also has its own internal logic of either stimulating or constraining technological renewal, which makes it appropriate to analyze their effects using a triadic scheme: institution – mechanism – result (Table 1).

Table 1

**Institutions and Their Role in Adapting to Technological Transformations**

Institution	Mechanism	Result	Potential Risks	Institutional Adaptation
Law	Formalization of rules, sanctions, scaling of change	Legal certainty, support for technological development	Lag behind technology, a regulatory vacuum	Flexible legal regimes, rapid updating, expert involvement
Patent	Restricted access to invention, temporary monopoly	Innovation incentives via quasi-rent appropriation	Dormant patents, blocking innovators, and institutional inertia	Shortened terms, open licensing, system reform
License	Market access regulation, enforcement of standards	Safety guarantees, promotion of responsible business	Innovation barriers, delay in technology deployment	Deregulation, digital licensing, regulatory sandboxes
Property Rights	Guarantees over resources and intangible assets	Investment attraction, technology transfer	Raiding, IP violations, investor flight	Digital registries, IP protection, and harmonization with international standards
Contract Law	Guarantees of contract enforcement	Partnerships, commercialization of innovations	Ineffective courts, contractual distrust	Smart contracts, expedited dispute resolution
Antitrust Law	Barrier removal, punishment of collusion	Increased competition, innovation stimulation	Rule circumvention, pseudo-competition, technological monopoly	Enhanced oversight, support for small-scale innovators
Standardization	Unification of requirements, coordination	Network effects, broad diffusion of innovation	Entrenchment of outdated solutions, suppression of alternatives	Periodic review, open standards
Liability Norms	Legal certainty, risk regulation	Safe deployment of technologies	Legal uncertainty, innovation blockage	Pilot regimes, new insurance models
Ethical Norms	Public consensus, codes of conduct	Trust in technologies, social legitimacy	Conflict with progress, resistance to innovation	Dialogue, ethics committees, public engagement

Source: compiled based on [8], [9], [15], [16].

Law, as a foundational institution, provides the general framework of legal regulation. Its mechanism consists of the codification of norms and their enforcement, which forms the stability of the legal field and enables the scaling of technological change by creating new sectors. However, in the case of slow legislative renewal, a regulatory vacuum arises – new technologies remain without legal support. Therefore, adaptive mechanisms for updating laws, consultations with technology experts, and innovative legal formats are necessary.

A patent grants exclusive rights to the use of an invention. Its mechanism is based on restricting access to a technology for a certain period, which provides the innovator with an opportunity to obtain innovation-related quasi-rents. This, in turn, stimulates investment in research and development, since it creates the prospect of exclusive appropriation of returns from innovation. As a result, this form of regulation increases the number of technological innovations and gives rise to new products and processes capable of transforming structures of production, markets, and consumption. However, in conditions of accelerated technological cycles, the patent institution may contradict the demands of dynamism: companies begin to purchase patents in order to restrict competition without implementing the respective technologies. This creates the effect of “sleeping patents,” which block innovation diffusion and lead to institutional lock-in: the system of innovation reward is transformed into a mechanism for rent extraction from outdated technologies. As a consequence, the patent system begins to constrain rather than stimulate technological development. Thus, the effectiveness of this institution requires modernization: reforming the duration of monopoly rights, supporting open licensing, and implementing mechanisms for early access to patented solutions.

The license, as an institution, regulates the right to access certain types of activities. Its mechanism lies in preliminary control and verification of compliance with established standards. The result is the establishment of a minimum threshold of safety, quality, and transparency, which reduces risks for consumers and increases trust in innovative products. Moreover, clear market entry conditions are formed, stimulating fair competition and the development of responsible business. In the technological context, the license creates prerequisites for implementing complex solutions in socially sensitive fields (e.g., biotechnology). At the same time, excessive regulation or outdated requirements may turn licensing into a barrier for the entry of innovative actors: under conditions of institutional inertia, licenses begin to

work against innovators. Hence, the adaptation of this institution should include deregulation and simplification of procedures for the trial implementation of new business models.

Property rights define entitlements to resources and outcomes of activity, including intangible assets. Their mechanism involves legal certainty and the guarantee of preserving the subject’s rights to the object of ownership. The result is increased investment attractiveness of innovation, enhanced technology transfer, stimulation of long-term planning, and diversification of investor portfolios. Where property rights are effectively protected, the economy develops a dynamic infrastructure for the generation and scaling of innovations. However, in cases of weak legal protection, absence of effective registries, or deficient judicial enforcement, there is a risk of asset raiding, piracy, and demotivation of developers. Institutional adaptation in this area involves digitization of registries, harmonization of norms with international practice, and strengthening sanctions for violations of intellectual property rights.

Contract law defines the enforceability of obligations within agreements. Its mechanism is based on the formalization of transactions and guarantees of their enforcement through judicial or arbitral systems. The result is a reduction of uncertainty in intersubjective interactions, expansion of partnerships (particularly in the sphere of open innovation), and acceleration of the transition from idea to market realization. However, if contract law lacks an effective enforcement infrastructure, it fails to perform its guarantee function, reducing the volume of cooperation. Adaptation of this institution involves simplifying dispute resolution procedures, recognizing smart contracts, and introducing alternative arbitration mechanisms for innovation-related projects.

Antitrust law, as an institution, performs a coordination function by limiting the abuse of market power. Its mechanism involves creating the rules of the game that ensure fair competition: controlling capital concentration and supporting the entry of new players. The result is increased technological dynamism within sectors: competition stimulates innovation, and firms seek ways to reduce costs and improve quality. Under transformational conditions, this allows markets to renew themselves, contributing to the emergence of new business models. However, if antitrust regulation fails to keep pace with the tempo of technological change, large corporations preserve rent via pseudo-competition, blocking innovative development.

The institution of standards (in the technological sphere) forms technical unification of components and systems. Its mechanism lies in coordinating

producers' actions around shared technical requirements. The result is a network effect: the spread of a unified standard promotes interoperability, reduces compatibility costs, accelerates technology diffusion, and fosters the development of second-order innovations (modifications, applications), which ultimately leads to the institutionalization of a technology as an industry or global standard that transforms market structures. However, in the case of premature or overly rigid standardization, outdated solutions may become entrenched. Therefore, it is necessary to ensure mechanisms for the periodic review of standards, open discussion of their specifications, and the development of flexible second-tier standards.

Liability norms define who bears legal responsibility for harm associated with the use of technologies. Their mechanism involves assigning obligations through certification, auditing, and insurance, which allows for the implementation of technologies in environments with clearly understood risks. The result is increased trust in innovation, consumer protection, and institutional stability.

At the same time, if liability mechanisms do not adapt to new technologies, legal uncertainty arises, blocking innovation.

Ethical and social norms perform a regulatory function beyond formal law, operating through informal pressure and public expectations. In a technological context, such norms provide cultural legitimacy for innovation. If a social norm is flexible, it supports innovation acceptance and fosters a culture of openness to novelty; if norms are excessively conservative, cultural inertia emerges, hindering change. In such cases, communication efforts by educational institutions, civil society organizations, and opinion leaders are required.

In the contemporary institutional context shaped by the pressures of technological change, each key institution performs one or more functions among the three basic ones: coordination, distribution, and stimulation. According to their substantive content, it is possible to differentiate the functional load of the institutions discussed above (Table 2).

Table 2

**Institutional Functions in the Context of Technological Transformations**

Institution	Institutional Functions	Explanation of the Institutional Role for Technological Change Effectiveness
Law	Coordinating, Distributive, Stimulative	Law sets general rules of conduct and sanctions for violations (coordinating), defines access to rights and obligations (distributive), and reduces uncertainty in transactions through legal certainty (stimulative)
Patent	Distributive, Stimulative	The patent restricts access to innovation by granting exclusive rights (distributive) and creates an incentive for innovation by providing expected rewards (stimulative)
License	Distributive, Stimulative	The license regulates access to specific types of activities, filtering entry (distributive), and creates predictability, which reduces transaction costs (stimulative)
Property Rights	Distributive, Stimulative	Property rights define who owns resources (distributive), and reduce exchange costs and risks, thereby increasing the efficiency of transactions (stimulative)
Contract Law	Coordinating, Stimulative	Contract law formalizes obligations and enforcement mechanisms (coordinating), and reduces costs of contract enforcement (stimulative)
Antitrust Law	Coordinating, Distributive	Antitrust law limits abuse of market power and sets rules of competition (coordinating), restricts dominant actors' access to rents, and opens the market to others (distributive)
Standardization	Coordinating, Stimulative	Standardization aligns technical decisions among market participants (coordinating), and reduces compatibility and information search costs (stimulative)
Liability Norms	Coordinating, Distributive	Define who is responsible and for what (coordinating), and delineate risk distribution between actors (distributive).
Ethical Norms	Coordinating	Establish behavioral expectations beyond formal law and set moral benchmarks (coordinating)

Source: the table is constructed according to the author's methodological framework

Law, as a basic institution, combines all three functions: its coordination role lies in establishing general rules of conduct, which enables predictability and reduces uncertainty; through its distributive mechanism, law restricts or opens access to rights and obligations depending on the established norms; as a stimulative factor, law reduces transaction costs through clearly defined procedural frameworks.

The patent performs both distributive and stimulative functions. Within the distributive function, it secures rights to innovative developments, establishing boundaries of access for third parties and concentrating intellectual and material resources in the hands of the innovator. Simultaneously, the patent realizes the stimulative function: by granting a temporary monopoly over the results of intellectual activity, it reduces the costs of legal protection for innovations and enhances motivation to invest in science and technological development.

The license, in turn, also combines distributive and stimulative functions. In its distributive aspect, it defines the conditions of entry into certain markets or regulated areas of activity, setting institutional boundaries for access. At the same time, licensing performs a stimulative function, as it creates standardized rules of access that increase the predictability of economic behavior, reduce informational and transaction costs, and thereby lower risks for investors and consumers.

Property rights represent an example of an institution that fulfills all three functions: in coordination terms, they indicate who can use resources and how; in the distributive aspect, they ensure exclusive ownership and thereby restrict access for other actors; as a stimulative instrument, property rights guarantee the retention of benefits from ownership, thereby reducing transaction costs and enhancing investment attractiveness.

Contract law performs a coordination function by ensuring the binding force of contracts. Its stimulative function is manifested in reducing the costs of compliance, ensuring the reliability of interactions, and accelerating the innovation cycle. When effective arbitration and judicial protection are in place, the institution of contract significantly increases the efficiency of economic transactions.

Antitrust law performs coordination and distributive functions. The first is achieved through the establishment of fair competition frameworks; the second is accomplished by limiting market power concentration, which enables less powerful innovators to enter the market and contribute to its renewal.

The institution of standardization ensures coordination among participants of technological

markets by unifying technical requirements. It also performs a stimulative function, since standards reduce the costs of specification alignment, enhance component interoperability, and accelerate the diffusion of new technologies.

Liability norms function primarily as tools of coordination and stimulation. They define the expected consequences of norm violations, increase the predictability of technology use, and reduce risks, thus encouraging investors and users to adopt innovations.

Ethical norms fulfill coordination and distributive functions. They define boundaries of acceptable behavior, influencing the cultural and societal acceptance of technologies. Through social control, ethical norms also regulate the availability of certain practices or technologies within society.

In general, the consideration of functional realization of the above-mentioned institutions confirms the necessity of their adaptation to the challenges of technological transformation. The functional structure must remain open to revision while preserving a balance between normative stability and dynamic innovation demands.

The interdependence of the coordination, distributive, and stimulative functions of institutions determines the integrated architecture of an effective institutional environment. These are not three autonomous vectors of influence but interrelated mechanisms, each realized through the others, forming a coherent institutional configuration capable of ensuring sustainable transformation in conditions of technological and social dynamism.

First, a reinforcing effect emerges between the functions. The coordination function, which ensures rule clarity, procedural transparency, and action predictability, provides the foundation for the legitimate distribution of resources and access rights to benefits. The distributive function, in turn, enhances trust in coordination mechanisms, as fairness in access to outcomes strengthens consensus regarding the rules. The stimulative function activates the participation of economic actors by reducing transactional barriers and reinforcing motivational structures, which, in turn, contribute to productivity growth and expand the potential for equitable redistribution. In such interaction, the functions do not merely coexist – they form a spiral of mutual reinforcement: legal order – fairness – initiative – growth – institutional trust.

Second, an effective institutional environment requires maintaining functional balance and avoiding extremes in the realization of individual functions. Dominance of the coordination function without adequate stimulative mechanisms leads to institutional stagnation, a decline in initiative, and the inhibition

of innovation-driven development. Even under conditions of formal order and clearly established rules, a society deprived of effective institutions for supporting innovation loses its capacity for adaptive modernization. This dynamic was demonstrated by authoritarian systems, which, while providing external stability, simultaneously suppressed entrepreneurial activity, ultimately leading to their technological and economic degradation.

Conversely, the predominance of the stimulative function without appropriate coordination generates opposite challenges – fragmentation of the institutional environment, destructive competition, and crisis-related distortions. When economic actors operate solely on the basis of individual gain, ignoring systemic constraints and externalities, the result is market failures, social cleavages, and financial destabilization. A classic illustration is the global financial crisis of 2008, which arose due to an imbalance: powerful incentives for banking profitability were not aligned with the institutional system of risk management.

The distributive function of institutions also requires a clear balance with stimulative mechanisms. Its dominance in the absence of an appropriate motivational architecture generates equality based on shared poverty. Thus, excessive equalization in the context of centralized economies eliminated certain manifestations of injustice, but at the same time, nullified incentives for individual productivity. This resulted in institutional inertia, suppression of innovation dynamics, and chronic economic stagnation.

Conversely, the dominance of stimulative logic without proper distributive mechanisms gives rise to asymmetries of access, social tension, and erosion of trust in institutions. Under such conditions, even rapid technological growth fails to translate into broad-based improvements in well-being; instead, it intensifies alienation and protest mobilization, threatening the very stability of the economic order.

Likewise, coordination without distributive justice is reduced to a formal regulatory shell. Authoritarian regimes that maintain order through inequality and restricted access to public goods are forced to compensate for the lack of trust with repressive expenditures, thereby undermining their institutional effectiveness. In the long term, the absence of fair distribution leads to fragmentation of the social contract and inevitable institutional transformations.

Third, it is the integration of functions that creates the preconditions for adaptability. Coordination provides a structured framework for action; distribution ensures the social legitimacy of change; and stimulation drives dynamism and innovation potential. Societies in which these functions are interrelated are capable

of adapting to technological and social transformations without radical upheaval. As shown by comparative studies, it is precisely the ability of institutions to adapt to a changing context that has been the decisive factor in the success of individual countries in the past [14]. Flexibility, combined with structural consistency, enables the gradual introduction of innovations based on empirical evidence and with regard for feedback mechanisms.

Thus, maintaining a balance between the coordination, distributive, and stimulative functions of institutions constitutes a critically important condition for the effectiveness of the institutional environment in today's world. Countries that have succeeded in adapting to dynamic change have generally been able to institutionalize precisely this functional equilibrium. They have established institutional structures that simultaneously organize socio-economic life, guarantee equitable access to goods and opportunities, and support internal energy for development, innovation, and entrepreneurship.

A classic example of such a balance is provided by the Scandinavian countries. Their institutions demonstrate stable implementation of the coordination function through low levels of corruption, consistent adherence to the rule of law, and procedural transparency. The distributive function is embodied in strong social protection mechanisms, minimal income disparities, and a high level of social cohesion. The stimulative function is manifested in the support of entrepreneurial initiatives, investment in the innovation sector, and the maintenance of a dynamic economy capable of competing at the global level. It is this functional integration of institutions that enables these countries to effectively respond to the challenges of digital transformation, climate restructuring, and social change.

A systems-based approach to analyzing institutional functionality following the scheme “function – mechanism – result – consequences” reveals that the institutional environment operates as the operating system of society. When each function is implemented through appropriate mechanisms, this not only ensures stability and predictability but also generates the capacity for gradual transformation. The absence of such a balance produces dysfunctions, in particular:

- coordination without stimulation leads to stagnant order, which, though formally structured, blocks innovation. Such institutional regimes provide the appearance of stability but fail in competition due to a lack of entrepreneurial initiative and institutional flexibility;
- excessive stimulation without coordination results in destructive competition, market distortions,

and financial bubbles;

- dominance of the distributive function without stimulation leads to equalized poverty, lost incentives, and institutional inertia, typical of planned economies;

- stimulation without effective distribution generates critical inequality and social fragmentation, which ultimately undermines economic stability;

- coordination without fair distribution produces repressive models in which institutional order is maintained not through legitimacy but through coercion, inevitably depleting developmental resources.

Thus, the systemic logic of institutional function interaction confirms the necessity of their integrated balance as a condition for the adaptive efficiency of the institutional environment. Each function – coordination, distribution, stimulation – cannot be implemented in isolation without risking functional breakdowns. It is precisely the mutual complementarity of these functions that creates space for dynamic development, where stability is combined with innovation, and fairness with productivity. Accordingly, institutions must not only organize behavior but also ensure fair access to resources and motivate economic activity – key prerequisites for sustainable progress amid technological shifts.

The generalized functional categories traditionally used to describe the institutional environment, such as coordination, distribution, or stimulation, constitute only an initial level of analytical reflection. They define broad directions of institutional influence but remain too abstract to serve as a basis for substantive assessment of adaptive efficiency under technological change. To investigate this specific issue, it is necessary to distinguish sub-functions, concretized mechanisms of institutional influence that reflect how a given function is implemented in a dynamic socio-technological environment. This analytical disaggregation makes it possible to move from a descriptive level to the operationalization of the studied phenomenon.

Within the framework of systems analysis, a function serves as the integrative objective of institutional activity, whereas sub-functions represent the specific directions by which this objective is pursued. They allow us to identify which institutional mechanisms are engaged in ensuring behavioral predictability, equitable access to public goods, or compensation of risks under technological uncertainty. It is precisely through sub-functions that one can detect functional gaps: where a certain function is declared at the policy level but remains unrealized in key areas of technological development. Moreover, the sub-functional level enables comparative analysis across countries or sectors, using quantitatively measurable indicators relevant to each sub-function. This opens

the possibility for empirical assessment of the adaptability of the institutional environment not only as a framework that maintains general stability, but as one that ensures society’s capacity to respond to breakthrough technologies while preserving social cohesion, legal certainty, and economic dynamism.

Thus, the identification of sub-functions is not merely a refinement of functions but a conceptual tool for constructing a full-fledged research framework within which institutions appear not as background structures but as active elements of society’s configuration for technological change. This enables a shift from formal classification to the construction of an integrated model of adaptive efficiency of the institutional system, taking into account the complex configuration of challenges and opportunities in a period of technological transformation.

It is important to emphasize that institutional sub-functions are often interlinked and may be realized within several functional domains. For instance, institutional determination of access regimes to resources and benefits reduces uncertainty and shapes predictable expectations among actors (coordination effect), while simultaneously setting boundaries of access to resources (distributive effect) and reinforcing motivation for innovation activity by guaranteeing returns on invested efforts (stimulatory effect). For this reason, the attribution of sub-functions to a specific category is partly conditional and depends on the context in which institutional action is considered. Nevertheless, such typologization is essential for the structural analysis of the institutional environment’s functional composition and for identifying points of adaptive strengthening under technological transformation (Table 3).

The coordination function of institutions, in the context of technological transformations, facilitates the resolution of decision-alignment problems among actors operating under structural uncertainty. This is why it acquires particular significance during periods of radical change, when established mechanisms of interaction are disrupted and new ones have yet to be institutionalized.

Unlike administrative or organizational coordination, institutional coordination entails the normative ordering of expectations, the reduction of uncertainty, the provision of transparency and a unified information space, the formation of trust, the legitimation of new practices, the smoothing of conflicts among stakeholders, and the creation of conditions for mutual predictability of actions. Institutions perform this function by stabilizing rules, codifying norms, legitimizing new forms of behavior, and ensuring symbolic coherence within society.

Table 3

Comparative Table of Core Institutional Functions and Their Subfunctional Structure

Institutional Function	Strategic Goal of the Function	Key Subfunctions	Focus in the Context of Technological Change	Institutions Implementing the Subfunction
(1)	(2)	(3)	(4)	(5)
Coordinating	Alignment of decisions and reduction of uncertainty under structural technological change	1. Establishing and maintaining the rules of the game	Coordination of interaction in new technological sectors	Laws, bylaws, customary law, codes of ethics, and institutionalized sanctions
		2. Ensuring transparency and reducing information asymmetry	Improving accessibility and quality of information	Disclosure rules, reporting obligations, transparency standards, open data requirements
		3. Ensuring cognitive stability of institutional order	Perception of innovation as a norm; preservation of intergenerational continuity in collective experience	Participation procedures, public consultation rules, legal verification mechanisms, expert review norms, ethical and cultural norms, professional training standards, and socialization rules
		4. Institutional conflict smoothing	Peaceful resolution of disputes during transition periods	Arbitration procedures, mediation rules, legal procedures, and participatory mechanisms
		5. Reducing transactional and behavioral uncertainty	Formation of predictability in new environments	Standard contracts, established practices, reputation mechanisms, and institutional expectations
		6. Ensuring institutional reversibility and dynamic equilibrium	Mechanisms for responding to imbalance	Appeal rights, checks and balances, procedural openness and transparency, and institutionalized participation mechanisms
Distributive	Ensuring fair access to resources and risk compensation in a technological environment	7. Institutional definition of access regimes to resources and benefits	Defining rights to access technological, digital, and natural resources; ensuring universal access to basic services	Patent law, copyright law, licensing agreements, property rights systems, data access rules, open data norms, public access guarantees, non-discriminatory standards, commons institutions
		8. Ensuring social inclusion and fair access to the benefits of technological development	Preventing profit hyperconcentration and social destabilization	Redistribution institutions, subsidiarity norms, anti-segregation institutions, public infrastructure access rules, anti-discrimination norms
		9. Restricting destructive behavior through clear boundaries of permissibility	Preventing imbalance of interests	Antitrust law, ethical rules for technology use, and bans on exploitation of vulnerable groups
		10. Institutional provision of mechanisms for compensating technological risks	Support under losses caused by technological transformation	Social insurance mechanisms, unemployment assistance systems, and retraining institutions
		11. Institutional provision of ecological responsibility	Regulatory anchoring of ecological sustainability principles during technological change	Environmental law, precautionary principle, polluter pays principle, technological environmental compliance norms

Continuation of Table 3

(1)	(2)	(3)	(4)	(5)
Stimulative	Reduction of exchange costs and trust building in an innovation-driven environment	12. Reducing transaction costs	Unification of procedures to reduce costs	Procedural standardization, model contracts, regulations, and interaction protocols
		13. Protection of property rights and contractual obligations	Building trust in the exchange of innovation results	Property rights, contract law, registration institutions, and judicial protection norms
		14. Ensuring institutional compatibility	Adapting legal frameworks to new forms of economic activity	Adaptation norms, harmonization mechanisms, and legal alignment principles
		15. Supporting the dynamic efficiency of exchange	Reducing coordination costs in rapidly changing environments	Interest alignment institutions, transparent procedures, open registries
		16. Eliminating structural barriers to exchange participation	Ensuring equal market access	Deregulatory norms, simplified registration rules, anti-barrier principles
		17. Reducing risks in highly uncertain environments	Institutional insurance for new practices	Legal environment stability institutions, contract enforcement guarantees, risk insurance rules

Source: the table is constructed according to the author’s methodological framework

The criteria for the manifestation of the coordination function of institutions under conditions of technological transformation include the following key aspects:

- Does the institution facilitate the alignment of decisions among economic actors in the context of emerging technologies, when the level of uncertainty is elevated?

- Does it enable the assessment of other participants’ actions by forming transparent rules of the game and minimizing the risk of opportunistic behavior?

- Does the institution construct a stable perception of “normal” or expected behavior in the new technological environment, thereby ensuring predictability of actions and social stability during periods of change?

Based on the above, the following key sub-functions can be distinguished within the structure of the coordination function:

- first, establishing and maintaining the rules of the game: institutions define formal and informal constraints that determine acceptable forms of interaction in new technological sectors, enabling the alignment of actors’ behavior in the market, preventing chaos in the emergence of breakthrough technologies, and laying the foundation for long-term contracts and partnerships;

- second, ensuring transparency and reducing information asymmetry: coordination is impossible without access to reliable and synchronized

information. Institutions regulate data disclosure, transparency obligations, and procedural openness, which is critically important for adaptation to modern breakthrough technologies, where information barriers can radically reshape market configurations;

- third, providing cognitive stability of the institutional order in conditions of technological dynamism: this sub-function lies in integrating new technological norms into public consciousness and preserving intergenerational continuity of collective experience. Institutions create conditions for the legitimation of innovations through procedures of public consultation, legal verification, expert review, and societal participation, which allow new practices to acquire the status of socially acceptable. Simultaneously, they support mechanisms for the transmission of knowledge and norms, forming a cognitive base for perceiving change as a consistent and meaningful process. This function ensures not only the reduction of uncertainty but also the stabilization of expectations during technological transformations. It is realized through institutions of participation (public hearings, open decision-making), ethical and cultural norms, standards of professional training, institutions of legal continuity, as well as mechanisms of public knowledge that maintain consistency between innovations and the existing system of representations. In this way, the institutional environment serves as a cognitive stabilizer, capable of mitigating the risks of societal fragmentation and enabling the implementation of technological changes without rupturing the established social structure;

- fourth, institutional conflict smoothing: during periods of radical change, the potential for interest collisions increases. Institutions provide rules for peaceful conflict resolution (arbitration, legal systems, stakeholder engagement), which help to avoid destructive upheavals;

- fifth, reducing transactional and behavioral uncertainty (ensuring predictability): by establishing stable behavioral norms, institutions promote the formation of predictable action models, which is especially important under conditions of dynamic innovation. This enables actors to plan actions based on reputation, standards, and established practices, without expending resources on constant renegotiation of interaction terms;

- sixth, ensuring institutional reversibility and dynamic equilibrium: institutions perform not only norm-setting functions but also create mechanisms for responding to imbalances by providing checks and balances, appeal procedures, openness, and participatory engagement. This enables the institutional system to remain within the bounds of managed evolution, forming conditions for adaptive feedback.

Thus, the coordination function of institutions in the technological context does not consist in direct regulation but in the creation of an institutional background that enables the self-coordination of diverse actors' actions without undermining trust, legitimacy, or the system's adaptive capacity.

Technological change is invariably accompanied by shifts in configurations of access to resources, statuses, and opportunities. For this reason, the distributive function of institutions is key to ensuring the resilience of the social system during transitional periods. This concerns not only access to material goods, but also the institutionally regulated system of admission to new forms of participation in the economy, the definition of legitimate and dominant positions, and the compensation of risks for those disadvantaged by technological shifts. This function is not performed through centralized distribution of resources but through the normative definition of rights structures, inclusion mechanisms, compensation rules, and the provision of public goods available regardless of market capacity.

The structural aspects of this function include defining criteria of access to resources, setting boundaries and restrictions, principles of fairness and inclusion, and balancing the interests of powerful and vulnerable groups.

Criteria for the manifestation of the distributive function:

- Does the institution define who has the right to participate in the new technological domain?

- Does it contribute to equalizing opportunities in the case of structural losses?

- Are the benefits and risks of change distributed fairly?

Accordingly, we identify the following sub-functions within the distributive function:

a) institutional definition of access regimes to resources and benefits: institutions determine who has access to material, informational, digital, and social resources, under what conditions, and in what form. This applies both to private rights through patent systems, intellectual property instruments, data access norms, and to public guarantees: basic education, digital services, social assistance. Through such normative delineation, the boundary between private and public resource circulation is established, ensuring both innovation incentives and inclusive access. The key institutions implementing this sub-function include patent law, copyright law, licensing agreements, property rights systems, data access rules, open data standards, public access guarantees, and standards of non-discriminatory provision of public goods;

b) ensuring social inclusion and fair access to the benefits of technological development: institutions create legal, economic, and normative frameworks that prevent the hyper-concentration of benefits within narrow groups and safeguard against inequality in access to resources, opportunities, and technological participation. Through subsidiarity mechanisms, crisis support, inclusive planning, and anti-segregation regulation, institutions contribute to the fair distribution of innovation gains and reduce the risks of social fragmentation. Institutions that realize this sub-function include: norms of subsidiarity, anti-segregation frameworks, public access rules to infrastructure, and ethical norms of non-discrimination;

c) restricting destructive behavior through clear boundaries of permissibility: institutions not only enable access but also restrict it for practices that violate the balance of interests (e.g. monopolization, technological exploitation of vulnerable groups, data manipulation). Distribution includes both access and limits on rights to consume benefits. This sub-function is implemented by institutions such as antitrust law, rules for ethical use of technologies, and bans on the exploitation of vulnerable groups;

d) institutional provision of mechanisms for compensating technological risks: institutions define rules that guarantee risk-sharing among the state, business, and citizens in response to technological change (e.g., through retraining programs, protection of labor rights under automation, etc.). Relevant institutions include social insurance mechanisms, unemployment support systems, and retraining institutions;

e) institutional provision of ecological responsibility for technological development, which involves the normative consolidation of ecological sustainability principles under conditions of technological change. Its objective is to prevent the negative environmental impacts of innovation, promote intergenerational responsibility, and align economic growth with ecological boundaries, as institutional responsibility lies not only in imposing restrictions but also in creating incentives for environmentally friendly innovation.

Thus, the distributive function of institutions in the era of technological change does not imply formal equalization but rather aims to prevent institutional segregation that could make the benefits of innovation accessible only to a narrow circle of actors while shifting the costs onto the rest of society.

The stimulative function of institutions in the context of technological transformations is interpreted as one aimed at increasing the efficiency of transaction organization, particularly under conditions of a shifting technological paradigm. Its outcome is the realization of benefits from economic activity through the reduction of exchange costs: primarily those associated with contract enforcement, protection of property rights, verification of counterparties' actions, and legal certainty of procedures. In this context, institutions do not “stimulate” in the normative sense, but rather create a configuration of rules that makes mutually beneficial behavior economically rational and less costly. It is precisely due to institutional support for rights protection, trust in counterparties, and predictability of agreements that participants in technological processes are able to conclude long-term arrangements, undertake investment risks, and launch innovative projects in new sectors.

The structural aspects of this function include the creation of conditions that reduce the costs of contract conclusion, execution, and enforcement; the removal of barriers to voluntary exchange between actors (informational, legal, procedural); protection of rights enabling resource and investment transfer; and the enhancement of market efficiency by minimizing unnecessary costs of coordination and agreement.

Criteria for the manifestation of the function under technological change:

- Does the institutional environment ensure predictability and security of exchange in new technological sectors?
- Does it allow actors to reduce transaction costs when investing in breakthrough areas?
- Does it establish stable rules for protecting contracts and property rights in new environments?

At the structural level, the stimulative function is manifested through several key sub-functions that provide its full analytical development:

- firstly, reducing transaction costs: formalization of procedures, contract typification, codification of liability, and the use of unified protocols enable lower costs of preparation, monitoring, and enforcement of obligations. In the technological context, this ensures the efficient scalability of innovation;

- secondly, protection of property rights and contractual obligations: the presence of clearly defined procedures for the recognition, registration, and enforcement of rights, including intellectual property, forms the basis for the exchange of innovation outputs. Without such institutional support, the expansion of technological innovation becomes impossible due to the absence of trust among participants;

- thirdly, ensuring institutional compatibility, that is, the adaptation of legal norms, procedures, and standards to new forms of economic activity, thereby ensuring continuity of exchange and the protection of actions in new environments. Institutions that timely update their frameworks help avoid regulatory vacuums in innovative sectors;

- fourthly, supporting the dynamic efficiency of exchange: this involves creating institutional conditions that reduce the cost of aligning interests in high-velocity environments. The development of open digital registries, public electronic platforms, and transparent procedures for norm and standard alignment facilitates the rapid inclusion of new actors in economic exchange, reducing temporal and transactional barriers. This enhances the ability of the economic system to respond to breakthrough technological opportunities without losing controllability, while stimulating investment, interaction, and real-time competition. Institutions thus not only structure exchange but also build infrastructure for its acceleration and adaptability, which is critical for maintaining flexibility in the innovation environment.

- fifthly, eliminating structural barriers to exchange participation: institutions that ensure equitable access to technological markets (through deregulation of new sectors, simplified registration procedures, anti-barrier policies) reduce non-price constraints and enhance competition. In turn, this promotes the identification of the most effective models for deploying new technologies.

- sixthly, reducing risks in highly uncertain environments, which refers to the institutional insurance of economic agents' actions under conditions of high uncertainty inherent in technological transition. This does not concern formal transaction costs, but rather the neutralization of fear of loss or unwillingness

to invest due to outcome unpredictability. It is achieved through the stability of the legal environment, enforcement guarantees, and institutional mechanisms for ensuring innovation-related activity. As a result, uncertainty is reduced, trust among actors increases, and willingness to engage in transactions on new technological markets is strengthened. This sub-function ensures the continuity of exchange under uncertainty, thereby stimulating innovation investment.

Thus, the stimulative function of institutions does not require direct market intervention or manipulative “encouragement.” Its strength lies in the creation of conditions under which innovative, productive, and efficient behavior becomes both the least costly and the safest option for the actor. Institutions that effectively realize this function not only facilitate the scaling of technologies but also ensure that their implementation remains sustainable, secure, and acceptable to the core actors of the system.

### Conclusions

The analysis of the functional structure of institutions proposed within this model demonstrates a clear divergence from traditional approaches found in institutional theory ([1], [5], [6], [11]) as well as from earlier analytical frameworks developed by international organizations. Built upon the principles of structural-functional analysis, the model does not merely classify institutional functions but constructs a coherent three-level system that distinguishes the coordination, distribution, and stimulation functions as foundational trajectories of institutional interaction. The coordination function ensures the alignment of actors’ behavior; the distribution function guarantees fair access to benefits and a balance of interests; the stimulation function creates conditions for reducing transaction costs and enhancing the efficiency of exchange. The inclusion of sub-functions within this structure captures essential domains of institutional influence – from cognitive receptiveness to technological change, to mechanisms for compensation, rights protection, and barrier removal in the innovation process.

Importantly, the model does not reject the traditional functional paradigm but develops and operationalizes it into an applied system suitable for empirical diagnostics in a technologically dynamic environment. This transformation is supported by recent empirical and policy-based contributions. For instance, the World Development Report 2019 [7] and the Technology and Innovation Report 2025 [8] emphasize the strategic role of institutional systems in enabling adaptation to automation, AI, and global value chain restructuring. The OECD Framework on Drivers of Trust in Public Institutions [9] and Eger’s

analysis of regulation, institutions, and productivity [10] provide evidence for the relevance of cross-functional coordination and adaptive governance in volatile contexts. Moreover, Ahern [15] and Novelli et al. [16] elaborate anticipatory regulatory models that resonate with the logic of sub-functions and mechanisms of institutional foresight.

Taken together, these recent works confirm that the proposed model is consistent with the global scientific and policy demand for dynamic, measurable, and functionally differentiated institutional systems capable of guiding technology-enabled transformation. Its analytical precision, structural coherence, and technological relevance position institutions not merely as formal regulators or guarantors of order, but as adaptive mechanisms that underpin breakthrough societal development. As such, the model provides a robust foundation for further empirical research, indicator development, and the formulation of institutional strategies oriented toward resilience, inclusiveness, and innovation-driven growth.

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## ДОСЛІДЖЕННЯ ФУНКЦІОНАЛЬНОГО ПОТЕНЦІАЛУ ІНСТИТУЦІЙНОГО СЕРЕДОВИЩА В УМОВАХ ТЕХНОЛОГІЧНИХ ЗМІН

Федорова Н. Є.

У статті представлено концептуальний аналіз функціонального потенціалу інституційного середовища в контексті технологічної трансформації, з особливим акцентом на взаємозалежності між інституційними нормами та динамікою інноваційно зумовлених змін. Авторка пропонує триадну модель функцій інститутів – координаційну, розподільчу та стимулюючу – як основу для розкриття здатності інститутів адаптуватися до нових технологічних траєкторій та сприяти розвитку, що поєднує ефективність із довгостроковою стійкістю. Зазначається, що реалізація інституційних функцій відіграє критичну роль у зниженні невизначеності, забезпеченні справедливого доступу до ресурсів і зменшенні транзакційних витрат, тобто чинників, необхідних для прискорення технологічного прогресу за одночасного підтримання внутрішньої системної стабільності. У дослідженні введено функціональну диференціацію на підфункції в межах кожної базової функції, що дає змогу детальніше представити механізми інституційної дії в інноваційно орієнтованому середовищі, а також ідентифікувати потенційні дисфункції, які можуть перешкоджати адаптивним реакціям на зміни. Особливу увагу приділено крос-функціональному впливу ключових інститутів, таких як патентне регулювання, стандартизація, антимонопольні правила, права власності та етичні норми. Аналіз демонструє їх внесок у формування адаптивної ефективності в умовах технологічної динаміки та посиленої глобальної конкуренції. Обґрунтовано необхідність збереження збалансованої взаємодії між трьома інституційними функціями як передумови підтримання цілісності інституційної конфігурації та стійкості соціально-економічної трансформації. Дослідження ґрунтується на системно-функціональному підході, який дає можливість операціоналізувати інституційний вплив через виокремлення ключових критеріїв, механізмів дії та ризиків дисфункцій. Це забезпечує надійну методологічну основу для подальших емпіричних вимірювань ефективності інституційної адаптації, розроблення релевантних індикаторів чутливості до технологічних змін і формування стратегій підвищення інституційної гнучкості, інклюзивності та інноваційного потенціалу.

**Ключові слова:** інституційне середовище, адаптивна ефективність інституційного середовища, функції інститутів, підфункції інститутів, технологічні зміни, координаційна функція, розподільча функція, стимулююча функція.

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**EXPLORING THE FUNCTIONAL POTENTIAL OF THE INSTITUTIONAL ENVIRONMENT UNDER CONDITIONS OF TECHNOLOGICAL CHANGE***Fedorova Natalia*

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*The article presents a conceptual analysis of the functional potential of the institutional environment in the context of technological transformation, with particular emphasis on the interdependence between institutional norms and the dynamics of innovation-driven change. The author proposes a triadic model of institutional functions – coordination, distribution, and stimulation – as the foundation for uncovering the capacity of institutions to adapt to emerging technological trajectories and foster development that integrates efficiency with long-term resilience. It is argued that the realization of institutional functions plays a critical role in reducing uncertainty, ensuring equitable access to resources, and lowering transaction costs – all of which are essential for accelerating technological progress while maintaining internal systemic stability. The study introduces a functional differentiation into sub-functions within each core function, which enables a more detailed representation of institutional action mechanisms in an innovation-oriented environment, as well as the identification of potential dysfunctions that may impede adaptive responses to change. Special attention is paid to the cross-functional impact of key institutions, such as patent regulation, standardization, antitrust rules, property rights, and ethical norms. The analysis reveals their specific contributions to the formation of adaptive efficiency in conditions of technological dynamism and intensified global competition. The necessity of preserving a balanced interaction between the three institutional functions is substantiated as a prerequisite for maintaining the integrity of the institutional configuration and the sustainability of socio-economic transformation. The research is grounded in a system-functional approach that allows for the operationalization of institutional influence through the identification of its key criteria, mechanisms of action, and dysfunction risks. This provides a robust methodological foundation for future empirical measurement of institutional adaptation effectiveness, the development of relevant indicators of responsiveness to technological change, and the formulation of strategies aimed at enhancing institutional flexibility, inclusiveness, and innovation potential.*

**Keywords:** institutional environment, adaptive efficiency of institutional environment, functions of institutions, sub-functions of institutions, technological change, coordination function, distribution function, stimulation function.

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