

ІННОВАЦІЙНЕ ПІДПРИЄМНИЦТВО ТА ІНВЕСТИЦІЙНА ПРИВАБЛИВІСТЬ

УДК: 005.591.6: 334.7

JEL Classification: O31, L26, D83

DOI 10.33111/EE.2026.56.GontarevaI_MykhailenkoD

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ФОРМУВАННЯ ІННОВАЦІЙНОЇ ПІДПРИЄМНИЦЬКОЇ АКТИВНОСТІ НА ОСНОВІ ІНФОРМАЦІЙНОЇ ЕКОЛОГІЧНОСТІ

АНОТАЦІЯ. Інформаційна екологічність передбачає оптимізацією обсягів наданої інформації за рахунок рівня її готовності до сприйняття підприємцем. Головними джерелами інформації в інноваційному процесі є університети та державні установи, а головними споживачами виступають підприємці. Запропоновано структуру вирішення соціальних проблем за допомогою підприємництва, в якій деталізовано формування інноваційної підприємницької активності на стратегічному, організаційному та латентному рівнях. Виділено види інформації, які представляють підприємцям університети та урядові установи для підвищення рівня інноваційної підприємницької активності. Систематизовано процес появи та розвитку формальних та неформальних правил обміну інформацією та знаннями при формуванні інноваційної підприємницької активності.

КЛЮЧОВІ СЛОВА: інноваційне підприємництво, інформаційна екологічність, університет, уряд, підприємницька активність, інституалізація інформаційного простору.

FORMATION OF INNOVATIVE ENTREPRENEURIAL ACTIVITY BASED ON INFORMATION ECOLOGY

ANNOTATION. The level of information ecology is understood as the minimum amount of data provided, which ensures their integrity, perception and interpretability. Information ecology involves optimizing the amount of information provided due to the level of its readiness for perception by the entrepreneur. Entrepreneurs manifest their activity in various organizational and legal forms, in different areas of economic activity and with varying level of innovation. The largest amount of information needs to be found and processed when choosing an innovative direction of development. The main sources of information in the innovation process are universities and government institutions, and the main users are entrepreneurs. A structure for solving social problems through entrepreneurship is proposed, which details the formation of innovative entrepreneurial activity at the strategic, organizational and latent levels. Types of information that universities and government institutions present to entrepreneurs to increase the level of innovative entrepreneurial activity are highlighted. As a result of the scientific activity of Universities, academic and applied information appears. Part of this information comes in the form of joint R&D mainly to the strategic level of entrepreneurship, and at the organizational level, the knowledge of spinoffs and spillovers that they have accumulated while working at universities is implemented. Government institutions are sources of regulatory information, information on measures to support innovative entrepreneurship and updated information in the form of real actions for the business environment. The process of the emergence and development of formal and informal rules for the exchange of information and knowledge in the formation of innovative entrepreneurial activity is systematized.

KEY WORDS: innovative entrepreneurship, information ecology, university, government, entrepreneurial activity, institutionalization of information space.

Вступ. The pace of socio-economic development of countries and regions is largely determined by entrepreneurial activities. Entrepreneurs run various types of businesses with varying innovation level in different economic areas [1]. The choice of the company's type, areas of activities and innovation level is associated with searching and processing information. At the same time, information and communication technologies, codified and tacit knowledge of entrepreneurs, their cognitive abilities are used. The uncertainty of the external environment, lack of relevant information, presence of subjective preferences and expectations complicate the choice for formation of innovative entrepreneurial activity.

Постановка завдання. The socio-economic development of society and its components, such as entrepreneurship and innovation, are too complex processes to be described by several determinants. In particular, commonly used approaches pay little attention to market information. More precisely, a set of information from markets interacting with entrepreneurship, such as the labor market, innovation market, market for innovative products, market for educational services, etc. As a result, the Triple Helix information space is created [2]. The structuring of this space, its transformation into a comfortable environment for innovation activities of entrepreneurs and society as a whole is of scientific and practical interest. Moreover, the article [3] shows the need for a further research on increasing the cumulative absorptive and desorptive capacity of heterogeneous participants in multilateral innovation projects or integrated programs.

The goal of the study is to structure the processes of solving social problems through innovative entrepreneurship in conditions of uncertainty and transformation of entrepreneurial activity. Achieving this goal involves solving the following tasks: i) determining the essence of information ecology; ii) forming a structure for solving social problems through innovative entrepreneurship; iii) institutionalizing the information space in the formation of innovative entrepreneurial activity.

Результати. The information ecology is optimizing the volume of information provided due to improving the level of its readiness for the entrepreneur's perception. It suggests the minimum amount of data provided ensuring their integrity, perceptibility, and interpretability [4]. By the intentional goal we mean a cognitive model of the desired and achieved result of the entrepreneur's activity in relation to the complex of internal motivations encouraging them to act [5]. The desirability of the results suggests the existence of a system of preferences, regulatory parameters and value judgments [6].

Potential entrepreneurs are faced with the goal of designing or redesigning their own business based on a variety of the existing or promising activities and forms of their implementation. At the same time, there are also a large number of economically comparable (Pareto efficient) combinations of business organization. Thus, there arises a need for intellectual and volitional efforts in making decisions on the degree of necessity and possibility of obtaining the desired result under uncertainty. Entrepreneurs make an intelligent choice if they: i) recognize the existence of other alternatives, i.e., availability of opportunity cost; ii) understand the insufficiency of the available

information and personal knowledge for an unambiguous orientation in the situation, i.e., the need to increase transaction costs. A potential entrepreneur can: i) refuse to take further actions; ii) delay the choice until the last critical moment and make the choice spontaneous; iii) continue collecting the necessary additional information; iv) reduce the level of uncertainty to subjective rationality with respect to more general motivational and cognitive goals.

With subjective rationality, decisions include not so much formal logical criteria as assessments of the entrepreneur's ability to act under uncertainty and skills to actualize all their intellectual and personal potential. Possible ways to solve the problem include conducting an axiology (value) assessment of information or formation of a stable personal ontology (a set of coherent knowledge). Both methods reflect either an accumulated experience or mental models obtained in the course of training. The methodological framework for the axiological analysis of intellectual choice is the theory of expectation and theory of planned behavior [7].

Any entrepreneurial activity begins with an idea. For increasing the rationality of choice and evaluating an entrepreneurial idea as well as for transforming it and choosing forms of its implementation, a potential entrepreneur searches and processes additional information. During these processes, large databases, «contaminated» with irrelevant, unreliable and even inadequate information, are examined. Such information overload negatively affects the entrepreneur's ability to concentrate. There are risks of over-saturation, misperception or abandonment of a further search [8]. The situational theory of problem solving (STOPS) considers information pollution as an obstacle in addressing a problematic situation (constraint recognition). The STOPS allow to assess the variable of Situational Motivation in Problem Solving [9]. The greatest amount of information needs to be collected and processed when choosing innovative development.

The normative context of the entrepreneur's intellectual choice is the external socio-economic situation. The architectonics of solving development problems by means of entrepreneurship has the form of a pyramid (Figure 1).

The lower (latent) level is occupied by: i) potential entrepreneurs, who are looking for opportunities to solve their problems through entrepreneurship; ii) self-employed, who use their skills and abilities to earn income in a narrow market niche without formalization; iii) other participants in the hidden (shadow) economy. The latent layer is the quantitatively largest and qualitatively heterogeneous one.

For its study, expert assessments are applied, the most common being the GEM and World Bank methodologies.

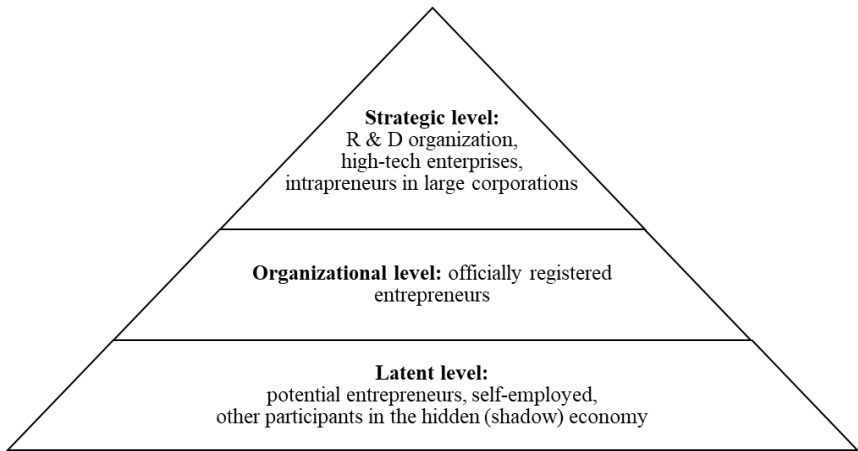


Figure 1. Architectonics of solving social problems through entrepreneurship (Developed by the authors)

Officially registered entrepreneurs are located at the middle (organizational) level. There is a significant variety of types of entrepreneurial activities – from freelancers and sole proprietors to medium-sized enterprises and networks. For their study national and regional statistical data are used.

At the upper (strategic) level, there placed R & D organizations, small and medium-sized high-tech enterprises and intrapreneurs in large corporations. Here, a diversity in research directions is observed. For the study, data from international and national organizations are used. The most common methodologies employed include the tools developed by the World Economic Forum (WEF), the World Intellectual Property Organization (WIPO), and the Organization of Economic Development Countries (OECD).

The top of the pyramid presents the socio-economic effects of entrepreneurship. They reflect the degree to which the final results of entrepreneurial processes satisfy the needs and interests of stakeholders. In general, these are the needs and interests of entrepreneurs themselves, market structures interacting with them, state institutions, and society as a consumer of goods and services.

The information circulating at each level of entrepreneurship differs in type, form and method of transmission, semantic and pragmatic context. Based on the Triple Helix methodology, we can single out the types of information provided to entrepreneurs by universities and government agencies.

Universities carry out research and pedagogical activities. As a result of research activities, academic and applied information emerges. Part of the academic information remains in the scientific environment and serves as a basis for the development of fundamental knowledge. The other part of this information goes in the form of joint R & D mainly to the strategic level of entrepreneurship. The middle (production and sales) level receives information about the applied research carried out by universities. At the same level, employees spinoffs and spillovers of knowledge they accumulated while working at universities are implemented. Moreover, spinoffs and spillovers transfer not only codified but also tacit personal knowledge [10]. The distribution of spinoffs and spillovers by levels of entrepreneurship can be considered uniform. However, this assumption needs to be refined in further studies. The same can be said about university graduates, who, based on a number of signs, can be classified as knowledge spillovers. Such signs, in particular, include the fact that the knowledge of graduates enters the business environment almost free of charge.

To the lower (potential and informal) level of entrepreneurship, most of the information goes indirectly: either in an unaccentuated and generalized form or in an objectified form. Objectified information is knowledge that is actualized in high-tech devices and the ways they are used. Individual entrepreneurs are required to acquire skills of their practical use. Potential entrepreneurs receive the necessary information either from public, but not structured, sources, e.g., the Internet, or from relatives, partners, friends. A low degree of completeness, adequacy and reliability of such information are prerequisites for the deterioration of information ecology [11]. The situation becomes more complicated if a potential entrepreneur does not have a personal full-fledged knowledge base in the required subject area. The problem is, in particular, as follows. A university scientist publishes laboratory results. If a prototype is obtained, this does not yet guarantee a successful industrial product development. In economic and social studies, even the most representative samples may not meet the conditions of the local markets in which small enterprises operate. Unintentional errors and inconsistencies are possible.

For the entrepreneurship environment, government agencies serve as sources of regulatory information, including that about measures to support entrepreneurship and actualized information in the form of their real actions. The discrepancy between official and actual information increases uncertainty in innovative entrepreneurial decision-making. The ecology of government information is negatively affected by its internal inconsistency and complexity of perception. Morris et al. [12] note that government information has an insufficient focus on the layer of potential entrepreneurs. This is especially true for the self-employed and micro-enterprises with low incomes as well as small enterprises operating in local markets.

In this study, we will consider institutionalization as the process of emergence and development of formal and informal rules for the exchange of information, knowledge, and intellectual property rights between ecosystem actors in the Multi Helix space. Such rules have social, economic and legal grounds. Their conventional (generally recognized) legitimacy improves the ecology of the information space and reduces transaction costs for the actors of its ecosystem. According to H. Collins [13], the use of information technologies without consideration for the social and economic context and understanding of the semantic content of information by its providers deteriorates the quality of the decisions made.

In a university laboratory, a scientist has developed a technology for obtaining an innovative product. In order for the product to acquire economic value (become a commodity), it is necessary to scale up the laboratory equipment to an industrial unit. This implies the involvement of designers and equipment manufacturers. It is necessary to mount the equipment, connect it to power supply networks and adjust; train maintenance personnel; launch the production; and carry out the trial operation. Furthermore, it also requires searching for suppliers of raw materials, product distributors, and consumers. The innovation ecosystem is growing and needs professional management. Given all the difficulties and uncertainties, up to 90 % of all patents do not reach the commercialization stage. Less than half of the commercialized ones are successful in the market and only a few of them become breakthrough technologies. On the one hand, this is explained by the objective need for redundant information for the internal development of a subject area of science. The scientific logic does not coincide with the economic logic of mandatory payback. On the other hand, unsuccessful commercialization cannot serve as a reason to deny the truth of the facts obtained by scientists.

The likelihood of a successful commercialization will increase if: equipment designers are aware of the exact characteristics of the technology (temperature, pressure, environment aggressivity, etc.) in advance; marketers understand operational advantages and disadvantages of the potential product; entrepreneurs can estimate its possible purchase / sales volume. The university scientist does not know part of this information and does not disclose the rest of it because it can result in their losing the intellectual property. According to the actor-networking theory [14], an initiator of a multilateral evolutionary communication process should appear. During this process of information exchange, formal / informal communication rules and a common understanding of tasks and terminology are formed, and the distribution of roles and responsibilities is carried out [15]. To some extent, this is informational syntax and semantics in making intelligent decisions. At the same time, the Triple Helix information space will evolve, with the appearance of nodes uniting heterogeneous flows of information. This is factual information from university scientists and engineers (what works and how) and pragmatic information from entrepreneurs and government (who needs it and why). Further development of these nodes (business ideas), first, occurs through mutual adaptation and attraction of additional, detailed information. A further materialization and commercialization of a business idea leads to the expansion of the network of ecosystem participants and the emergence of the Multi Helix information space. Society and the market evaluate how much the new product is needed.

At the beginning of the innovation network formation, the initiator is autonomous and intentionally self-determined. Their self-determined behavior is conditioned by: i) stimuli from the external context, including the need for prompt response to situational circumstances, social norms, formal requirements; ii) intrinsic motivation, including the degree of attractiveness of the result, belief in a high probability of achieving it, ambitiousness; iii) volitional attitudes, including action propensity, behavioral self-control, and self-efficacy; iv) involvement in joint activities, including partner, scientific or public ones. In addition to psychological determination, the initiator requires communication skills and project thinking to make an intellectual choice.

The initiator perceives and formulates the problem and then conveys (transfers) their understanding to other partners. In the information space, the problem situation is described by quantitative and qualitative parameters as well as significant links and

relationships between them. The perception of the problem occurs through the filters of the personal codified and tacit knowledge of the initiator as well as their intentional self-determination. The personal knowledge and motivators personify the perception of the problem and its formulation, which will require their joint coordination with other ecosystem actors in the future.

The perception should be systemic, i.e., provide a reasoned concept of how the available information will help achieve intentional goals; determine what thematic information needs to be supplemented and expanded; as well as show the existing inconsistencies and contradictions. The formulation of the problem should take into consideration the main barriers to technology transfer and commercialization. A particular focus should be on the absorptive capacity, which decreases with each level of entrepreneurship. Absorptive capacity is highlighted among the multiple barriers, since it is directly related to information ecology. A weak degree of absorptive capacity distorts the uniformity of the information space for its actors, increases the information asymmetry, and complicates the creation of an atmosphere of trust between partners in the process of forming innovative entrepreneurial activity.

Висновки. The level of information ecology is understood as the minimum amount of data provided, which ensures their integrity, perception and interpretability. Information ecology involves optimizing the amount of information provided due to the level of its readiness for perception by the entrepreneur. Entrepreneurs manifest their activity in various organizational and legal forms, in different areas of economic activity and with varying level of innovation. The largest amount of information needs to be found and processed when choosing an innovative direction of development. The main sources of information in the innovation process are universities and government institutions, and the main users are entrepreneurs. A structure for solving social problems through entrepreneurship is proposed, which details the formation of innovative entrepreneurial activity at the strategic, organizational and latent levels.

Types of information that universities and government institutions present to entrepreneurs to increase the level of innovative entrepreneurial activity are highlighted. As a result of the scientific activity of Universities, academic and applied information appears. Part of this information comes in the form of joint R&D mainly to the strategic level of entrepreneurship, and at the organizational level, the knowledge of spinoffs and spillovers that they have accumulated while working at universities is implemented. Government institutions

are sources of regulatory information, information on measures to support innovative entrepreneurship and updated information in the form of real actions for the business environment. The discrepancy between official and actual information increases uncertainty in innovative entrepreneurial decision-making.

The process of the emergence and development of formal and informal rules for the exchange of information and knowledge in the formation of innovative entrepreneurial activity is systematized. It is assumed that the distribution of spinoffs and spillovers by levels of entrepreneurship can be considered uniform. However, this assumption needs to be refined in further studies.

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Стаття надійшла до редакції 25.03.2026 р.

УДК 330.3

JEL Classification O310, M210

DOI 10.33111/EE.2026.56.YakushevaN

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