ISSN Print 2786-5150
ISSN Online 2786-5169

UDC 373.061:316.774 DOI https://doi.org/10.26661/2414-0287-2025-1-65-02

INFORMATION PREDICATE IN THE STRUCTURE OF ENTERPRISE MANAGEMENT

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Key words:
information, management, enterprise, homeostasis, stochastic coefficient.

The process of enterprise activity assumes the presence of stochastic relations, which is an objective necessity. However, this does not mean that deterministic relations are given a secondary role. Only with the dialectical interaction of random and deterministic relations are their roles equivalent. The preference for random relations leads to a violation of the stability of the enterprise's functioning, the preference for deterministic relations reduces the enterprise's ability to adapt to external conditions, the ability to innovate. The unconditional relevance of the problem lies in determining the ratio of these relations. To solve the tasks set, appropriate methods were used, namely, systemic and critical analysis in the synthesis of the formation of deterministic and stochastic relationships on the basis of the theory of production systems; information theory. The conducted research allowed us to propose the concept of "optimal information accumulation", which makes it possible to conduct emergent selection. This approach allows creating conditions for the emergence of elements of evolution, in particular innovations, at the enterprise. which allows determining the ratio in shares of deterministic and stochastic information, which is advisable to use in the process of enterprise management. A stochasticity coefficient is proposed, which will ensure the homeostasis of the enterprise, while any of the extremes (absolute determinism or maximum stochasticity) leads to a deterioration in the functioning of the enterprise. Thus, it is proved that the process of managing the activities of the enterprise indicates the presence of a ratio of determinism and stochasticity. Given that complex production systems are systems open to information, when accumulating it, information must be selected to establish a connection with the external environment. The analysis conducted allows us to conclude that in the process of functioning of the production system, there is an increase in the volume of information that is accumulated and stored for further use. Thus, this should not be a replication of previously known information, but the creation of new information channels. Thanks to abstraction from the substantive characteristics, which are matter and energy, it is possible to trace the transformation of information in the processes of its accumulation, storage and transmission, that is, in the implementation of the information function. This approach allows us to create conditions for the appearance of elements of evolution in the functioning of complex production systems, namely enterprises.

ISSN Print 2786-5150
ISSN Online 2786-5169

ПРЕДИКАТ ІНФОРМАЦІЇ В СТРУКТУРІ УПРАВЛІННЯ ДІЯЛЬНІСТЮ ПІДПРИЄМСТВА

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Ключові слова:
інформація, управління, підприємство, гомеостаз, стохастичний коефіцієнт.

Процес діяльності підприємства передбачає наявність стохастичних зв'язків, що є об'єктивною необхідністю. Однак це не означає, що детермінованим зв'язкам відводиться другорядна роль. Тільки при діалектичній взаємодії випадкових і детермінованих зв'язків їх ролі еквівалентні. Перевага випадковим зв'язкам призводить до порушення стабільності функціонування підприємства, перевага детермінованим зв'язкам знижує здатність підприємства адаптуватися до зовнішніх умов, здатність до інновацій. Безумовна актуальність проблеми полягає у визначенні співвідношення зазначених зв'язків. Для вирішення поставлених завдань використано відповідні методи, а саме системний та критичний аналіз у синтезі формування детермінованих та стохастичних зв'язків на засадах теорії виробничих систем; теорія інформації. Проведені дослідження дозволили запропонувати концепцію «оптимального накопичення інформації», що дає можливість проводити емерджентний відбір. Такий підхід дозволяє створити умови для появи на підприємстві елементів еволюції, зокрема інновацій. що дозволяє визначити співвідношення в частках детермінованої та стохастичної інформації, яку доцільно використовувати в процесі управління підприємством. Запропоновано коефіцієнт стохастичності, який забезпечить гомеостаз підприємства, при цьому будь-яка з крайнощів (абсолютна детермінованість або максимальна стохастичність) призводить до погіршення функціонування підприємства. Таким чином, доведено, що процес управління діяльністю підприємства свідчить про наявність співвідношення детермінованості та стохастичності. Враховуючи, що складні виробничі системи є системами відкритими для інформації, при її накопиченні має відбуватися відбір інформації для встановлення зв'язку із зовнішнім середовищем. Проведений аналіз дозволяє зробити висновок, що в процесі функціонування виробничої системи відбувається збільшення обсягу інформації, яка накопичується та зберігається для подальшого використання. Таким чином, це має бути не тиражування відомої раніше інформації, а створення нових інформаційних каналів. Завдяки абстрагуванню від субстанційних характеристик, якими є матерія та енергія, можна простежити перетворення інформації в процесах її накопичення, зберігання та передачі, тобто в реалізації інформаційної функції. Такий підхід дозволяє створити умови для появи елементів еволюції у функціонуванні складних виробничих систем, а саме підприємств.

Statement of the problem

The current stage of economic development is characterized by the widespread use of a systems approach to the study of economic phenomena. A systems approach is a comprehensive study of the economy as a single whole from the standpoint of systems analysis. In turn, systems analysis is a methodology for studying any objects by presenting them as a system and analyzing these systems. Economic systems are characterized by an exceptionally high complexity of the structure (branching) and the presence of interaction between system elements. Economic systems are characterized by an exceptionally high complexity of the structure (branching) and the presence of interaction between system elements (Maliarets, L. M. & Achkasova, O. V., 2022). If practical tasks required taking into account all the connections that exist in the system, and in all their complexity, then no meaningful scientific and practical activity would be possible. In reality, the matter is different. From the point of view of an economist, any object (enterprise, industry, etc.) is considered from the standpoint of a certain task (goal), and the consideration (research) itself is determined with finite accuracy, based on the permissible uncertainty. achievement of the goal. The most important principle of effective use of labor, material and financial resources of production is the principle of coordinated criteria management, which is formulated in the following form: the best is such management that takes into account the interests of the system as a whole, provided that they are coordinated with the interests of subsystems.

Thus, the development of an information support mechanism should be considered one of the most important tasks of effective management. In the current conditions of transformational processes in the economy, this task is of particular priority.

ISSN Print 2786-5150
ISSN Online 2786-5169

One of the important components of ensuring effective management is the availability of information tracking of processes occurring in complex production systems. This is explained by the stochasticity of both external influences and the state of the technological processes themselves.

Thus, the development of a mechanism for determining information predicates in enterprise management processes is relevant and a priority. In modern conditions of transformational processes of the economy, this task is especially relevant.

Analysis of recent studies and publications

Information support as a system is based on primary data about the management object. The functioning of the production system is complicated by changes in both the external and internal environment of its activity, which necessitates the development of new approaches to determining its target function, substantiating the economic prerequisites for achieving optimal profit reserves that ensure the competitiveness of the enterprise. enterprise in the market and determining the prospects for its development. The authors have proven the need for management actions using modern methods of information processing. The influence of information on making rational decisions has been determined (Sytnyk, H. V., Blakyta, H. V., Huliaieva, N. M., Hanechko, I. H., Hanushchak, T. V., Zubko, T. L., Lanovska, H. I., Adamenko, V. V., Lositska, T. I., Vavdiichyk, I. M., Butova, T., Olesenko, I., & Arkhipov, N. M., 2020). The issues of modeling complex production systems are the subject of works by scientists, which reveal the essence of the influence of the external environment. An assessment of the essence of information on the assessment of economic systems is provided (Beridze, T., lokhman, N., Bondarenko, O. & Buhra, A., 2020; lokhman, N., Serebrenikov, V., Beridze T., Cherep A. & Dashko, I., 2020). It has been established that information is one of the most important elements of the resource potential of an organization. The essence, structure and main criteria for the application of information systems at modern enterprises have been determined. The need to use an information system as a powerful tool for ensuring the competitiveness of a modern enterprise has been substantiated. It has been studied that modern information systems allow for continuous recording and control of the state and movement of material, financial and human resources of an enterprise, and to receive information about the results of the enterprise's activities in real time. (Puriy, G. M., 2019). At the same time, the technological paradigm is changing, governance models and social norms are changing, and large-scale changes are taking place that view the digital economy through its communicative function. Namely, as an economic activity that occurs between its subjects through certain communication channels for the exchange of data and processes (Sirko, A. V., 2020). Currently, the digital economy is proposed to be considered as part of economic relations created by digital resources based on the production of electronic goods and services. (Kolyadenko S. V., 2016). It is also believed that the modern digital economy is a constant transformation of all sectors of the economy by transferring all information resources and knowledge to a computer platform (Veretyuk, C. M., & Pilinsky, 2016). There are scientific developments on the application of information in HR processes in modern realities. Trends in the process of digitalization of the personnel management service have been analyzed, their main opportunities and risks have been investigated, since there is a need to study the risks and opportunities of implementing various digitalization tools in the activities of the HR service. (Melnychenko S., Lositska T., Belyaeva N., 2021). The digital economy is defined as a completely independent economic category, which is interpreted as a new type of economic system within which the processes of production, exchange, distribution and consumption are implemented (Kotelevets, D. O., 2022). The digital economy is increasingly intertwined with the analog economy, which complicates a clear distinction between them (Kuznetsova A. Ya., Chmeruk G. G., 2019). An in-depth study of the application of the latest methods of using information and information resources in management decision-making is presented by the scholar Armstrong M. Practical ideas and in-depth coverage of HRM strategies in such key areas as employee engagement, talent management, learning and development, as well as strategic approaches to HRM in an international context. It is supported by key learning points, key questions and real-life examples (Armstrong M., 2021). The conducted research confirmed the importance and necessity of in-depth research into the influence of information predicates in management processes. This is due to the multifaceted nature and rapid dynamics of the development of the digital space of society and the world.

Objectives of the article

Determination of the functional components of information in ensuring the management of the enterprise's activities.

The main material of the research

Considering the main functions of production system management, planning and organization functions are usually distinguished. In a broad sense, these functions are generalized (integral) management functions. Therefore, the planning function is defined as the process of organizing the purposeful activity of a person, based on establishing his goals and criteria, methods and means of achieving them. The organization function in a broad sense can be considered as a specific process of learning purposeful and orderly actions, that is, it can regulate the performance of all functions (Poplavska Zh. V., 2013).

The combination of a certain management structure together with a set of functions that characterize the actions of the structural elements of the production system and the rules that regulate the management processes in the system characterizes the mechanism of management of the production system.

The following properties are essential for explaining the mechanisms and processes of management of the production system.

1. The structure of the production system management is built on a hierarchical principle. This means that the production system has a multi-level organization with limited

ISSN Print 2786-5150
ISSN Online 2786-5169

autonomy of lower-level subsystems and the right of intervention (priority of actions) of upper-level subsystems in the activities of lower-level subsystems.

2. In the production system, only the main parameters of the subsystems are controlled (which is the prerogative of higher levels of the hierarchy), and individual elements of the system (subsystems) are given a certain independence in choosing solutions, taking into account their own and general system limitations.

3. The elementary link of the management system that carries out conscious (intelligent) activity is a person (the subject of management). The subject performs all informalizations of the management function that make up the elementary cycle of the decision-making process (Matveichuk L. O. 2018).

The presence of a subject in the management system determines a certain level of its activity. The activity of subsystems of the production management system is manifested in the self-organization (self-development) of the subsystem, which is expressed in its desire to achieve the set goals. The goals of subsystems may not coincide with the general goals of the entire system. The presence of local goals causes conflicts in the system - inter-level and intra-level. Inter-level conflicts arise if the global goal of the system and the local goals of subsystems are incompatible. For example, lower-level controls will try to provide false information or hide some of the production resources from higher levels. Such actions may be due to the desire of the subordinate system to receive less stressful plans that guarantee their implementation in the future.

Intra-level conflicts arise if the achievement of local goals by each subsystem of one level prevents the achievement of its goals by other subsystems. For example, stimulating subsystems from a single fund of material incentives leads to a conflict of rivalry, which under certain conditions can have both positive and negative consequences.

The formalization of a number of these properties led to the creation of a methodology and theory of active systems, i.e. systems whose control objects are “active” elements. At the substantive level of the definition, an active element is a purposefully functioning element that has the property of self-organization (self-development) and works with varying efficiency depending on the goals set for it.

An active system is a centralized system. It contains a control center, the main functions of which are: 1) formation of planned tasks and their issuance to subsystems; 2) accounting, control and evaluation of the results of the subsystems' implementation of planned tasks; 3) decision-making and provision of management actions that ensure the stability and reliability of the implementation of plans (Kish L. M., 2019).

The behavior of the active elements of the system is largely determined by the given mechanism of its functioning. The mechanism of functioning includes: methods of forming plans, goals and criteria of management; laws of management (planning, assessment, stimulation); organization of management processes by functions: planning, accounting, control, assessment, decision-making, management actions.

The practice of applying the theory of production systems can be directly used at all levels of management, as well as in solving such issues as monitoring the efficiency of the production system.

It should be emphasized that the measure of the amount of information, as well as the category of information, which is one of the functional characteristics, has a fundamental difference from all others, since it reflects not unambiguous dependencies, but multi-valued. relationships of system elements. By abstracting from the substantive characteristics, which are matter and energy, with the help of this measure it is possible to trace the transformation of information in the processes of its accumulation, storage and transmission, that is, when monitoring.

The analysis conducted allows us to conclude that in the process of functioning of the production system there is an increase in the volume of information that is accumulated and stored for further use. At the same time, the condition of information accumulation for improving management is necessary, but not sufficient. Considering that complex production systems are systems open to information, information selection should occur during its accumulation to establish a connection with the external environment. Thus, there should be no duplication of previously known information, but the creation of new information channels. This will allow for the progressive accumulation of information, which makes it possible to conduct emergent selection. This approach allows creating conditions for the appearance of elements of evolution in production systems, in particular innovations. The analysis shows that the progressive accumulation of information cannot be carried out only according to a deterministic program. The basis of such processes should be a stochastic mechanism. Thus, the presence of stochastic connections is an objective necessity. However, this does not mean that deterministic connections are given a secondary role. Only with the dialectical interaction of random and deterministic relationships are their roles equivalent, the advantage in favor of random relationships leads to a disruption of the stability of the functioning of the production system, the advantage in favor of deterministic relationships reduces the ability to adapt to environmental conditions, the ability to innovate (Onopko A.S., Zhigalkevych Zh.M., 2017).

Given that enterprises are informationally open systems, information selection should occur during its accumulation during communication with the external environment. Thus, in the process of the enterprise's activities, there should be no duplication of previously known information, but the creation of new information channels. This will allow for the gradual accumulation of information when monitoring the enterprise's activities, which makes it possible to conduct emergent selection. This approach allows creating conditions for the appearance of elements of evolution, in particular innovations, at the enterprise. The analysis shows that the gradual accumulation of information when monitoring the enterprise's activities cannot be carried out only according to a deterministic program. Such processes should be based on a stochastic mechanism (Kuznetsova A.Ya., Chmeruk G.G., 2019).

Let us denote the amount of redundant information by a symbol that simultaneously serves as a measure of the preservation of deterministic order in the production

ISSN Print 2786-5150
ISSN Online 2786-5169

system. Then the measure of the existing order can be represented by the equality:

$$H_1 = H_m - H_0 = I_1 \quad (1)$$

Where H_m is the entropy of the production system under conditions of maximum uncertainty, i.e. when all actions in the production system are equally likely; H_0 is the entropy in real operating conditions.

The introduced notations allow us to introduce the stochasticity coefficient for further analysis of the ratio of random and deterministic relationships:

$$G = \frac{H_0}{H_1} \quad (2)$$

The redundancy factor, which is used in information theory, is determined by the formula:

$$R = \frac{H_1}{H_1 + H_0} \quad (3)$$

Taking into account (3), formula (2) takes the form:

$$G = \frac{H_0}{H_1} = \frac{H_0 + H_1 - H_1}{H_1} = \frac{H_0 + H_1}{H_1} - 1 = \frac{1}{\frac{H_1}{H_0 + H_1}} - 1 \quad (4)$$

$$G = \frac{1}{R} - 1$$

Analysis of formula (4) shows that there is an optimal value of the stochasticity coefficient, which allows us to determine the ratio in shares of deterministic and stochastic information used in the formation of the information component of management. Such an optimal stochasticity coefficient will ensure homeostasis of a complex production system, while any of the extremes (absolute determinism or maximum stochasticity) leads to a deterioration in functioning.

Thus, information tracking of a complex production system, carried out for the purpose of its evolution, indicates the presence of an optimal ratio of determinism and stochasticity, since the process of evolution itself is the result of dialectical unity and struggle of opposing tendencies - the desire for decisiveness and all kinds of changes caused, in particular, by innovations. An important point is that deterministic and stochastic relations are not in equilibrium, but in a state of evolutionary dynamics. When conducting a study of complex production systems, the amount of information inherent in the system increases, and to reduce the uncertainty of knowledge about it, redundant information appears. Such redundant information is deterministic information, thanks to which the stable functioning of the production system is maintained. At the same time, stochastic connections serve as a source of new, unpredictable information, which can be obtained through channels from the external environment. The issue of the content and practical application of information does not lose its relevance.

Conclusions

The proposed optimal stochasticity coefficient makes it possible to ensure homeostasis of the enterprise, while any of the extremes (absolute determinism or maximum stochasticity) leads to a deterioration in the functioning of the enterprise. It has been established that deterministic and stochastic relations are not in equilibrium, but in a state of evolutionary dynamics. In the process of studying complex production systems, the amount of information increases, and to reduce the uncertainty of knowledge about the system, redundant information appears. Such redundant information is deterministic information, thanks to which the stable functioning of the production system is maintained. At the same time, stochastic relations serve as a source of new, unpredictable information coming through channels from the external environment. Due to the abstraction from the substantive characteristics, which are matter and energy, it is possible to trace the transformation of information in the processes of its accumulation, storage and transmission, that is, during the implementation of the information function. The proposed concept of "progressive accumulation of information" makes it possible to conduct emergent selection. This approach allows creating conditions for the emergence of elements of evolution in the functioning of complex production systems.

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