




“Innovative character of modernization of managerial information system of the enterprise”

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# INNOVATIVE CHARACTER OF MODERNIZATION OF MANAGERIAL INFORMATION SYSTEM OF THE ENTERPRISE

## Abstract

Important scientific and practical task concerning identifying the trends of innovation development of the managerial information system of the enterprise is solved and presenting of new concept modernization of managerial information system of the enterprise is done. The development of the managerial information system of the enterprise is described by the influence of innovative changes on processes with managerial information. This is carried out in accordance with the conditions and factors of the enterprise development with the organization of parameters of influence and the development of necessary measures to avoid disintegration of information processing processes, thus increasing the efficiency of information to exercise a guiding influence on processes of management. The concept of achieving information equilibrium in the process of making managerial decisions is substantiated that characterizes a more qualitative level of information provision of decision-making. The methodical principles of organization of the informational basis for the formation of variants of managerial decisions are developed, the effectiveness of which is determined by qualitative and quantitative parameters of managerial information. Information provision of managing an enterprise is formed through the architecture, which includes processes and schemes of organization, structuring, formalization, maintenance and information movement in the managerial system and beyond.

## Keywords

information system, management, innovations, modernization,  
decision-making process

## JEL Classification

O30

П.Л. Гринько (Україна), В.В. Белявцева (Україна)

# ІННОВАЦІЙНИЙ ХАРАКТЕР МОДЕРНІЗАЦІЇ УПРАВЛІНСЬКОЇ ІНФОРМАЦІЙНОЇ СИСТЕМИ ПІДПРИЄМСТВА

## Анотація

У статті вирішено важливе науково-практичне завдання щодо виявлення тенденцій інноваційного розвитку управлінської інформаційної системи підприємства та презентації новітньої концепції модернізації інформаційного забезпечення управління підприємством. Розвиток управлінської інформаційної системи підприємства описано через вплив інноваційних нововведень на процеси з управлінською інформацією. Це здійснюється у відповідності до умов і чинників розвитку підприємства з організацією параметрів впливу й розробкою необхідних заходів уникнення дезінтеграції процесів обробки інформації, підвищуючи таким чином ефективність інформації для здійснення керівного впливу на процеси управління. Обґрунтовано концепцію досягнення інформаційної рівноваги в процесі прийняття управлінських рішень, що характеризує більш якісний рівень інформаційного забезпечення прийняття рішень. Розвинуто методичні засади організації інформаційного підґрунтя формування варіантів управлінських рішень, ефективність яких визначається якісними та кількісними параметрами управлінської інформації. Інформаційне забезпечення управління підприємством сформоване через архітектуру, що включає процеси і схеми організації, структурування, формалізації, обслуговування й руху інформації в управлінській системі та за її межами.

## Ключові слова

інформаційна система, управління, інновації, модернізація,  
процес прийняття рішень

## Класифікація JEL

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## INTRODUCTION

Diversity of approaches to information provision of system of managing an enterprise is the advantage of the modern stage of development of society and the economy. Information is the connecting element, the foundation, the result of business processes that constitute the basis of activity of the business entity. In the general “economic picture”, the information system is the missing element, without which any activity becomes meaningless. Scientists for the last years reasonably proved superiority of an information system in provision of activity of the enterprise, its financial stability and competitiveness in an aggressive market environment. For information the quality is determined from the point of view of its key features and principles of formation. It is about reliability, timeliness, relevance, intelligibility, comparability and other. Among the principles of information generation there are those that are regulated at the legislative level. And those for which informal rules are established that are regulated at the level of tradition and corporate ethics. For business there is no unimportant or secondary information, and each of the information sources carries its own semantic load for making managerial decisions. Managerial information system is a non-alternative source of comprehensible, high-quality and timely data for decision-making. Despite the development of the issue concerning the organization of the information system of the enterprise, the task to develop the innovative direction of modernizing of managerial information system does not lose the relevance. Business is a complex system of economic, financial and resource links, the regulation of which can provide with the using of the necessary managerial information to obtain the expected effect.

## 1. LITERATURE REVIEW

An analysis of modern domestic and foreign scientific researches made it possible to conclude on the multifaceted researches in the context of innovative approaches to the organization of information provision of management.

The essence and features of information provision of managing an enterprises and organizations are substantiated [5]. The features of the use of modern information systems and technologies in the activities of enterprises are investigated in order to increase the efficiency of managerial decisions [12]. The features of implementation of information technologies in the management system are determined in order to improve the domestic business practice [4]. A number of modern scientific developments in the field of systems of support of decision making is analyzed [7]. The features and objectives of information policy in the modern conditions of constructing an information society are analyzed [8]. The organization of information provision is considered as the main means of the overall management system [9]. The promising system architecture of IT-infrastructure with a system of components is described that provide needs of management [7]. Formation of the general architecture of the information system with the details of business processes and the definition of their information provision is considered [6]. The current state of innovation activity of economic entities of Ukraine is analyzed [3]. Author's interpretation of strategic architecture as a specific organizational and functional model for implementing enterprise strategy is proposed [10]. The directions of optimization of information-analytical provision of managing an enterprise on the basis of structural transformations in the information system are investigated [11]. The concept of intellectualization of the information provision of managing an enterprise is substantiated on the example of modeling of information system [2].

The scientists laid the theoretical and methodological basis for activating reforms, proposals and recommendations concerning development of information provision of management. However, the need for innovative approaches to modernizing the information system of the enterprise remains relevant in accordance with the real requirements of the modern economy.

## 2. AIMS

The goal of the study is development of recommendations for the modernization of the managerial information system in the context of the priority of innovation in information processes and data processing systems.

To achieve the goal the following tasks were set:

- to define a new level of information traffics which typical for the technological economy and affecting on qualitative indicators of information;
- to develop proposals for improving the means, methods and procedures for the organization of the managerial information system of the enterprise.

### 3. RESULTS

Information provision, creation and use of information channels are in demand by the management system, which depends on the quality and type of information received. The information interaction of key users has reached a new level that implies greater availability of data, without violating the right to confidentiality of management data. Thanks to high-quality management information, the level of trust in the business entity increases and its business reputation improves. Information relations involve the exchange not only of data and information, but rather of knowledge that is typical for the technological economy. Accordingly, information should not only be consumed, but also produced. It is necessary to organize uninterrupted movement of information that involves the use of various sources of useful data, previously prepared by other specialists.

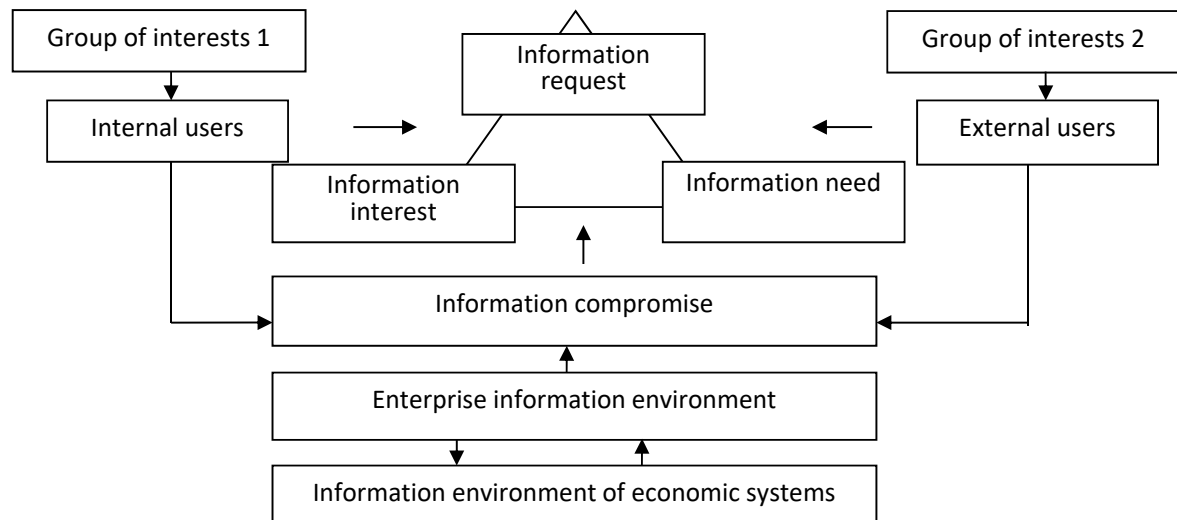
For successful development of business and economy the decision relative to the information system is in two polar planes, which characterize the subordination of business to information or information to business. Despite significant changes in the representation of the role of information for decision-making, managing an entrepreneurial activity and economic development, the information system is adapted to the business, and not vice versa. The advantage of such flexibility of information is the exclusion of patterns in decision making that creates an additional competitive advantage among other participants in market relations. When the business is oriented to information, a multivariate model of information relations is created, the possibility of which is currently excluded, taking into account the unpreparedness of the necessary base.

Different managerial information is required for conducting business activities, but the main requirements for it are its quality, reliability, relevancy, relevance and comprehensiveness for various users, which have the purpose of their own interests in relation to activities of the enterprise. The complex structure of managerial information is explained by the multilevelness of information communications and relations between the subsystems of enterprise management in the internal and external environment. Managerial information differently interpreted (decoded) by users according to their target requests, work experience, professional competencies.

Information provision of management can be viewed from an economic, organizational, technological and technical point of view, as well as a system of resource provision as a specific type of professional activity, as a component of the system and process of management [5, p. 421]. From the standpoint of a systematic approach the information provision is a dynamic system of data and methods of processing them, which allow to study the real state of the controlled object, identify the factors that determine it, as well as identify the possibility of implementing the necessary management actions.

Managerial information connects all participants of business relationships and contributes to reaching a compromise between different groups of users, thus providing information requests for the decision-making process (Figure 1). On the basis of the achievement of the equilibrium in user requests the solving specific tasks is achieved by adopting alternatives to managerial decisions, to which precedes the evaluation and selection of relevant information.

The balance of information interests of different users is possible with the provision of comprehensive information as a result of the formation and maintenance of the information environment of the enterprise, which summarizes information of various character: corporate, analytical, methodological, normative, legal, technical, information and reference. Information need arises and exists objectively and is conditioned by socio-economic factors concerning the management of change and the formation of model of reaction on them. Information interest is a conscious information need or a form of its active manifestation that has a subjective character. Information



Source: Developed by the authors.

**Figure 1.** Achievement of information equilibrium in the process of making managerial decisions

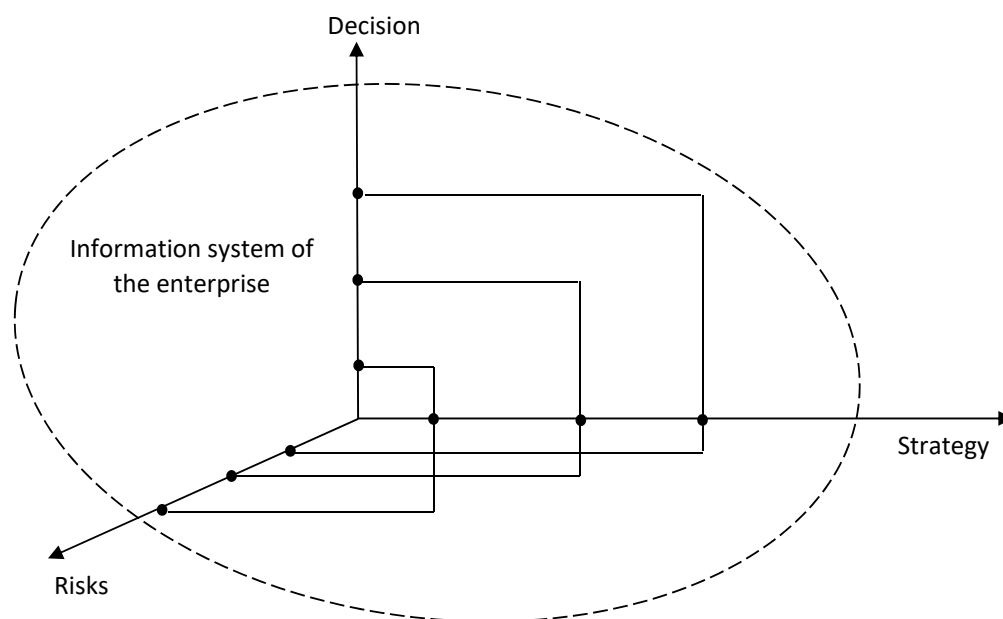
request means the formulation of information interest or the indirect manifestation of information needs, its conditional designation.

In the information system the analysis of data in the time and space context is carried out using complex queries for organization of the decision making system [12, p. 55]. The integrated managerial information system covers all business functions and all management processes of the enterprise and provides interaction of complex and well-organized processes with high-speed means of modern information and telecommunication technologies of high scientific and technical level [4, p. 357].

Managing an entity is a complex system of reciprocal information relationships between the internal and external environment. The information technology of managing an enterprise involves merging into a single complex of all technical means of information processing with using modern methodology and various information processing procedures [7, p. 176]. Information and analytical provision of managing an enterprise is located at the intersection of information flows of the external environment and the internal system, importing and exporting information, summarizing and analyzing it, forming on the basis of technological decisions separate databases, from which, in accordance with the level of professional competences, knowledge and experience, decisions are formed, development scenarios, management projects in accordance with the mission of the enterprise, individual peculiarities of its activity. Important aspects of the qualitative characteristics of the information system are the degree of its integration into the project management process and the ability to provision of procedures of regular and crisis management.

Alternatives of managerial decisions are developed and grounded on the basis of information and analytical provision of management, taking into account the basic factors that influence the speed and reality of achieving the goal – decision and risk (Figure 2).

In the process of making managerial decisions the time is inversely proportional to risk and vice versa. The remoteness of the prospect of an event involves the definition of a lower level of risk that negatively affects the reality of the evaluation of future processes and makes false adjustments to the model of reaction to changes. In case of the necessity of making operational decisions, the level of risk for implementation of the management influence increases that prompts the enterprise management system to adjust the models of decision, adapting it to the time context of the subject of the business. The area of optimal managerial decision is at the point, where the balance between time and risk is achieved that is supported by a complex of universal economic information, expanded corporate data.



Source: Developed by the authors.

**Figure 2.** Information basis of the formation of variants of managerial decisions

Alternatives of managerial decisions and options of projects are developed on the basis of a combination of different information, which corresponds to the time contexts of the enterprise with the assessment of perspective events that according to professional competences, experience and knowledge contributes to the choice of the optimal variant (in real time) and its justification based on conscious management of indicators, results, business processes. Managerial decision is the result of integration of policy of managing an enterprise, corporate culture, development of information and analytical provision of management in accordance with the characteristic features of the business entity, its current state, tasks and strategy, conditions, factors and influence of the concepts of economic development in general.

The main content of information policy at the micro and macro level is to provision of scientific, technological, organizational and economic conditions for the creation and application of information technologies, information infrastructure, as well as information resource formation system [8, p. 100]. Modernization of information policy involves the optimization of managerial data, technologies and techniques for their processing and generalization, which is regulated by professional provision. Information policy is developed as open, flexible to innovations that consistent with the intensity of changes in the enterprise activity, taking into account the influence of factors of external environment, contributing to improving the quality of information for the adoption of management decisions.

The development of a management strategy (perspective goals and objectives), the development and the choice of managerial decisions, organization of their implementation, regulation and control, summing up the results of the consumption of the information obtained and ending with the issuance of new information. But the scope and content of the information depend on the structure of management, on the ratio of the management system between the dedicated structural subdivisions or subsystems of management [9, p. 353]. System of managing an information flows needs agreement in accordance with the initial architecture of business processes and the well-established information infrastructure that serves the import-export of information between functional subsystems of management. The information should be synchronized at the stages of import and export of data, correspond to business processes and requests of the management system in real time in order to constructed of information architecture that reflects the spatial and temporal context of the enterprise's activities. At the present time, when modernizing the enterprise, the requirements for IT infrastructure modernization are put forward in the first place in such a way as to ensure maximum efficiency and flexibility of automation of business processes [7, p. 9].



Through information architecture the user is oriented in the information space and is able to design, update and improve the processing, transmission and storage of data. Each new information should be finely integrated into the general information system, without violating its foundations. Information is perceived by the user when he can perceive it, it is logical to associate with the data already known to him and interpret (decode) according to his own experience. Information architecture is intended not to increase the amount of information, but to managing its quality. Information is just as valuable a resource as material, financial and other intangible resources.

The enterprise based on architecture implements information management, obtaining maximum efficiency from the information that expressed in managerial decisions. For information architecture should be inherent in the integral character of systematic, promoting the activation of the information potential of the enterprise to provide synchronized development of subsystems of management. An objective response to the development of information architecture should be the redesign of information provision of management, taking into account the preliminary assessment of the impact of the information and communication complex on the integrated communications and the construction of the architecture of the information system. The information provision of management processes is based on a clear system of goals, where each subsequent level of goals contributes to the achievement of the goals of the highest level, and all individual goals together should be coordinated among themselves, and those that ensure the achievement of the overall goals of the organization [6, p. 328].

Information provision of managing an enterprise should be formed through architecture, which is based on: centralized data processing that serves the processes of its automated maintenance with the support of technical processing and data monitoring; support for reference information; the function of updating information with the filtering of data according to the criteria of time, quality, quantity, significance, etc.

Information provision of managing is organized through its inclusion in the integrated information and communication infrastructure, which operates through the contours of internal and external destination. The contours of internal destination are adapted to service information and communication activities within the enterprise and implemented through a complex of technical and technological means, organizational systems and regulatory control bases, which serving internal management processes and information flows. The external contours serve the informational infrastructure of economic systems, creating a base for flexible information and communication activities, facilitating the maintenance of centers and channels of processing, transmission and storage of data. The internal infrastructure interacts with the external through the open channels of communication within the access that allows to continuously monitor the requests of different users.

Information provision of managing an enterprise is based on adaptive architecture, that is, on the integrated unity of organizational, financial, technological and information architectures. Technological architecture is the basis for provision the necessary software and communication environment for the management of information, and through them – for the implementation of business functions. Organizational architecture is constructed on the basis of mission, strategy, goal of development and long-term business plans, on the basis of which determines the overall structure of the internal business environment that is the basis for the development of management policy. A beneficial indication of the effectiveness of the financial architecture is the degree of satisfaction of the financial interests of the owners and participants of the enterprise, as well as the growth of the value of business as a potential sale and sale in the market [3, p. 147].

The information architecture contains the processes and schemes of organization, structuring, formalization, navigation, service and information movement in the system and beyond. This is more wider than the usual data structuring, this is the setting of the information space that is the environment for the implementation of all business processes of tangible and intangible nature, which ensure the activities of the enterprise and promote its follow-up to the concept of sustainable development. The initiative of updating information architecture has a key position in increasing the business informativeness and further implementation in the strategy of development of a universal platform for the processing, transfer and storage of relevant information intended for extended provision of information interests of different users.

One of the main principles for setting up the general architecture of the enterprise, primarily in its information

aspect, is the principle of systemic congruence that in the context of balancing elements of the management system means the need to reconcile the relationships between such elements of the management system as goals, structure, people and culture [10, p. 105]. Among other mandatory principles, which regulate the complex construction of the information program, it is necessary to indicate the binding character of single database for all program algorithms. Information processes should be not only integrated, they have to be coordinated and organized in accordance with common principles, rules and procedures [11, p. 86]. This contributes to avoiding duplication of information, since the parallel setup of different databases may violate information security and, as a consequence, affect the formation of enterprise management accounting.

Information for management has gained a new meaning in the context of managerial influence on decision-making and data interpretation in accordance with the assigned tasks [2, p. 4]. In the infrastructure of information provision of managing an enterprise provides for the establishment of traffic data, their volumes, identification of addressees and addressers, control of inputs and outputs of information, monitoring of traffic information and regulation of communication nodes. Organizational and methodological provision is oriented on the compliance of the information provision of management to the architecture of business processes, the establishment of rules and standards for the operation of the system, the analysis of the results of information traffic, the identification of "weaknesses", the construction of information and logical data model for each system objects and personnel provision, which constitutes the intellectual part of the maintenance of the information system of the enterprise.

## CONCLUSIONS

1. For modernization of the management information system of the enterprise realized progressive resources – information potential, technologies, knowledge, etc. Information provision of management is presented as a tool for activating the enterprise's activity that should be optimized and improved without interrupting management activity with reaching the actualization of enterprise development policy. The development of business through the optimization of information provision of managing an enterprise has been obtained through the emergence of a new level of management of information that involves other approaches to the use of information potential. This allowed to optimize the information base for making managerial decisions in the conditions of sustainable development of the enterprise.
2. The transition to construction of information system based on architecture is substantiated that became possible due to the change and elimination of standard representations, rules and norms governing the organization of information flows in the enterprise. Thus, the beginning of the transition to a new methodological level is described that characterized by the introduction of innovative methods and technologies for organizing the information provision of the management of a flexible, complex, semi-open system for generating and disseminating relevant information between the subsystems of the enterprise. In the future, it is planned to expand research in the direction of construction of integrated model of the managerial information system to increase the efficiency of information use for the purpose of making managerial decisions.

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