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FORMALIZING THE TECHNOLOGY OF MANAGEMENT AS A CONSTITUENT OF THE ORGANIZATION CORE CAPABILITIES

The article considers technology as a component of organization core capabilities. The technology is broadly described as a set of formalized knowledge. The main task of any technology is framed; this task involves determining the structure of a process and the methods by which its individual operations are carried out. The term “management technology” is defined. As opposed to the available definitions, the new one emphasizes a set of formalized knowledge about the implementation of the process of management in regard to the composition and sequence of its stages and operation, the list of input and output information on operations, the description of methods for obtaining and transforming input information and professional qualification requirements to managerial staff. It is proved that management technology allows managers to execute clearly coordinated actions without additional instructions via formalizing. It is justified that the knowledge of management technology should be formalized according to the logical patterns of the management process and its stages, reflecting the structure of the process and the relationship among its components. Using a special form of an information model – the informogram of the management process is suggested as a way of formalizing; it contains information on the composition and methods of executing each stage and operation. The stage of the management process, that is monitoring, is formalized. The composition of strategic monitoring operations is determined; these operations are scanning the external environment of the direct action, interpreting information on the external environment of the direct action, scanning the external environment of the indirect influence, identifying significant weak signals, scripting, composing industrial success factors. The logical pattern of the implementation of strategic monitoring and its informogram are suggested. They make up the monitoring technology as the stages of the management process and appear as the formalized knowledge of its implementation. Thus, the organizational routine describing the sequence of standard operations which provide an opportunity to coordinate the activities of management personnel is obtained.

Keywords: management technology, stage and operation of the management process, competitive advantage, monitoring.

Introduction

The present time is characterized by the process of globalization, which gradually erases regional and national boundaries. Powerful global companies that had entered the domestic market radically changed the conditions and ways of doing business and raised the problem of creating sustainable competitive advantages of domestic enterprises. The basis of their adaptive diffusion in the competitive environment under the conditions of rapid changes in the environment is the competition not only of goods and services but also innovative management methods.

Analysis of scientific sources and problem statement

In the last ten years, the resource approach has become the dominant paradigm of the strategic management in creating competitive advantages. Due to this, the concept of “core capability of the organization” as a set of business processes has been introduced into scientific discourse [1, c.519; 2, c.156-181; 3, c.20-30].

Some theoreticians in the area of the resource approach regard sustainable competitive advantages as a skillful use of resources, but the article considers the “capability of an organization” not as a combination of business processes that create the opportunity to succeed, but as the capability to perform any kind of activity (business process) efficiently, that is, the capability does not lie in the composition of business processes, but in their implementation. Two components of the organization capabilities were previously studied: technology and personal competence of the personnel [4, c. 55].

Modern methodological approaches to the identification of the key capabilities of the organization

[2, p. 155–181; 3, p.20–30] are based on the concept of the value chain introduced by M. Porter, which represents the activity of an enterprise as a number of typical activity that creates value [5, c. 38]. Five primary activities that directly relate to manufacturing the product and four secondary or supporting activities that ensure the factors of production are identified in the suggested model.

This model has become the basis for many modern concepts: competitive advantages, reengineering, value chain, organization capability. However, it has a significant disadvantage: there is no management process among the value chain processes.

Management is the most important process in creating the value of an organization. All tangible and intangible assets of the firm are activated by managers who perform managerial functions. As a result, managers integrate all kinds of resources (natural, capital, raw material, human, financial, informational, intellectual), which enables performing operational processes, that is designing new products, exploring the market, providing with supplies, manufacturing products, selling and ensuring after-sales service.

Thus, it can be concluded that the management is an activity that drives the mechanism of obtaining the value of products in the chain of its creation and enables doing it better than competitors, that is, increasing the competitiveness of an organization.

Therefore, the management is considered as the key capability of an organization will enable obtaining the source for creating a unique competitive advantage, which requires, first and foremost, defining its component – the technology of management.

The goal and objectives are to determine the content of the technology of management and frame the means of its formalizing.

Basic material

Solving the problem of designing the technology of management technology requires determining the content of this definition. Nowadays, the common point of view is making the connection of management technology with the process of making managerial decisions [6, p. 237]. It is inappropriate and is caused by:

- the confusion of the notions of “process” and “process technology”;
- the lack of a clear definition of the mentioned notions and boundaries of the management process.

Technology can be broadly defined as a set of formalized knowledge about the process execution. J. Henry divides the technology into three main components [7, c. 139]:

- the material and energy component that is technical and energy supplies. It is considered as a complex of technical means, tools, equipment, devices, power equipment that have certain parameters and characteristics which meet the standard requirements of this technology;
- the informational component that represents a set of knowledge about the means of technological, energy and information support, and about the materials being processed. This knowledge is embodied in the form of descriptions, drawings, requirements, standards, norms, instructions for the use of the listed assets and their repair, software, know-how, etc., which is assigned to this technology in the form of knowledge and is finally embodied in the general notion of the use this technology;
- the human component that is a set of requirements for users of this technology according to the level of general and professional education, qualifications, professional skills, the readiness of users, and so on.

It should be noted that the article deals with the technology of operational processes that cover the stages of processing raw materials into products that can have a nature of physical transformation as a result of production, a change of location as a result of transportation and warehousing as a result of storing services.

The basic components of the technology of operational processes are the formal requirements for the equipment used in the process; raw materials, semi-finished products and means of their processing during each technological operation and the qualification of the personnel performing technological operations.

Since the process is considered as a sequence of executing a set of operations for converting inputs into desired outputs, the main task of any technology is to determine the structure of the process and the methods that are used to perform its individual operations, which finally will increase the efficiency of the process.

The process of management is significantly different from the operating processes, so its important characteristic is the composition and methods of information transformation.

Taking into consideration all the stated above, the technology of management can be defined as a set of formalized knowledge about the execution of the process of management that includes the composition and sequence of elements execution (stages and operations), a list of input and output information according to

operations, the description of the methods for obtaining and transforming input information, determining technical means as well as professional and qualification requirements for managing personnel.

Thus, management technology allows managers to execute clearly coordinated actions without additional instructions and recommendations because of their formalization. If mastering managerial skills is developed on the basis of the principle of “learning during work”, the knowledge that lies at the bottom of their execution remains implicit, so they are difficult to reproduce.

The knowledge should be systematized, that is typical procedures should be formalized for its efficiency. The technology of management solves this task and becomes the holder of so-called organizational routines or “a certain sequence of coordinated actions of people” [2, p. 157].

The achievement of the best results of production and economic activity of the enterprise is known to be linked with making efficient managerial decisions which are the result of using the rational management technology.

According to the theoretical foundations of the industrial engineering, the technology can be considered as rational if it meets the following requirements:

- the objective composition of stages and operations of the process, which provides the shortest way of transforming input information;
- the specialization, that is consolidating homogeneous procedures or processing homogeneous information at certain stages and operations of the management process;
- the minimum of links among the process components;
- the establishment of rational methods for implementing the stages and operations of the management process.

Basing on the definition of management technology and the requirements for its rationality, the formalization of knowledge of management technology should be carried out according to logical patterns of the management process and its stages. Such patterns should reflect the structure of the management process and the interconnection among its components.

The technology fulfils its main purpose – the establishment of rational methods of performing operations – not only by establishing certain methods but also by establishing method targeting, that is detecting particular methods suitable for certain operations. To do this, a special form of the information model is suggested. This is the informogram of the management process that contains information on the content and the composition of the methods of implementation for each stage and operation. At the same time, the targeted list of methods in informograms enables determining the qualification and professional requirements for personnel, which is one of the formalized basic components of the management technology.

The typical stages of the management process were identified in previous studies [8]; the significance of the stage of monitoring increases due to increasing the

importance of making preventive managerial decisions at some stages.

The development of monitoring technology requires solving the problem of the composition of the information that is necessary for its implementation. It is caused by the question – what type of information should be collected if the nature of the decisions on changes in the activity of the enterprise is not known in the context of the factors of the environmental impact. This problem illustrates a distinctive feature of monitoring. Information support for any decision requires a clear definition of the nature and amount of information that enables outlining the boundaries of its search. That is, the decision of the problem of information support of monitoring requires developing basic criteria for selecting the necessary information.

Its simplest solution is to obtain any information about the state of the environment. However, the simple solution in this case is not efficient as it can lead to the situation when the company may “drown” in the information noise, because, on the one hand, a certain amount of information can be excessive for the enterprise’s response to environmental impacts, and, on the other hand, some useful data may get lost in a load of unnecessary information. Consequently, the following conclusion can be made – monitoring should start from framing the boundaries of information collecting.

Solving such task according to the methodology of the system analysis should be based on the process of monitoring, which, in turn, corresponds to its type – strategic or current.

Basing on the conceptual model for developing key competitive advantages [4], it can be stated that the purpose of strategic monitoring is to determine the industry success factor (ISF) and the drivers that influence their change. Therefore, that the structure of force fields should be considered as an object of the strategic monitoring.

After the characteristics of the strength fields are determined, the intensity of their influence can be determined and, on this basis, ISF can be created as a counteraction to the cross-power field. Since the functional purpose of monitoring lies in the ability to predict changes in ISF, the external environment of indirect action should be the object of monitoring in addition to the sectoral force fields.

It should be noted that considering the environment of indirect action, scientists disagree on the list of its segments but hold a view that its each segment should be carefully studied, the main trends and mutual influence should be identified, and the trends of their development should be studied [9, p. 320; 10, p. 293]. But it is difficult to apply this approach practically due to the significant amount of information.

At the stage of strategic monitoring, not whole segments of the environment of indirect influence should be observed but only the driving forces that are developed within the environment. The driving forces are identified by weak signals that represent changes in the social demographic, economic, state, political, and scientific and technical spheres that can significantly affect the intensity

of industry force fields and through them the composition of industrial success factors.

Due to the fact that the impact of the indirect environment is homogeneous for enterprises of one industry, it seems appropriate to track weak signals based on industry characteristics after the characteristics of the industry force fields are studied and the intensity of their impact is assessed.

Summarizing the above, the tasks of strategic monitoring can be defined as follows:

- identifying weak signals;
- assessing the impact of weak signals on the intensity of individual industry force fields;
- identifying probable changes in the intensity of industry force fields.

All of the above can reasonably suggest the composition of strategic monitoring operations and the logic of their implementation.

1. Scanning the external environment of the direct action.

The operation is aimed at accumulating and systematizing information about the environment of direct influence.

Information from primary and secondary sources is collected with the help of known methods – special and documentary observations, surveys, questionnaires, content analysis. The accumulated data should be systemized according to the suggested map of the industry force fields and their characteristics.

2. Interpreting information on the external environment of the direct action.

The intensity of the impact of each industry force field should be assessed during the operation.

Suggested characteristics of industry force fields enable describing them, which is the basis for assessing. Further actions should be aimed at direct measurement of force fields. At this step, there is a problem related to the lack of a scale for measuring fields of similar nature. The intensity of their action can only be determined as strong, weak, medium, difficult to identify.

In this connection, the theory of fuzzy sets and fuzzy logic is suggested for measuring the industry force fields. Below, the method for measuring power fields is suggested; this method is developed with the use of fuzzy logic and enables performing the measuring operation to the fullest extent.

3. Scanning the external environment of the indirect action.

Since the environment of indirect action is very wide and affects the enterprise indirectly through industry force fields, only weak signals should be identified in the process of its scanning in contrast to the similar operation in the environment of direct action where information on the characteristics of each field is collected. They are identified as changes in the corresponding segments of the environment which can shift the intensity of the action of industry force fields.

The operation is executed using the methods that are used while scanning the external environment of direct action.

4. Identifying significant weak signals.

Not all detected weak signals can be significant for the studied industry. Consequently, the following problem should be solved – whether detected signals can act as a driving force in relation to the system of industry force fields.

This problem can be solved by iterative launching the procedure for assessing the intensity of industry force fields using the suggested method. The procedure involves reviewing the characteristics of force fields that can be changed under the influence of a single weak signal and a re-assessing the intensity of the action of the industry force fields. The resulting assessment of industry fields based on the effect of a weak signal should be compared with the results of the operation “interpreting information on the external environment of the direct action”. If the results do not differ, the detected signal is not significant for the industry. Conversely, while detecting shifts in force fields, a weak signal should be considered as significant.

The procedure is repeated for all weak signals that have been detected.

5. Scripting.

Weak signals are only indicators of potential changes in the environment of indirect action which can grow in several possible ways. Therefore, they should be predicted. In this case, the efficient method is scripting – “describing future situations and ways that lead to them” [11, с.28].

While scripting, experts determine the factors that can intensify or weaken the detected signal and create further options on this basis. Finally, the content of the script is always created on the answers to the question “what will happen, if”. The assumptions that describe the conditions of future events are made in this way.

It is fair to assume that the developed scripts can be used for the next multivariate planning. However, the practice of planning proves that this way is quite labour-intensive and costly and contradicts the principle of cost-effective planning. Therefore, scripts should be assessed and the most probable one should be used in the future. Such script is called basic.

Other scripts are alternative. They describe the probable development of the external environment under the conditions of significant deviations of some influential factors from the baseline script.

The following methods are used for scripting: cause-and-effect diagrams, morphological analysis, situation modelling as well as special methods – the cross-impact of events, calibration and sorting, references, the logic of probable development (Saati), Bayesian method.

6. Composing industrial success factors.

The operation should result in the list of industry success factors which is one of the components of developing key competitive advantages and, finally, the competitive strategy of the enterprise.

Basing on the map of industry force fields [4], ISF should be created as a counteraction to the action of industry force fields.

The input information for this operation is the characteristics of the force fields obtained on the basis of weak signals and put in the baseline script.

The ISF composition can be determined in the process of brainstorming using the methods of formalization of its results:

- affinity diagrams (“KJ” method) that enable systematizing a great amount of associated information (the ideas which were suggested by group members);
- communication diagrams that enable identifying links between the main idea and various data and systematizing a great amount of logically connected information;
- matrix diagram that enables identifying the importance of various interconnections.

The general scientific methods are also used, these are the methods of analysis, synthesis, induction, the logic method.

The developed, selected as the most probable and consistent with the strategic objectives baseline script and composed industry success factors are the initial information of the monitoring stage; this information is transmitted to the input of stage of planning the enterprise activity. After that, the first cycle of monitoring is completed; it precedes the stage of strategic planning and is consequently carried out at the beginning of the cycle of strategic management.

However, monitoring should be carried out continuously for collecting and processing information on the probabilities and threats of the environment. Therefore, repeated monitoring cycles should be carried out with the given periodicity which corresponds to the degree of mobility of the external environment; these cycles of monitoring include two objects of observation:

- the environment of indirect action to identify new weak signals;
- the development of assumptions that have been laid down in the baseline script and can intensify increase or weaken the detected weak signal.

To understand the trends of weak signal development, the events should be systematized chronologically.

If the events in the external environment significantly differ from those in the baseline script during the operations of “scanning” and “interpreting information”, the alternative script should be selected and the plan of activities should be corrected.

All the listed above make it possible to suggest the logic diagram of strategic monitoring (fig. 1) and its informogram (table 1). The suggested technology of monitoring as a stage of the management process is a formalized knowledge about how to perform this process or an organizational routine that describes the sequence of standard operations that enable coordinating the activities of managerial personnel without additional guidance and instructions.

Its application along with the developed model of competencies enable improving the process of managing enterprises and creating a key management capability that determines the capabilities of making efficient strategic decisions and finally enables developing and maintaining stable competitive advantages. And vice versa – an enterprise that does not have a key management capability loses competitive advantages, even if it had earlier.

The suggested technology of monitoring and implement this process or an organizational routine. management is a formalized knowledge about how to

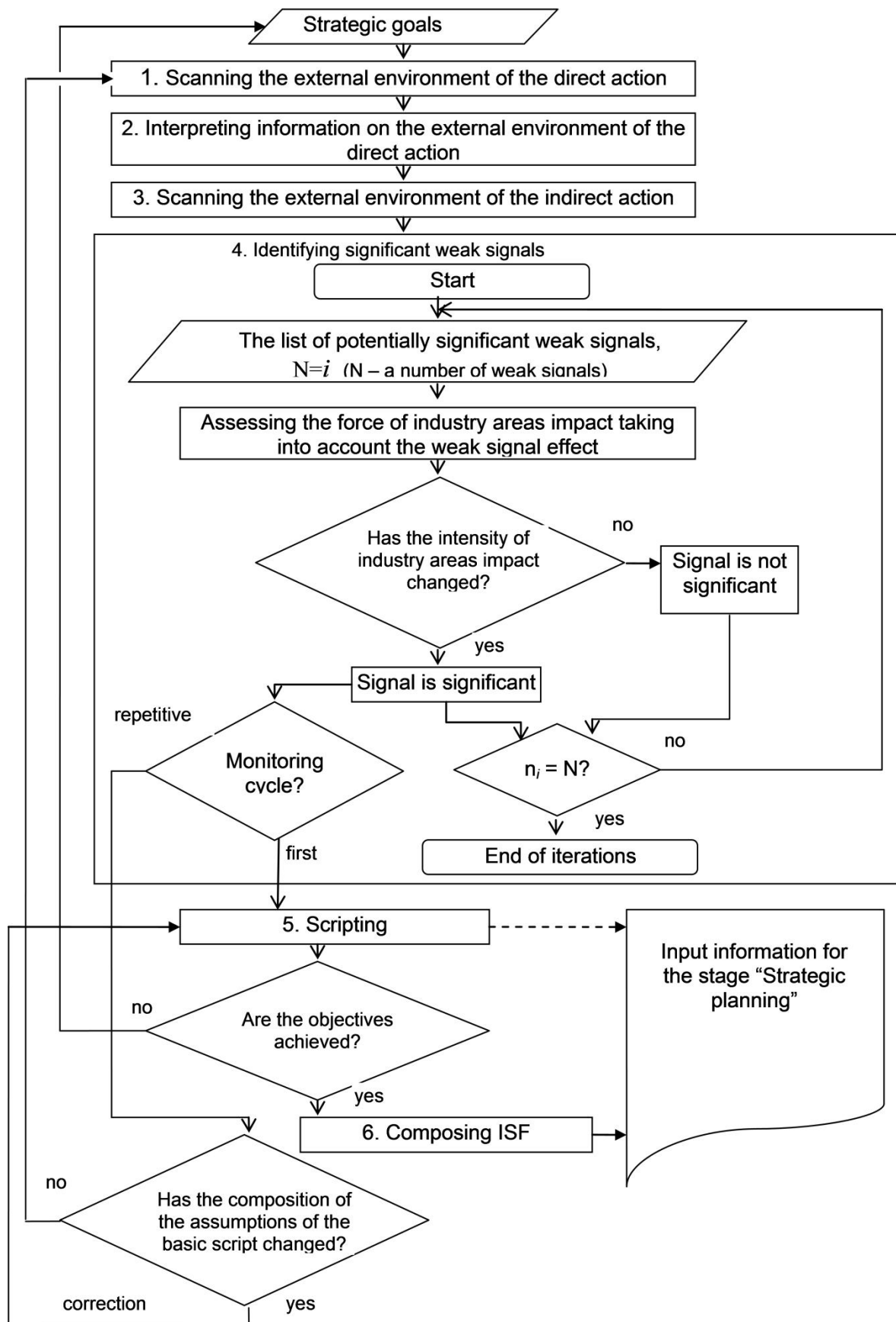


Fig. 1. Logical diagram of the strategic monitoring

Table 1. Informogram of the strategic monitoring as a stage of the management process

Operations	Input information	Transformation	Output information	Methods of transformation
1. Scanning the external environment of direct action	Sources of primary data: professional meetings; exhibitions; sales staff; personnel of marketing departments, supplies. Secondary data sources: state statistics, industry research, analytical and consulting firms, the reports of Ukrainian Corn Association, professional journals, business press, company websites	Accumulating and systematizing information on the characteristics of industry force fields	The map of industry force fields (the characteristic of fields: industry competitors, suppliers, buyers, substitutes, complements)	Special and documentary observations, surveys, questionnaires, content analysis.
2. Interpreting information on the external environment of the direct action	The map of industry force fields	Measuring the intensity of the action of each industry force field	Assessing the intensity of their action as strong, weak, medium or weak	Recommendations on assessing the intensity of force fields action with the use of fuzzy logic
3. Scanning the external environment of indirect action	Sources of primary data: professional meetings; exhibitions; sales staff; personnel of marketing departments, supplies. Secondary data sources: state statistics, industry research, analytical and consulting firms, professional journals, business press, ministry websites	Accumulating and systematizing information on weak signals according to the segments – state policy, scientific and technical progress, social and demographic factors, the state of economy	Listing weak signals and their characteristics	Special and documentary observations, surveys, questionnaires, content analysis.
4. Identifying significant weak signals	Listing weak signals and their characteristics; assessing the intensity of their action as strong, weak, medium or weak	Iterative check of the change in the intensity of the action of industry force fields for each weak signal and comparing with the preliminary assessment	Listing significant weak signals	Recommendations on assessing the intensity of force fields action with the use of fuzzy logic
5. Scripting	Listing significant weak signals and their characteristics	Scripting and assessing scripts probability	Baseline and alternative scripts of developing weak signals	Cause-and-effect diagrams, morphological analysis, situation modelling as well as special methods – the cross-impact of events, calibration and sorting, references, the logic of probable development (Saati), Bayesian method.
6. Composing ISF	The map of industry force fields; assessing the intensity of each force field action	Composing industry success factors	Composition of industry success factors	Brainstorming with the use of the methods of formalization of its results: affinity diagrams (“KJ” method); communication diagrams; matrix diagram

Basing on the fact that the effective work performance is "the achievement of special results" [12, p.15] (outputs that correspond to official duties) by using certain procedures and specific behavioural actions, it can be reasonably stated that the efficiency of a manager is achieved by following the rational technology of management due to mastering managerial abilities.

Conclusions

1. Management technology formalizes typical operations and thus becomes the bearer of so-called organizational routines, which allows managers to perform clearly coordinated actions without additional guidance and instructions.

2. Basing on the requirements for the rational technology, the knowledge of managerial technology should be formalized in logical models of the structure of

the management process and information models of its stages.

3. The rationality of technology is achieved both by determining the rational methods which help carry out the operations and process stages and by establishing their targeting, that is, by identifying methods to be applied for particular operations. To meet these requirements, a special form of the information model – informogram of the management process should be introduced.

4. Objects of strategic monitoring should be industry force fields which result in creating competitive relations in the industry.

5. The suggested technology of monitoring is a formalized knowledge of its implementation or an organizational routine that describes the sequence of standard operations that provide the opportunity to coordinate the activities of management personnel without additional guidance and instructions. Its use enables improving the process of managing enterprises and creating a key competitive advantage.

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ФОМАЛІЗАЦІЯ ТЕХНОЛОГІЙ УПРАВЛІННЯ ЯК СКЛАДОВОЇ КЛЮЧОВОЇ ЗДІБНОСТІ ПІДПРИЄМСТВА

В статті розглянуто технологію як складову ключових здібностей організації. Надано характеристику технології в широкому значенні як сукупність формалізованих знань. Сформовано головне завдання будь-якої технології, що полягає у визначенні структури процесу та прийомів за допомогою яких виконуються його окремі операції. Запропоновано визначення дефініції "технологія управління", яку відрізняє від існуючих акцентування на сукупності формалізованих знань про виконання процесу управління стосовно складу та послідовності його стадій та операцій, переліку вхідної та вихідної інформації за

операціями, опису методів отримання й перетворення вхідної інформації, та професійно-кваліфікаційних вимог щодо управлінського персоналу. Доведено, що управлінська технологія завдяки формалізації дозволяє менеджерам виконувати чітко скоординовані дії без додаткових розпоряджень. Обґрунтовано, що формалізація знань управлінської технології має здійснюватися у логічних схемах процесу управління та його стадій, що відбивають структуру процесу та взаємозв'язок між його складовими. Запропоновано як спосіб формалізації використання особливої форми інформаційної моделі – інформограму процесу управління, яка за кожною стадією та операцією вміщує інформацію щодо їхнього змісту та складу методів їх виконання. Формалізовано стадію процесу управління моніторинг. Визначено склад операцій стратегічного моніторингу: сканування зовнішнього середовища прямого впливу, інтерпретація інформації стосовно зовнішнього середовища прямого впливу, сканування зовнішнього середовища непрямого впливу, ідентифікація значущих слабких сигналів, розробка сценаріїв, формування складу галузевих факторів успіху. Запропоновано логічну схему виконання стратегічного моніторингу та його інформограму, які уособлюють технологію моніторингу як стадії процесу управління, що по суті є формалізованим знанням його здійснення. У такий спосіб отримано організаційну рутину, яка описує послідовність стандартних операцій, котрі надають можливість координувати діяльність управлінського персоналу.

Ключові слова: технологія управління, стадія та операція процесу управління, конкурентна перевага, моніторинг.

ФОМАЛИЗАЦИЯ ТЕХНОЛОГИИ УПРАВЛЕНИЯ КАК СОСТАВЛЯЮЩАЯ КЛЮЧЕВОЙ СПОСОБНОСТИ ПРЕДПРИЯТИЯ

В статье рассмотрена технология как составляющая ключевых способностей организации. Охарактеризована технология в широком смысле как совокупность формализованных знаний. Сформирована основная задача любой технологии, заключающаяся в определении структуры процесса и приемов, с помощью которых выполняются его отдельные операции. Предложено определение дефиниции "технология управления", которую отличает от существующих акцентирование на совокупности формализованных знаний о выполнении процесса управления относительно состава и последовательности его стадий и операций, перечня входящей и исходящей информации по операциям, описания методов получения и преобразования входной информации и профессионально-квалификационных требований к управленческому персоналу. Доказано, что управленческая технология благодаря формализации позволяет менеджерам выполнять четко скоординированные действия без дополнительных распоряжений. Обосновано, что формализация знаний управленческой технологии должно осуществляться в логических схемах процесса управления и его стадий, отражающих структуру процесса и взаимосвязь между его составляющими. Предложено как способ формализации использование особой формы информационной модели - информограммы процесса управления, содержащей информацию по составу и методам выполнения каждой стадии и операции. Формализовано стадию процесса управления мониторинг. Определен состав операций стратегического мониторинга: сканирование внешней среды прямого воздействия, интерпретация информации о внешней среде прямого воздействия, сканирование внешней среды косвенного воздействия, идентификация значимых слабых сигналов, разработка сценариев, формирование состава отраслевых факторов успеха. Предложено логическую схему выполнения стратегического мониторинга и его информограмму, которые составляют технологию мониторинга как стадии процесса управления и по сути являются формализованным знанием его осуществления. Таким образом, получено организационную рутину, описывающую последовательность стандартных операций, которые предоставляют возможность координировать деятельность управленческого персонала.

Ключевые слова: технология управления, стадия и операция процесса управления, конкурентное преимущество, мониторинг.