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ISTRAŽIVANJE PRAVACA RAZVOJA ORGANIZACIONIH I TEHNOLOŠKIH PROMJENA U AKTIVNOSTI PREDUZEĆA

RESEARCH OF THE DIRECTIONS OF DEVELOPMENT OF ORGANIZATIONAL AND TECHNOLOGICAL CHANGES IN ENTERPRISE ACTIVITY

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Abstract: *Theoretical bases of the enterprises production activity changes are revealed. Requirements to the directions of changes process development are defined. Two approaches to definition and essence of changes process are proved: from a recurrence regularity position changes and in relation to life cycle of concrete change. The organization of changes process is considered as set of structural elements of the enterprise, individuals, and also ways and norms of their interaction during the developing and realization of changes. The qualifier of innovations, processes and changes is developed. In structure of the qualifier two levels are allocated: basic signs of objects of classification and group of typological concepts on basic signs. It is offered to use typology of organizational and technological changes according to hierarchy of management of them depending on dynamics of functional properties and the principles of a production system, and also quantitative and qualitative characteristics. It is proved that changes managing of becomes the obligatory factor of production involving in the address considerable part of material resources and forming organizational and technological capacity of social and economic system. The perspective directions of development of the changes, connected with the solution of key problems of the enterprises are reasoned.*

Key Words: *changes, production activity, development, qualifier of changes, typology of changes, management, enterprise.*

INTRODUCTION

Identification and research of the enterprise process development changes directions at the, as well as the analysis of the factors influencing its development, is a necessary condition for its effective functioning. Thus the main objective consists in allocating those conditions of the environment of the industrial enterprise which have essential impact on processes of formation of changes. It is expedient to pass the solution of this task in strict logical sequence: assessment of activity of the industrial enterprise; research of its structure and potential; assessment of factors of environment. This sequence allows reasonably and with necessary degree of concreteness to formulate the key directions of changes both in structure and potential, and in its activity. That the directions of development of process of changes promoted development and justification strategy and the enterprise purposes, they have to satisfy to a number of requirements:

- all changes have to be systematized. Systemacity promotes by means of quantitative or qualitative scales to an assessment of degree of discrepancy of that is also that has to be.
- the directions have to provide completeness of identification of the essential restrictions, not allowing to reach more good results of activity of the enterprise. If such restrictions are revealed only partially, it will lower possibilities of formation of effective process of changes. Having eliminated one restrictions and having left others, it is possible to reach only partial improvements in results, or not to reach them at all.
- the directions have to provide a reasonable assessment of the importance of changes. Changes have to be ranged on the importance and the most priority of them are allocated. The assessment of the importance of restrictions has to be given proceeding from that, how significantly they influence a state and results of work of the enterprise.
- requirements have to have prognostic character. It means that requirements to structure, potential and results of the enterprise have to be shown not only proceeding from a today's social and

economic situation, but also its predicted change in the future.

METHODOLOGY

In activity of the industrial enterprises there were basic changes in the ratio factors of economic development. Organizational technology factors come out on top. It is necessary to understand the process of managing relying on continuous search and use of new ways and spheres of realization of the potential as process of changes of activity of the enterprise. Now economists are unanimous in definition of essence of process of changes, considering it as set of stages, stages, actions, actions, the processes connected with origin, preparation and release of new production and the technologies possessing scientific and technical novelty and satisfying new public requirements. At treatment it is possible to use it two approaches: from a position of regularity of recurrence of changes and in relation to life cycle of concrete change (Mensch, 1979). The process of changes generalizing results of scientific and technical activity, most fully reveals stages of its organization which are established according to the main stages of evolution of scientific knowledge in a cycle of works "research – development – production". Consistently being replaced stages provide as origin and justification of idea of a new method of satisfaction of public requirements, and creation, distribution, use in practice of a concrete product, technology, service. Process of changes as the system phenomenon can be divided into three main stages: the first stage — detection of an impulse of changes; the second stage — this understanding of requirement for changes; the third stage — resistance overcoming. The life-cycle concept of changes plays very important role in definition as maximum volume of release, sales volume and profit, and duration of a cycle of life of a concrete innovation. It is possible to tell that transition to a technical production cycle became characteristic feature of process of changes. At first the technical aspect of changes, then – organizational, afterwards – control is realized. Changing something one (production, technology, the equipment, shots), heads try to keep invariable other components of activity of the industrial enterprise in order to avoid risk to lose for some time control. Before beginning planning process, it is necessary to take into account: the enterprise structure is how great and difficult; what experience of management by changes is available in it; whether there are exclusive difficulties or crisis situations which demand fast actions; whether there are conflicts which complicate communication and achievement of the agreement concerning changes (Nesterov, 2011).

In figure 1 processes of planning and management of process of changes are shown. Key types of activity – typical are presented at realization of changes, but for each enterprise it is necessary to find the corresponding approach (Miller, 2011). Continuous interaction between the enterprises, owners of technologies and the research organizations is a kernel of process of changes of any branch, especially machine-building. The end results are expressed in various forms: maximizing arrived; minimization of losses, expenses and expenses; increase of efficiency of use of applied technical means and the equipment; timely introduction of new technologies, products, services; the best use of available labor and financial resources; creations of new technical capabilities, etc.

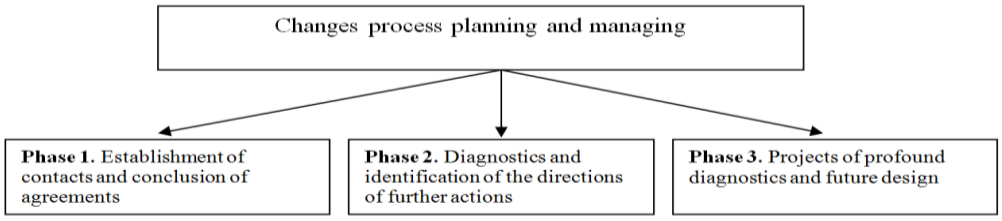

Figure 1: Phases of changes realization Source: Authors' research

As shows the analysis, the industrial enterprises often lack a complex assessment to diagnostics of changes and opportunities of realization of suitable alternatives. Besides, they lack the economic potential that doesn't allow to apply in due time the experience of management confirmed with world practice by changes. Often it leads to that the competitive level, the corresponding personnel and demanded culture of the management, promoting creation, transfer and large-scale distribution of technology.

The organization of changes process is a set of structural elements of the enterprise, individuals, and also ways and norms of their interaction during the developing and realization of changes. Includes the following elements:

a) direct contacts – are carried out between heads of various links without change of formal communications and touch on private issues, without concerning the purposes, limits, standards which are defined at the highest levels of management. The main objective of these contacts consists in the joint solution of problems, smoothing of the conflicts;
b) coordination of links. Coordinators of links are appointed on averages and the lower

management levels in intermediate departments if communications of these departments have regular, steady character and demand continuous exchange of information;

c) problem and target groups which are created if coordination of actions of many links is necessary for introduction of changes. They are formed top-level managements, include the qualified professionals, capable to make decisions on problems in the field of innovations and to risk;

d) teams – a special type of problem and target groups; work at a constant basis under a form of advising meetings. Are formed for coordination of activity of many links as formal organizational units with the approved structure of members and the established regulations of work. At the enterprise the hierarchy of teams is created;

e) the economic groups which are numerous organizational subsystems in which by means of temporary communications carriers of the decision various on hierarchical levels and functional accessory unite. Thus, the connected kinds of activity at implementation of changes are coordinated, and formal ways of communication as a result are overcome.

Coordination by means of economic groups demands the expenses connected with their internal structure and structure, with holding meetings. However decisions can be realized comprehensively, and possible mistakes - in time to open. Attraction of a large number of carriers of the decision is the positive moment, but on time process of implementation of changes is dragged out (Nesterov, 2011). Organizational design of control systems by changes can't be separated from enterprise management system design as a whole. It is connected with that it includes along with the functional divisions which are busying with changes, all linear heads, an administrative board of functional divisions of all levels of hierarchy of the enterprise. At its design it is necessary to use system approach that will allow to approach to the solution of this problem in a complex. In this case the subsystem of the general management, all functional and target subsystems, subsystems of ensuring management and elements making them is projected: functions, organizational structure and technology of its managing, shots, information, technical means of management, methods of the organization of management, administrative decisions. Reasonably to allocate investments into processes of changes, it is necessary to know the main signs and the basic content of all variety of innovations and innovations. Their classification by basic signs and other characteristics will give essential help at decision-making in management of changes, definition of the directions of scientific and technical activity (table 1).

The structure of the qualifier has two levels.
1 . Basic signs of objects of classification.
2 . Group of typological concepts on basic signs.

Table 1: Qualifier of innovations, processes and changes

Groups	Basic signs of objects of classification	Group of typological concepts on basic signs
Innovations	1.1.1 . – the scientific and technical 1.1.2 . – the technological 1.1.3 . – the economic 1.1.4 . – the organizational 1.1.5 . – the administrative	1.2 . Novelty degree 1.2.1 . – the absolute 1.2.2 . – the relative 1.2.3 . – the conditional 1.2.4 . – the private
		1.3 . Potential 1.3.1 . – the radical 1.3.2 . – the combined 1.3.3 . – the modified
Processes of changes	2.1.1 . – main objectives 2.1.2 . – carrying out time 2.1.3 . – cost 2.1.4 . – investments 2.1.5 . – risks	2.2 . Features of the org. of processes of changes 2.2.1 . – the intra firm 2.2.2 . – the interorganizational 2.2.3 . – the design and program 2.2.4 . – the competitive
Organizational and technological changes	3.1.1 . – simple product 3.1.2 . – difficult product 3.1.3 . – modifications of products 3.1.4 . – technological processes 3.1.5 . – services	3.2 . Level of develop. and distribution of changes 3.2.1 . – the state 3.2.2 . – the regional and republican 3.2.3 . – the branch 3.2.4 . – the corporate 3.2.5 . – the firm
		3.3 . Sphere of development and distribution of changes 3.3.1 . – the production 3.3.2 . – the scientific and pedagogical 3.3.3 . - the legal

Basic signs of objects of classification are subdivided into three groups. The first group included innovations, in the second – processes of changes, in the third – organizational and technological changes. In each group subgroups of basic signs of classification are allocated. In turn, on typological concepts all innovations and changes are subdivided on scientific and technical, technological, economic, organizational and administrative.

Basic signs of classification of organizational and technological changes are supplemented with typological concepts about their fundamental essence, distinctive property (the simple product, a difficult product, product modification, technological progress, service). Each of changes can be developed in the course of scientific and technical activity on state, branch, firm and other levels of hierarchy of a social production and the relations. Therefore, the variety of changes is accompanied by different types and forms of their development and distribution.

In foreign and domestic literature a large number of types of organizational and technological changes and various bases of their classification creating the whole system depending on solved tasks (Nesterov, 2011) is allocated, especially considering complexity of management of. On this basis it is offered to use typology of organizational and technological changes according to hierarchy of management of them, i.e. depending on dynamics of functional properties and the principles of a production system, and also quantitative and qualitative characteristics.

Organizational and technological changes of the quantitative plan from a zero order to the third order include: changes about the positions of a goal keeping and updating existing functions of business system as a whole or its separate elements; the target adaptation to quantitative requirements at preservation of function of business system as a whole or its separate elements; the organizational changes concerning personnel potential, for the purpose of providing the best organization of business system or its elements; mutual adaptations of elements of a production system. These changes in itself don't change quality of separate elements of business system, and in the complex conduct to increase of its efficiency as a whole.

Organizational and technological changes of the fourth order and above in essence are qualitative, they are characterized: partial functional changes within a production system or its separate elements, arising when form new "options" with new useful properties or the updated parameters; dynamics of all or the majority of initial properties of considered system at which the basic structural concept remains; qualitative recursors of functional properties of a production system or its elements when its initial concept changes, at preservation of the functional principle; cardinal changes in functional properties of a production system or its elements which change its basic functional principle.

The order of organizational and technological changes is not only an indicator of character and intensity of changes of the most production system, and also acts and as a measure of complexity of management as process of changes.

Options of the organization of processes of changes and the direction of scientific and technical activity are influenced by a large number of factors.

Distinctive characteristics (with strong positive correlation). This factor defines degree of advantage of use of an alternative method for the internal and external user. The assessment of competing alternatives assumes the accounting of such parameters, as the price, the useful productivity and reliability.

Suitability of an alternative method from the point of view of enterprise characteristics (with strong positive correlation). Existence of resources of the enterprise – financial, technical and marketing know-how, possibilities of development, and also qualification of the administrative personnel is compared to those resources which are required for successful realization of this alternative method.

The scale and possible needs for application (with positive correlation). The scale and possible expansion of scope of application also should be taken into account.

Advantages to users (with positive correlation). This factor characterizes extent of achievement by the consumer of his purposes. It can consider reduction of price, increase in a share of the market and need of observance of laws (environment).

Novelty for the enterprise (with weak negative correlation). If alternative methods of production, sales channels, etc. are less preferable in comparison with existing and also if it is fair concerning offered production, chances of success decrease.

Competitiveness in the market (with weak negative correlation). This factor is important for introduction of new production. With a competition aggravation (number of competitors, their aggression) chances of success decrease.

Specialization (with weak positive correlation). If the alternative method is based on ideas of consumers and bears the standard decision for rather their large number, chances of success grow.

In spite of the fact that changes can belong to any sphere of activity of the enterprise, it is necessary to concentrate attention generally on organizational and technological changes at realization of technological innovations as it is

important to managers to understand their features and to consider at adoption of administrative decisions. Therefore, ideas of changes and models of management of them – useful instruments of decision-making.

Management of changes in production demands ability of management of the enterprise to identify production requirements, technological and financial capabilities. It allows to choose adequate technologies, to adapt or develop them taking into account specifics of each enterprise and to promote their large-scale introduction.

Management of changes becomes the obligatory factor of production involving in the address considerable part of material resources and forming organizational and technological capacity of social and economic system.

Organizational and technological capacity of social and economic system is an ability of the enterprise to positive critically perception of new information, to an increment of the general and professional knowledge, promotion of new competitive ideas, finding of solutions of the non-standard tasks, new methods of the solution of traditional tasks, to use of knowledge for anticipation, a practical materialization of innovations. The integrated assessment of technical and technological capacity of the enterprise is defined by the relation of heads to changes and their abilities to work in the changed conditions; condition of management processes and information support of changes; level of vocational and economic training of the personnel; condition of technical and technological base of the enterprise; level of scientific and technical policy.

Changes at the enterprise (figure 2) promote formation of scientific and technical policy. For implementation of each policy estimates therefore strategy and plans are formed are carried out.

The first group of scientific and technical characteristics includes intellectual development and speed of mastering knowledge; professional competence, requirement not to lag behind life; creative, initiative approach to work, an ingenuity and a versatility; ability to development of programs of improvement of quality of production, growth of productivity, decrease in expenses; aspiration to rationalization of process of work, but knowledge of a measure; ability to self-education and self-development.

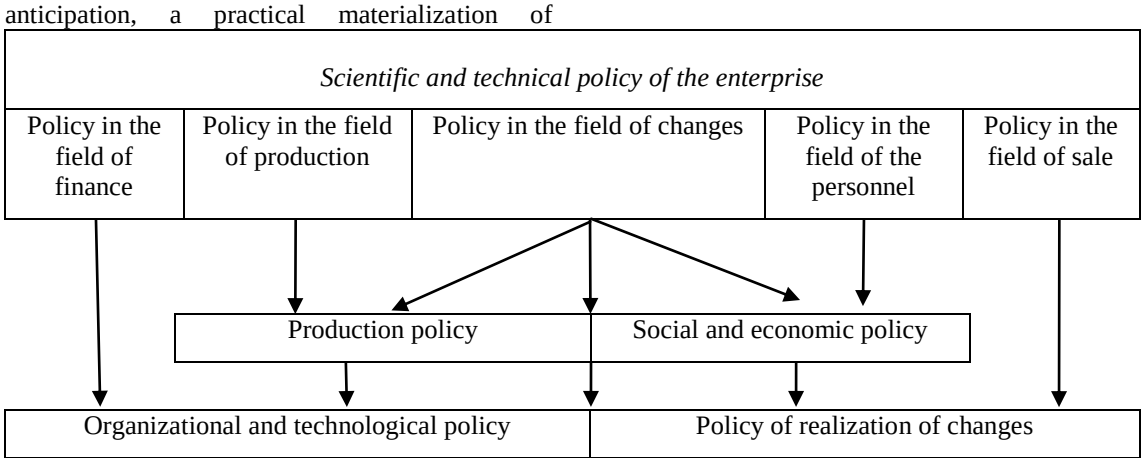

Figure 2: Scientific and technical policy of the industrial enterprise
Source: Authors' research

The second group includes independence and internal nature of motives to work, an initiative, work without urging on, high call of duty; work contrary to obstacles; desire in practice to check the abilities in solution of problems; critical mentality and high degree of inquisitiveness; vigor and efficiency of work; belief that for well performed work there will be also a good payment; the aspiration to perform work is better, than from it expect (sense of superiority in work).

The third group treat orientation to the high quality standards of work; creative relation to work; confidence and sequence at realization of innovations; readiness for unexpected decisions and new installations; flexibility and susceptibility to all changes on production.

Fourth group: knowledge weak and strengths; aspiration constantly to accumulate experience; existence of healthy ambitions and aspiration to professional growth; aspiration to exchange ideas and experience.

Task of each enterprise is improvement of the activity in the directions connected with increase of competition of production and the enterprise as a whole. At introduction of changes it is necessary to consider a susceptibility to them. The susceptibility to changes is an ability of workers or the enterprise to perceive these changes. The susceptibility is defined by time of introduction of concrete change or total number of the changes accepted to development by this worker or this enterprise to a certain timepoint. Than earlier the

decision on introduction will be reached, or the it will be more accepted changes to this timepoint, the susceptibility of the worker or the enterprise to changes (figure 3) is higher.

The general model of a susceptibility of the enterprise to changes can be presented in the form of personal and psychological characteristics of the personnel of the enterprise; characteristics of organizational structure (structural variables); characteristics of an external environment and interorganizational communications (contextual variables); stimulation of realization of changes on objects.

Personal and psychological characteristics of workers are considered from a point of view of heads and the other personnel respectively:

- installation to changes; gender and age characteristics; professionalism; "cosmopolitism"; place in hierarchy; ideology (conservatives, liberals, etc.); interest in office growth; tendency to risk.
- information contacts; awareness; motivation to changes; educational level.

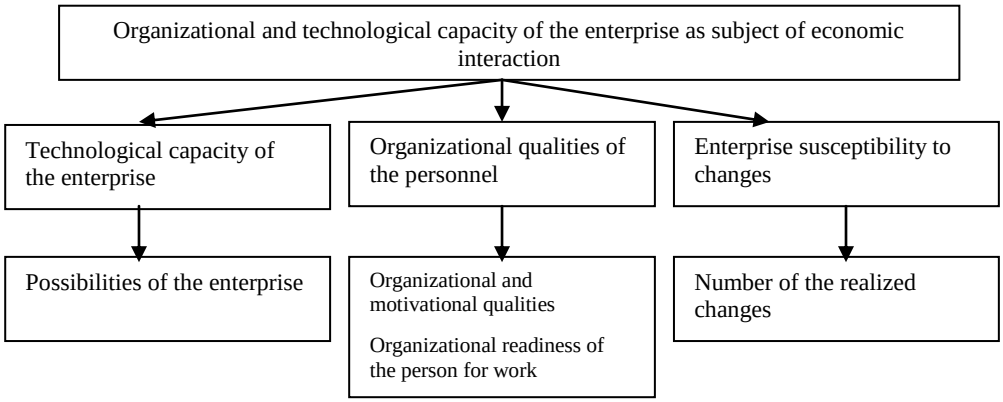

Figure 3: Approaches to determination of organizational and technological capacity of the enterprise
Source: Authors' research

The characteristic of organizational structure includes the following variables: size of resources; existence of reserve resources; existence of separate division for creation and introduction of changes; experience in use of changes; organizational structure: complexity; centralization; work regulation; development of communication channels; interorganizational integration; organizational climate.

The characteristic of an external environment includes the following variables:

- stability and uncertainty of an external environment; changes in demand for production; interorganizational cooperation; competition level; regional characteristics; situation among competitors.

In our opinion, it is necessary to allocate in model of a susceptibility of the enterprise to changes function of stimulation of realization of change:

- creation of favorable climate, at the expense of the correct (rational) organization of work;
- development of the adequate mechanism of compensation of workers: increase in compensation to an optimum level, modification of compensation system;
- interest of workers of the personnel in realization of changes;
- their participation in the course of approbation, adaptations, tests and productions.

As for the enterprise, changes, the administrative decision won't be realized with the efficiency put in them and effects if the personnel doesn't aspire to it.

In this regard it is offered to enter coefficient of changes into compensation system. This coefficient is recommended to be used for the employees of the enterprise who are directly taking part in changes. The coefficient of changes is established to workers by developed position in the enterprise, and conditions, according to life cycle of changes.

It calculates taking into account the carried-out analysis of efficiency of the changes, in direct ratio got profit that is an indispensable condition. The share of profit on realization of changes in financial result of the enterprise is considered when planning coefficient of changes. If the profit separately on divisions of the enterprise isn't estimated, it is necessary to be guided by market condition, demand and the developed price level. This coefficient will increase interest of workers in realization of changes in enterprise activity.

On the basis of studying of processes of introduction of changes the general model of process of changes is offered. The general process of introduction of changes consists of three interconnected subprocesses proceeding at the same time: solutions, distributions of changes in the enterprise and the adaptation of changes.

The main actions connected with a solution: definition of the direction of changes (in production, and also in development of process); definition is more whole than it; development of methods of achievement of the objectives; definition of a scope of changes and its realization in practice.

Each action is carried out as the certain cyclic process which is taking place four phases:

- creative phase (identification and problem description). Possible approach – to study a problem under a new corner;
- selection phase (the choice of that problem which allows active development and can have the perspective decision). Development of preliminary model and criteria has to follow it for expected results.

Possible approach – to solve, what ideas need detailed development. Control actions can include definition of selection criteria of the put-forward ideas, establishment of priorities, collection of information about possible decisions, an assessment of alternatives and a choice of options for further studying;

- design phase (the chosen strategy of the solution of problems are developed until possible realistic application of an innovation will be found).

Possible approach – to formulate the offered options in the form of the specific actions allowing practical implementation of changes and including development of decisions, search of approach to their realization, a work method, to carrying out tests, definition of norms on performance of operations and development of technical characteristics of the final product;

- introduction phase - offers are carried out in life. Plans are realized, new experience is gained. Supervision and assessment is initial stages to start the following cycle.

Possible approach – to carry out an inspection of decisions. Specific actions can include implementation of plans, drawing up reports on their execution, introduction of a new method of work, training of users, providing with resources.

Distribution of changes in the enterprise is a process of acquaintance with it all divisions and services. This process – necessary part of introduction of changes. The main aspects of this process – information, interaction, motivation and enthusiasm of the involved personnel. On an initial phase of management of changes the number of its participants is insignificant, but in process of its development it gradually grows. It confirms the special significance attached to communications in the enterprise as on them depends, change will be accepted or not.

The adaptation of changes is necessary in order that there were possible a solution of problems and distribution of changes. Besides, it is quite possible that no developed decision can be introduced without adaptation to it enterprise. Quantitative and high-quality changes in activity of the enterprise affect its personnel, resources, processes and structure.

The presented process characterizes three internally connected subprocesses which by the interdependence and interaction determine a course of introduction of changes. Besides characteristics of the enterprise there are also other random factors, such as nature of changes (novelty degree, a type of an innovation) and the environment characteristics, capable to affect a course of management of changes.

CONCLUSIONS

Thus, the general conditions of successful management of changes are reduced to the following:

Different processes (a solution, distribution of changes in the enterprise, the adaptation of changes) have to be joint among themselves and consider random factors. For example, submission of information on the purposes of changes motivates the personnel to active support of its introduction. Change has to correspond to style of work of the enterprise and if it not so, it is necessary to make changes to its activity.

Freedom of implementation of changes has to be caused by specifics of activity of the enterprise.

Changes should be considered as process of training of all enterprise. However not always the good beginning conducts to good end. Therefore it is important to mean the next moments: reservation of resources (time, money and human); planning of changes; ensuring access to information – a preliminary condition of involvement of the personnel; decision-making coordinating at the level of the highest management.

Process of changes is understood as consecutive change of states, close connection of naturally following stages of development, in total actions carried out for achievement of result. Elements of structure are carriers of these functions. Efficiency of statement of the purpose and interaction of elements of structure directly depends on the management mechanism. The mechanism of management of changes is a set of procedures of interaction of elements of the system stimulating performance of work and purposeful development, changes regulating process. Process of changes at different stages is characterized by different problems of management of. At a conceptual stage is a creation of climate with participation of the workers, favorable for organizational and technological changes. At a development stage from managers creation of the mechanism which

will allow to provide normal development of changes and training of workers in new requirements is required. At last, at a stage of introduction more traditional approach to management is necessary: planning, execution, control.

Creation of the main theoretical approaches of management by changes means that all aspirations of the industrial enterprise, analytical methods and methods of management have to be directed on achievement of one common goal: to help the enterprise to maximize the profit in the course of corporate development. Efficiency of activity of the enterprise depends on many factors – technical, personnel and organizational and technological. Organizational technology factors consist in creation of the conditions providing impact of economic, financial and credit, planned and organizational levers on the fullest use of potential of change of the enterprise.

First, a current trend of the control system formation connected with impact on changes – is strategic management of changes. Secondly, for the enterprise at a choice of a control system two factors are defining: imperatives of environment and level of claims, installations of managing directors. Therefore for development of an effective control system it is expedient to differentiate and conditionally to allocate the group of productions differing on a level of development and degree of competitiveness of production. Thirdly, because the enterprises of machine-building branch function in several types, activities, and spheres in the enterprise, for management of changes it is necessary to choose the priority direction, from the point of view of the appeal competitive to a position, a synergy, a susceptibility to changes. Fourthly, the system of actions (control, long-term planning or strategic management) and system of actions is developed for management of changes (ranging of tasks or a control system in the conditions of strategic surprises) proceeding from instability of the chosen direction. If the organization comes to new activity, the combination of administrative systems is influenced by integration processes, and also technical specifics of branch.

Therefore, the perspective directions of development of changes of machine-building enterprises include:

- expansion of certified, qualitative, new production;
- increase in the range of competitive highly liquid export production;
- formation of integration processes with the research organizations and owners of technologies;
- change of organizational structure by means of association of technological repartitions in the enterprise.
- formation and activation of business process of organizational and technological changes and mechanism of management of them.

Thus, the perspective directions of development of changes are connected with the solution of key problems of the enterprise. Becomes obvious that increase of efficiency of activity of industrial production is defined both technical and economic, and organizational technology factors.

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