BUSINESS CULTURE IN MANAGEMENT OF INNOVATIONS DEVELOPMENT OF INDUSTRIAL ENTERPRISE: RESOURCE APPROACH

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Abstract

Looking at evolution of industrial enterprises, one can observe a tendency of displacement of production processes culture by consumption processes culture. A combination of both is able to ensure optimal planning and utilization of enterprise's resources. Unfortunately, this subject is not adequately covered by modern literature, but today challenges of resource management are rising. The foundations of scientific industrial management, introduced by F.Taylor and others in the beginning of previous century, do not find practical implementation in modern industry. Authors of the article propose to use resource approach to management of innovations development of enterprise to bring together modern business culture and traditional production culture, and give an example of a specific industrial enterprise. The work makes an effort to contest idea, that resource approach is not capable of considering such factors as speed of technological changes and quality standards, which are important for innovations development of an industrial enterprise.

Key words: *culture, production, consumption, distribution, processes, vital resources, indistinct sets*

One of the main problems of Russian industrial enterprises is the tendency to exchange management priorities from production processes of value creation to processes of creation of customer loyalty and allocation of final products with the aim of strengthening own market position. As a result, business culture of production processes is being substituted by business culture of allocation processes and development of culture of consumption (or distribution) processes.

Here with, the enterprises are losing competitive advantages of technological character. In the current innovative world, this damages their competitive positions. In many ways this challenge originates in inefficient management.

In modern Russian conditions, the following features characterize business culture of consumption society:

- wide utilization of IT space, created by network resources and possibilities of mobile communications; drastic increase of communication circles, and often transfers it to a virtual one;
- open information and communication space prompts consumers to stand out through their requirements to the goods / services, thus forming a relevant offer on the market, which serves as a signal to enterprise development;
- competition on the supply side, and wide availability of credit lines, motivates producers to focus on satisfying new demands in condition of high speed of changes in technology, products and services;
- products are becoming obsolete and irrelevant much faster than they wear out, change of product generations becomes a trend; durability is no longer a main criteria of manufacturers; product life time becomes equal to warranty period.

At the first stage, this business culture has affected manufacturers of mass consumption products, which caused massive market changes. These changes are not always negative, quite often they are justified. Nowadays, however, one can observe diffusion of those tendencies to high tech production fields, where the main role lies with production processes, effectiveness of which is defined by

systematic planning, specific and rationality behind resource utilization, including intellectual resources.

Another important resource of high tech enterprises is time, which is defined by duration of production- technological cycle, which is often rather prolonged.

At the same time, allocation business culture assumes full customer satisfaction on aforementioned criteria as well, which, often, is contradictory to requirements of business culture of production processes, and at times causes loss of certain characteristics of finished product, or even some of it's consumer properties.

The authors agree with important of scientific and technological progress, speeding up of changes, enhancements of products and technologies, development in marketing activities, distribution systems etc. They are, rather, expressing concerns over penetration of business culture of mass consumption into the area of high tech and complex production.

Consequences of these tendencies are negative for both industrial enterprises and their clients, as well as for the partners – suppliers of diverse resources.

Production and consumption of mass products creates an extended need in specialists who are involved in its production and marketing. Automation and robotization decrease the need in human resources involved in main technological processes, and, often, increase the need in human resources involved in auxiliary and management processes. This causes a deformation or human resource structures. As a result, consumer might receive goods, which do not possess stated properties.

Taking into consideration increased demand and solvency of clients of high turnover products, education establishments are restructuring their training to new business demands of distribution culture; this fact brings decrease in quality of preparation of specialists in the fields of organization, planning, and management of production processes.

The foundations of scientific industrial management, introduced by F.Taylor (1911), F.Gilbreth (1912) and H.Gantt (1919) in the beginning of previous century, do not find practical implementation in modern industry and are almost not mentioned in publications on management of industrial enterprises.

Obviously, Jean Baudrillard was correct saying in his book "The Society of Consumption. Its Myths and Structures" (2006) that curiosity and ignorance are expressing same behavior in the face of reality – wide spread behavior and systematized by the practice of mass communications, and the one that characterizes our society of consumption: this is refusal of reality based on greedy and multiplying study its laws.

Already in 70s Japan has refused to use of European model, based on which many countries have started to substitute experienced specialists by finance and marketing employees. As a result, Japan showed a continuous industrial growth compared to lack of success of European counterparts. Nowadays, Japanese experience is widely studied: Kaizen, Toyota Production System, Lean, 5s etc. Japanese secret of success comes from proper production process management – culture of production processes, technological and performance discipline, educational and professional level of personnel, technological production preparation, motivation and stimulation of labor.

As during scientific and technological revolution of mid 70s, modern "information revolution" means change of technological basis and industrial production structure. In our opinion, what is actually happening is substitution of concepts. Information revolution is not concerned with main business processes, rather with support, supply and management processes. This causes a number of changes, especially in the area of distribution of finished products; thus it forms a new business culture, which hardly takes production culture into consideration.

Competition is moving from product competition to marketing. Nowadays the main competition tool is advertising of innovative products, which frequently do not correspond to what has been declared. As a result, manufacturers are decreasing the product life cycle and sacrifice quality - not often does the market allow them to successfully introduce a product with a long term perspective. This causes

challenges with return on investment (development, production preparation), which is relatively big in high tech production sector. Conservative and inert technological and design base does not allow to implement innovative ideas; it causes a gap between production and allocation, and as a result loss of product competitiveness and decreased effectiveness of the enterprise.

In authors' opinion, the aforementioned challenge can be solved. The article presents main findings of research in the field.

We used SWOT analysis methodology to identify and differentiate main factors, characterizing business culture of production processes. Characteristics of tradition production business culture of distribution as internal factors, with its strengths and weaknesses; characteristics of consumption business culture are defined as external factors, which create opportunities and threats. SWOT analysis is presented in Table 1.

Table 1. SWOT of business culture

Strengths	**Opportunities**
• connection of research and applied science; • unity of research and development work; • focus on production preparation; • continuity of research and applied scientific developments; • legislative possibility of financing research with negative result; • strict replantation of development steps with possibility of their documentation and financial monitoring and control; • big amount of normative documentation; • narrow specialization of workers' qualifications and wide specialization of engineering personnel; • inter-industry production standards and technological standards (with no analogues in the world)	• open information space: clarity in decision making, free access to databases; • extensive multi-professional expert community; • personalization of product requirements (customization of products - the formation of specific requirements for products): simplicity of the criterion comparison of objects; multifunctionality / multitasking requirements; speed of reaction to changes in private and general requirements; decrease response time of the allocation system; • availability of financing: emphasis on the cost of servicing of credit resources; product price ceases to be a differentiator; principle of financing is changed, narrow specialization, outsourcing; • increase of turnover of products on the market: creation of databases of ready-made solutions; new requirements to materials (composites, nano, etc.); change of technologies (additive technologies)
Weaknesses	**Threats**
• high degree of bureaucratization of design and development; • sequential nature of development process (inability to start the next stage without having obtained complete documentation pack from the previous one); • absence of systematic financing of research and applied works (this stage is behind the brackets of the process of designing and developing of a new product);	• open information space: reducing personalization of responsibility; distortion of information; distortion of the expert community's assessment; • personalization of requirements for products (product customization): artificial overstating of product requirements; distortion of technically sound and achievable characteristics; refusal to take into account the time factor; • availability of funds: investment in pseudo-

• reduction of Research in relation to Development,%; • lobbying of sectoral design organizations to the detriment of an open market of services; • complexity of introduction of initiative developments in the established system of cooperation; • blurring of the conceptual apparatus of innovation in relation to the existing base of construction; • complexity of adapting of scientific and technical documentation to digital systems; • absence of Russian development systems, non-compliance with DIN, ISO, GOST standards; • selective automation and modernization of production processes and technological equipment; • parallel manual and automated design, absence of digital bases of existing R&D documentation; • complexity of management of change in the existing design and technological documentation; • loss of the results of after-sales support, caused by a change in the forms of ownership and owners	innovation; redistribution of the importance of costs (investments) from main business processes to auxiliary ones; unreasonable costs of measures to reduce costs; • increase in the turnover speed of products on the market: simplification of design solutions; diffusion of production processes from the production of technical products to the production of consumer goods; reduction of the level of research and development work in order to reduce costs (resources)

To start with, according to the classical scheme of the analysis, we will consider strengths of production culture capable of preventing threats generated within the culture of allocation. It is obvious that general decrease in personalization of responsibility can be compensated by the existing strict reglamentation of steps and by existing system of monitoring and control of management processes of production. Connection of research and applied science, unity of research and developmental activities shall provide impossibility of artificial overestimation of requirements and, especially, misstatement of characteristics that are technically sound and achievable, as well as simplification of design decisions. A large variety of specifications and technical documentation causes, according to authors, compensation of threat of refusal of accounting of a time factor as real resource necessary for high-quality management.

On the other hand, the opportunities of culture of allocation can enhance production culture in relation to management tasks of innovative development of the enterprise. The problems of research financing that is lagging behind in comparison with development works, and also lack of proper financing of research and applied works, can be compensated by a current trend of prevalence of maintenance cost of credit resources over direct investments. If all other resources are well accounted (first of all a time resource) the model of utilization of borrowed funds can be a game changer. Narrow specialization on outsourcing along with widely adopted "platform decisions" give significant acceleration to the processes of development and deployment despite such weaknesses of production culture as: bureaucratization of development processes, partial automation and availability of parallel systems of

design, complexity of management of change, etc. Besides that, open information space, a wide range of expert community and required speed on carrying out changes significantly reduce opportunities of lobbying and simplify implementation of innovations in the established processes.

Thus, usage of factors revealed in the analysis for timely diagnostics of problems, their resolution and rapprochement of business cultures in order to increase efficiency of industrial enterprise – is a relevant and important task of management of modern production in the conditions of its innovative development.

Till 90th Russia had a historically developed production culture – the culture of production processes that provides connection of research and applied science, unity of research and developmental activities, inseparability of pre-production and production activities, after-sale service by a developer both within warranty, and after-warranty term and during recycle.

We will try to analyze management process of innovative development as a way of rapprochement of modern business culture and traditional production culture with an example of model of specific industrial enterprise.

The problem of development of industrial enterprises in quickly changing environment caused by "information revolution" and prevalence of business culture of consumption is sharp around the world including Russia. The solution of this problem is partially proposed in works of American researcher I. Adizes from late 80s, in particular, in the theory of vital and business cycles of the organizations (Adizes 1988). Importance for the purposes of understanding of development stages and adaptation of the enterprises to changes (birth, infancy, youth, blossoming, etc.) determined feasibility of looking at a problem of resources that are necessary for management of innovative development of the enterprise from the point of view of the theory of vital resources in a problem of interface of various business cultures.

For a start let us determine terminology. According to the big encyclopedic dictionary issues of 1953 (Prokhorov 2004) "resources - are means, values, stock, opportunities, available for use if necessary". Vitality, translated from French (vitalité) means viability or survivability. Thus, the mentioned theory allows us to speak about resources that are necessary and sufficient for survival, and for development of difficult production systems.

One of the Russian founders of the "vital" theory, E. Balatsky, in his work (2007) notes that "the result of activities of big team (X) can be represented by a kind of derivative function of four vital resources: M – money; E – energy; I – knowledge; T – time. Total absence of any one resource leads to a result of zero, i.e. economic activity requires availability of all vital resources. In this case we have a perfect analogy with macroeconomic functions that are well studied in theory. This exact property is the cornerstone of the market of vital resources because otherwise economic actors wouldn't begin to enter in difficult interactions with each other". Developing this idea, the author in his work (Balatsky 2008) continues: the deep sense of the concept of market of vital resources means that with its help it is possible to study economic relations which are based on badly verified, but very strong connections.

First of all, we will note that out of all practical and theoretical recommendations only this vital theory considers time as a resource. The other theories we analyzed do not consider time, or considered it indirectly.

We agree with work of E. Balatsky, however we consider it is needed to clarify few details.

For this purpose we will introduce several subgroups of resources - means and subjects of labor as parts of a "vital" resource E – energy, having designated E1 and E2 respectively, skills I1 and documentation I2 as part of a resource I – knowledge. Further we will reflect the content of production and consumption business cultures, in relation to a research problem as results of use of vital resources in the form of a matrix (table 2).

Table 2. Matrix of formation of business culture on the basis of vital resources

Criterion of business culture / type of vital resource	Vital resource					
	Money, M	Energy, E		Knowledge, I		Time, T
		Means of labor, E1	Subject of labor, E2	Skills, I1	Documentation, I2	
Consumption Criterion 1 … Criterion N						
Production Criterion 1 … Criterion N						

As a research hypothesis we will determine that the business culture of production processes adapted for market conditions and the associated business culture processes of distribution - are capable of providing, to some extent, optimum planning and effective use of resources in case of targets directions of its innovative development.

As a mathematical apparatus to prove the hypothesis authors used the theory of indistinct sets, as the fuzzy logic is one of the most applicable tools for primary analysis of the management of change systems connected with innovative development of enterprise. This theory lies on the edge of mathematical approaches with their accurate systematization of data, and logical approaches (for example, expert systems).

We also consider that the theory of indistinct sets will allow determine dependence between targets of innovative development of enterprise, which depends on utilized and / or necessary resources and the level of efficiency of the organization, including financial.

For this reason each criterion is assigned with borders of indistinct set, its assessment and classification of level by subsets are performed, and membership function is set, which specifies degree of membership of an element to a subset.

There are various methods of determination of membership function; the most popular are methods of preliminary and direct appointment, parametrical and probabilistic methods and method of indirect examination. For the purpose of this work authors have chosen method of direct appointment. According to this method the person making decision, or the elected expert, appoints values of membership function (each its ordinate) on the basis of his subjective opinions. Naturally, authors understand that the created function has subjective character and strongly depends on qualification of the expert.

During their work, authors chose some 20 criteria (based on the developed SWOT) that characterize the concept of "business culture" (legality, accomplishment of commitments, ethical norms, competence level, initiative and risk, readiness for change, decision making, team work, openness to knowledge, respect for society, distribution of remuneration for work, etc.). After that a group of 10 experts from various industries (managers from industrial enterprises, recruitment agencies, logistic and consulting companies, etc.) was offered to specify the need for vital resources. They had to fill in the table according to the form provided earlier. Besides, expert community helped define the indicators which were used to assess of rationality and/or efficiency of management.

Multi criteria option analysis is an important task of decision-making, which arises not only in production but also in economy, etc. (Rothstein 1999, Abdulaev, Aliev & Ulanov 1975). Methodology used in this work is based on information on quality of options in the form of pair comparisons and it provides, firstly, consideration of criteria as indistinct sets which are set on universal sets of options and, secondly – ranging of options on the basis of known transactions with indistinct sets: crossing $A \cap B$, consolidation of two indistinct sets $A \cup B$ and addition of a set - with the corresponding membership functions.

In this case we used a two-dimensional set of comparative alternatives (A1 and A2), implying business cultures of consumption and production. The set of criteria of comparison was made by 20 indicators (C1 … Ci … C20). Alternativeness assessment by criterion Ci is multiple-valued and is characterized by membership function X with values on a set (0 - 1) i.e. the fact of membership of element to an indistinct set A is affirmed with only a certain degree of confidence from 0 (for certain doesn't belong) to 1 (for certain belongs).

Not mentioning rather difficult mathematical apparatus, we will provide results of work in table 3.

Table 3. Results of assessment of business culture of production and consumption

Business culture / type of vital resource	Vital resource					
	Money, M	Energy, E		Knowledge, I		Time, T
		Means of labour, E1	Subject of labour, E2	Skills, I1	Documentation, I2	
Consumption (A1)	0,7	0,6	0,9	0,8	0,6	0,8
Production (A2)	0,8	0,9	0,6	0,6	0,9	0,8

The main objective of a research, as we remember, is to determine by what vital resources alternatives A1 and A2 should supplement each other, consolidate or be crossed from the point of view of maximization of one resources and minimization of others for achievement of rational management of innovative development of the enterprise.

It is obvious that the modern industrial enterprise requires operational coordination and coordination of all its links on the basis of centralized control of main resources. At the same time nowadays there is a conflict between objectively developed production relations and subjectively lagging productive forces. We see this on the example of examined business cultures. Nevertheless, V. Gorfinkel notes in his work (2014) that schools of rational management and behavioral, psychological direction which existed for long time in parallel, but at the same time in many respects contradicting each other, now show active search of ways of integration. 17 years after we see it in results of our research. Tough and formalized approach created by production business culture shall be complemented by the business culture of consumption, much more humane and customer-oriented.

We can interpret results coming from mathematical calculations:

- both business cultures treat money as "an average resource", but its use varies. We will note that production is oriented on long-term financing at the first stage of a technological chain, and consumer (distribution) culture is ready to consider more expensive short-term financing;
- business culture of allocation (distribution) puts a relatively low importance on means of labor that is caused by modern business tendencies to use loaned resources as opposed to ownership of fixed assets and complex equipment; in production culture mans of labor have dominating value;
- on the other hand labor subjects play a smaller part in production culture in comparison with a share of means of labor; they play a key role in business culture which creates value added not due

to a technological increment, but due to handling capacity of distribution channels and efficiency of movement of objects;

- skills, as well as money are in the center of membership function for both cultures, but a resource is different in nature - culture of allocation (distribution) requires "highly specialized" and fast-updated, in production – cumulative, which affects resource fluidity;
- in production culture documentation is one of key resources on an equal basis with means of production while only the documentation regulating processes, being standard in most cases is important for the culture of distribution;
- accounting (or availability) of such resource as time is extremely important in both cases. In case of allocation all other resources are directed to its minimization since maximum speed of reaction of system is a key competitive advantage. In production culture technologically reasonable time is the encumbering resource. The percentage coefficients which are often pledged in production processes (preparation / final time, equipment maintenance, an inter-operational time loss etc.) reduce overall performance of system, requiring an expense of other resources for compensation.

CONCLUSIONS

The growing role of business culture of allocation (distribution) in conditions of "information revolution" doesn't mean decline of production business of culture. The culture of allocation (distribution), limited in means of labor, exerts a great influence on resources of skills, shifting them towards the supply and auxiliary processes. This brings concerns about available of production personnel pool in future. Nevertheless, the business culture of allocation (distribution) positively influences such resources as subject of labor, moving production to move to broader cooperation and to rationalization of technologies for the purpose of decrease in unreasonable time losses.

In general, Russian industry is still prevailed by production culture, which has been pledged in Soviet period, with some diffusion of business culture of consumption. In authors opinions, the situation is far from critical, however, we consider that the matter is subject to constant monitoring, among others with the help of methodology that we offered.

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