Increasing the creative potential of production in the context of prevailing trends

G Ganina¹, A Mukhin¹, Yu Ostrovsky¹ and A Yakovleva¹,²

¹Bauman Moscow State Technical University, 5 Second Baumanskaya Street, Moscow, 105005, Russian Federation
²E-mail: Yakovleva525@mail.ru

Abstract. The article examines the prevailing trends in modern production and their role in forming ideas about further development. It is shown that involvement in the process of understanding the trends of the regularity of labor activity transformation leads to an understanding of the place of self-development in the production strategy. A comprehensive analysis of trends, combined with the use of new approaches to the description of labor activity, helped to reveal and justify a new view of the strategy for improving production. This made it possible to describe at the conceptual level a new type of production systems, namely self-developing production systems. The presence of a model of real transformation of labor activity in the description of such production makes it possible to create a system with an internal self-development device. Such self-developing production systems do not need external influences and are invariant in a variety of social environments.

Introduction
Currently, among economists, production managers and specialists of industrial enterprises, issues of strategic development are of increasing interest, taking into account changes in technical equipment, employment problems and other social issues. Most often, issues related to the emergence of global trends in the life system, in particular, in production activities, are discussed.

It is noteworthy that the analysis of trends in the discussed problem is complicated by the fact that factors include both the parameters of technology and the economy of direct production activity, and factors of social and social sound. In this regard, the analysis of trends in production activities is most often carried out at the level of emotional judgments, which does not approach an objective assessment of the impact of trends on production efficiency.

In these circumstances, it is advisable to resort to a well-known technique when the analysis of a global problem is carried out step by step:

– splitting the global system into parts (cells);
– analysis of the problem at the cell level;
– spreading the results of cell analysis to the entire system.

This article attempts to deduce a solution to the problem of production development, taking into account the analysis of various trends and patterns used in the goals adopted by the community at present and in the foreseeable future. Since trends reflect only the direction of controlled or spontaneous development, the most interesting problem is the impact of the identified trend on the
solution of specific tasks. Due to the fact that in the future, the creative potential of the production system will affect the efficiency of production, this article is devoted to this problem.

**Analysis of trends in production activities**

In order to delve deeply into the essence of trends in production activities, it is advisable to identify the causes that determine the nature of trends, and, if possible, classify these causes by certain characteristics. Since trends do not appear to occur spontaneously, but are the result of someone else's activity, we can assume that it is possible to manage trends if you know the reasons for their occurrence.

Attempts to systematize trends have been made in all spheres of human life; all research inevitably faces a huge scale of tasks and the only acceptable way is to divide the problem into components for which it seems easier to find a solution [1].

In relation to production activities, it is advisable to start analyzing trends by dividing the signs of trends into two types:

– trends that are caused by the external environment (exotendencies);
– trends, the causes of which need to look inside the company (intendencia).

A characteristic exotendence observed in production at present is an increase in the load from consumer demand, which manifests itself in different ways depending on the interaction with production.

Among a large number of attendance possible to distinguish those that are visibly manifest in practice. First of all, we are talking about such exotendencies as a permanent increase in the variety of manufactured and, consequently, consumed products. Another current trend is to accelerate the change of manufactured and consumed products. These trends are related, but they should be considered separately. These trends have an impact on the production, where you can also select the current time of attendance.

Among the most important attendance include two, in our opinion, important:
– accelerating with each passing year, automation of production processes;
– the outsourcing as a new phenomenon in the established production systems.

In themselves, Exo- and endotendencies are of great interest, but the problem remains how they interact with each other, bringing a tangible effect or, conversely, unconditional harm.

Methodically, it is convenient to represent the interaction mechanism using a matrix (see table 1).

**Table 1. Trend matching matrix**

|                | Intendencia |
|----------------|-------------|
| Outsourcing    | x₁          |
| Automation     | x₂          |

| Intendencia   | Variety of products | y₁          | Degree of compliance | y₁x₁ |
|----------------|---------------------|-------------|----------------------|------|
|                | The rate of change of demand | y₂          | Degree of compliance | y₂x₁ |
|                |                      | Degree of compliance | y₁x₂ |
|                |                      | Degree of compliance | y₂x₂ |
It should be noted that the analysis of the correspondence of various trends in the life of society is carried out by many specialists from different points of view; most often this is done at the level of the economy of various subjects [2-10], even when it concerns purely industrial activities [3,9,11]. However, we are interested in the problem of analyzing the compliance of trends at the level of organizational and technological approach to the activities of enterprises.

The degree of compliance of the yixi type is easiest to find, based on the previously described method of evaluating product-product compliance [2]. It is easy to show that according to this method, the values of characteristics given in the table will allow us to conclude that these trends correspond to each other.

However, recently, at the intersection of these trends, another cause for deep concern has emerged: the trend of a steady increase in the number of employees released from routine work, but not engaged in any further activity.

A new problem arises, which we propose to solve on the basis of a previously identified pattern [3].

**The task of effective use of released employees for creative activities**

The article [3] describes a model of a production system that can claim to be self-developing in the future. This role can be provided primarily by the model of transformation of labor activity (1), based on two types of thinking in decision-making: intuitive and logical.

\[ T_i \xrightarrow{H} P_i \xrightarrow{A} T_j \]  

Intuitive thinking and, consequently, decision-making is present in creative work (Ti), and formal-logical in routine work (Ri).

The model presented by (1) is fairly transparent and does not require additional explanation. However, it contains one nuance that has to be considered in practice.

The fact is that the automation of routine work does allow you to release workers, which there are a huge number of examples, but it does not guarantee that the released immediately engage in creative activities (TJ). This is still the case in most industrialized countries — the problem of "release" is becoming almost the most important one in the context of rapidly advancing automation.

Let's try to show a solution to this problem based on the following assumptions:

– production development is subject to the "transformational model" [3];
– the driving force of production transformation is creative work, making the production system "self-developing";
– all people have creative abilities; the division into routine or creative workers depends on the existing industrial relations (forms of ownership).

Taking these assumptions into account, we will develop the model (1), bringing it to a form that includes a mechanism for the possible transformation of P into T into a real one. Taking into account the created mechanism, we obtained a model of real transformation of labor activity based on intuitive and formal-logical decision-making in production (Fig. 1).
Transformation of labor activity as the basis of a self-transformation of labor activity, presented in figure 1, reflects a fundamentally new type of production transformation on the formation of Odo and FROM inside EDC, we note the most important the organization of labor in voluntarily United cooperatives.

An important role in the model presented in figure 1 is played by factors-the driving forces of individual transformations:

- **Φ**-formalization of actions created by T (i) using passive or active experiments;
- **A**-automation of routine actions, which leads to the release of the individual, both from routine work and from the dictates of property;
- **O**-organization of voluntary associations in order for individuals of RSV (i) to be able to carry out activities to create their own creations;
- **R**-expanding the diversity of satisfied human needs by replenishing creative potential;
- **U**— an infinite variety of human needs arising from the state of the external environment of the sun and the capabilities of the creative individual T(i) at the current time.

Comparing models (1) and Fig. 1, we come to the conclusion that for a real transformation of labor activity, it is necessary to find a suitable mechanism for the transformation of RSV(i) → Pcob (i) and Pcob (i) → Tн(i).

Research in the field of ergodynamics has shown [7] that such a mechanism in the most acceptable form can be represented as an energy dynamic cooperative (EDC) [4]. After reviewing the work [4], an attentive reader will easily find that the proposed scheme of the EDC includes the organization of labor in voluntarily United cooperatives. Without reducing the role of conclusions on the formation of Odo and FROM inside EDC, we note the most important—the model of real transformation of labor activity, presented in figure 1, reflects a fundamentally new type of production system—self-developing.
The transformation of the theoretical model of the transformation of labor activity (1) into a real model (Fig. 1) is made in order to "design" the main core of the self-developing production system (SRS). The recent discussion of the place and role of self-developing systems[5], [6] is mainly aimed at presenting the image and driving forces of the SRS.

At present, the discussion of this problem has brought at least clarity about the conceptual apparatus of the SRS.

**Conclusion**

It turns out that the analysis of existing trends in production is necessary not only to develop objective measures to improve efficiency. A comprehensive analysis of trends, combined with the use of new approaches to the description of labor activity, helped to reveal and justify a new view of the strategy for improving production.

This made it possible to describe at the conceptual level a new type of production systems, namely self-developing production systems. The presence of a model of real transformation of labor activity in the description of such production makes it possible to create a system with an internal self-development device. Such self-developing production systems do not need external influences and are invariant in a variety of social environments.

**References**

[1] Latysheva, V. V. Fundamentals of sociology and political science: textbook for secondary vocational education / V. V. Latysheva. - 2nd ed., ISPR. and additional — Moscow: Yurayt publishing house, 2019. — 304 p. — (Professional education). — Text: electronic / / EBS yurayt [site]. — URL: https://urait.ru/bcode/437410 (date accessed: 01.10.2019)

[2] Ganina G. E., Ostrovsky Yu. a., Mukhin A.V. Accounting for production efficiency in the system of technical and economic indicators of an industrial enterprise / / Controlling. — 2014. — № 52. — Pp. 26–35.

[3] Mukhin A.V. Identification of production. Modeling and optimization of production systems. Textbook. M., Bauman Moscow state technical University. Access mode: http://wwwcdl.bmstu.ru/ibm2/index1.htm (accessed 16.09.2019).

[4] Mukhin A.V., Ganina G. E., Ostrovsky Yu. a., Yakovleva A. P. a New approach to the formation of cooperatives that ensure the continuous development of innovative production. // Bulletin of the South Russian state technical University (Novocherkassk Polytechnic Institute). Series: Socio-economic Sciences. — 2019. — № 2. — P. 15–21.

[5] Stepin B. C. self-developing systems and post-non-classical rationality / / Questions of philosophy, 2003, no. 8, Pp. 5–17.

[6] Akatov N. B. Initiation of organizational self-development // Bulletin of Perm University. Series: Economics. — 2012. — №2(13). — Pp. 118–123

[7] many-Sided role of material production in society / / a. Mukhin, G. Ganina, S. Mozgin, Yu. Ostrovsky and A. Yakovleva, IOP Conference series: Material Science and Engineering 2019. — Volume 589, Issue 1. — Art. no 012024 DOI: 10.1088 / 1757-899X/589/1/012024

[8] A. E. Brom, O. V. Belova, A. Sissinio. Energy equipment lifecycle costs: Fmeca and Lifecycle Costing models as "decision-making" tools to reduce costs over the entire life of the equipment. Procedure Engineering, Vol. 152, 2016, pp. 173–176, doi:10.1016/j. proeng.2016.07.687.

[9] Irina Omelchenko, Pavel Drogovoz, Eugene Gorlacheva, MrSabadeco and Olga Yusufov. The efficiency of production and distribution systems of a new generation based on cognitive factors of production is modeled.VGD Conf. Series: materials Science and engineering 630 (2019) 012020, IOP Publishing, doi: 10.1088 / 1757-899X/630/1/012020-Yes.

[10] Kushnarev L. I. improving the competitiveness of the machine-building industry / / IOP Publishing, IOP Conf. Series: materials Science and engineering a 560 (2019) 012074 doi: 10.1088 / 1757-899X/560/1/012074 012074
[11] Dmitry Novikov, Alexander Veretennikov, Alexey Borodin and Alexander Snedkov // Factory of the future—a new solution and a new quality in scientific instrumentation. IOP Publishing: IOP Conf. Series: materials Science and engineering a 497 (2019) 012133
doi: 10.1088/1757-899X/497/1/012133