METHODOLOGY FOR ASSESSMENT THE EFFICIENCY OF PRODUCTION CAPACITIES MANAGEMENT AT TEXTILE ENTERPRISES

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Abstract: *The article describes the method for determining the efficiency of production capacity management in textile enterprises. The methodology is based on a weighting factor and expert assessment. Despite the fact, that there are many methods of assessment efficiency of production capacities usage, much of them based on financial results of enterprise and this do not always shows causes of the problem in performance of production capacity usage. In this paper, have been elaborated method based on integral rate of results and quality of the performance of production capacity management in textile enterprises. For choosing criteria of all performance process were involved five experts in textile area, including leading engineers and managers. Proposed in article the technique is universal and it can be used in other industries. At the end of the article, the methodology was tested on the basis of real textile enterprises. According to author`s opinion, proposed method does not reflect the influence of indicators of production capacity management efficiency on the financial results of enterprises, that approved the space for further research in this area.*

Keywords: *production capacity, utilization, effectiveness, production process, assessment, textile.*

1 INTRODUCTION

In modern conditions, the problem of reliable assessment of the production capacity of the enterprise and the level of equipment load (jobs) has become particularly important and is very important. In the development of technology, production technology under the influence of technological progress there are significant changes, changing their quality part. They are reflected in the complication of technology, in its computerization, automatic control, increasing unit capacity. Large systems of machines are being created and implemented, which increase the efficiency of equipment of enterprises and accelerate the production process due to its threading, continuity and flexibility. As a result, qualitatively new opportunities arise for the creation and growth of the production capacities of existing firms and enterprises.

The purpose of this article is to improve the methodology for assessing the efficiency of managing the use of production capacity in textile enterprises.

It should be noted that characteristic for textile production is the construction of production structures on the technological principle, the presence of a large number of consecutive technological transitions. For example, cotton yarn is ready for transfer to weaving after 8-11 transitions, wool - after 20; In the process of finishing cotton fabric goes through about 40 operations. Such a multi-stage production process makes it difficult to assess the efficiency of production capacity management in enterprises. Based on this, we decided to develop a methodology that will be able to evaluate the effectiveness of the process and the results of production capacity management. The technique is based on expert assessments and an appropriate scale.

2 METHODOLOGY OF RESEARCH

The issues of management, specialization and optimization of production capacities are reflected in the scientific works of the following foreign scientists: V.J. Stevenson, R. Chase, R.F. Jacobs [14], W. Clein, [3], C.G. Dickerson [4], Juvong Lee [10], D.J. Strickland, M.M. Ahmad, N. Dhafr [2], C. Forza, F. Salvador [8] and others. A significant contribution to the development of the theory and practice of production capacity management was made by economists from the CIS countries: G.A. Aleksandrov, M.S. Abryutin [1], R.A. Fatkhutdinov and others. Aspects of the organization of the use of production capacity in industrial enterprises and its management were studied by Russian scientists K.S. Krivyakin [11] and M.V. Dadalova [5].

The study of this problem is devoted to the work of many domestic scientists, economists, such as S. Iskandarov, A. Ulmasov, S. Gulyamov, M. Sharifhodzhayev, M. Boltabaev, Z. Khakimov etc.,

which are considered mainly the theory of reproduction of basic production assets and improving the competitiveness of textile enterprises based on marketing approaches.

E. Milewska researched problem of manufacturing process flexibility in view of a company's material and information flow stream management, were discussed IT tools supporting the process of production planning, organization and control, as well as MRP II/ERP, MES and APS. She scientifically approved that the automation of information flow in a production control system makes it possible to increase the level of production capacity use and optimize the size of the company's intensive and extensive reserves [13].

A performance indicator can be defined as "a variable" that quantitatively expresses the effectiveness or efficiency, or both, of a part of or a whole process or system against a given norm or target [12]. The desired global production objectives in the context of a production management system can be more objectively defined as the reference values for significant measures of plant efficiency, production plant productivity, mean product quality and others. These production objectives are often called implicit objectives as they usually can be expressed only implicitly as functions of the measurable and manipulatable variables [15]. Since implicit objectives are not directly measurable, their translation into a set of output production process variables should be provided. These output production process variables should have the following properties [16]. Issues of utilization of key performance indicators in production control were investigated by Vladimir Jovan, Sebastjan Zorzut and Alenka Žnidaršič. In their work was proposed an approach to measuring and presenting the attainment of production objectives in the form of introducing production KPI [17].

However, despite the considerable attention paid to solving the issues of using the production capacity of an enterprise, a single point of view regarding the determination of the content of production capacity has not yet been developed and a comprehensive assessment of the management efficiency of the production capacity of textile enterprises has not been studied.

In current research were used expert assessment, analysis and economic-mathematical methods. For assessment of criterias were chosen five experts from textile branch, and has been checked the degree of reliability of the expert assessment for each group of indicators was calculated the coefficient of concordance. For evaluating production capacity management in textile enterprises elaborated the special scale, which consist of five criteria's.

3 RESULTS OF RESEARCH

The category of "production capacity" is one of the keys to economic science. It reflects the potential of associations, enterprises, production shops and therefore, the level of competitiveness of enterprises.

Professor of the Turkish Social Institute Kahramanmaraş Ö. Güneçıkan [9] gives the following definition regarding production capacity: "Production capacity of an enterprise is the production quantity that the enterprise is capable of realizing by using the available production factors in a rational manner within a certain period of time".

Determining the value of production capacity occupies a leading place in identifying and evaluating production reserves, and its planning is one of the strategic directions of development.

In scientific works of M. Dadalova [7] and K.S. Krivyakin [6] various classifications of factors influencing the size and capacity utilization are given. Analyzing the classification data, it should be noted that it highlights not only the factors influencing the size and level of capacity utilization but also:

1. Conducted an enlarged grouping of these factors;
2. Their influence on individual elements associated with the calculation of production capacity is measured.

The disadvantages of the considered classification of factors include the following:

1. The grouping of factors is not well constructed, i.e. it mainly relies on the analysis of the influence of elements on the calculation and use of capacity;
2. The previous drawback is caused, in our opinion, by the fact that the proposed grouping of factors does not properly take into account the influence of factors of production on the size and degree of utilization of production capacity;
3. The reliability of the influence of individual factors on the size and level of capacity utilization raises certain doubts. For example, the possible unscheduled operation of equipment (i.e., use of Saturdays, Sundays and holidays, the third (fourth) shift, lunch breaks, as well as the transition to a continuous week) should be taken into account in the process of calculating the production capacity. In other words, this only characterizes the shortcomings of the existing methods for calculating and planning capacities, but cannot be an objective factor that requires consideration of its influence in the classification. In addition, the methods used in various industries for determining the size of production capacities do not involve taking into account such subjective factors as reducing losses from marriage, reducing losses in working time,

improving forms and systems of labor in enterprises, developing competition and others;

4. This classification of factors also implies consideration of the features of machine-building production only. We can single out a whole number of classification factors cited in it, which are characteristic of this type of production and do not affect the production capacity of instrumental or aggregate production:
   - increase in the number of production areas;
   - involvement in the production of unused space;
   - use of more modern tooling and tools;
   - introduction of methods of scientific organization of labor;
   - rationalization of labor practices of production workers;
   - professional development of production workers;
   - reduction of unproductive loss of working time;
   - reduction of losses from marriage;
   - improvement of rationing and wage systems;
   - expansion of socialist competition;
   - increase in shift coefficient and equipment load due to reduction of unproductive losses in the use of equipment and an increase in the number of key production workers;
   - an increase in the production program in proportion to assortment;
   - an increase in the production program disproportionately set assortment (change of nomenclature) due to production in accordance with the developed optimal production plan;
   - an increase in the production program due to the expansion of deliveries from the cooperation.

In our opinion, this and other (noted above) classifications need further development by highlighting the interrelation of factors with individual elements of the production process. It is also necessary to take into account those factors influencing the size and degree of use of production capacity, which reflect the specifics of the activities of textile enterprises.

The classification we propose the main factors influencing the size and degree of utilization of the production capacities of enterprises in this industry is presented in Table 1.

This approach to the classification of factors allows you to:

- to distinguish factors taking into account their influence on the size and degree of capacity utilization;
- takes into account the peculiarities of textile enterprises related to aggregate concentration (manifested in the periodic replacement of basic technological devices with more productive ones), flow continuity (in cotton processing) and their complexity;
- takes into account the relationship of factors with individual elements of the production process.

The amount of production capacity is influenced by entrepreneurial abilities, labor and capital. Entrepreneurial skills determine management decisions on the development of existing and the creation of new production facilities. These solutions are implemented in practice using the labor of employees of enterprises. The three elements that make up the capital directly affect the amount of production capacity - the active part of fixed assets, intangible assets and part of current assets, presented in the form of stocks. The development of the first element is manifested in an increase in the number of leading equipment units and the replacement of basic technological devices with new, more productive industrial units. Intangible assets are associated with the improvement of the existing technology and the introduction of advanced technologies (Table 1).

In Table 1 was presented functional control units of production capacity in textile enterprises, which was divided into two parts: external and internal factors. The peculiarity of this classification is that it was developed taking into account the specifics of the enterprise of the textile complex and includes the specifics of a continuous production process.

The main factors that determine the level of production capacity are considered to be: the number of available equipment, the size of production areas, the progressiveness of technology, the number of qualified personnel, the quantity and quality of material resources used and the advanced organization of production.

In the course of the study, the author came to the conclusion that "the effective use of production capacity implies a rational distribution of the production resources available to the enterprise, which are necessary for the flow of interrelated processes in space and time by means of installed technology, advanced technology and skilled personnel". A key factor in the level of capacity utilization in a market economy is the position of the enterprise in the market, the level of competition and the level of demand for products.

Table 1 Functional control units of production capacity in textile enterprises

PC value	Functional blocks of planning and management	PC usage level
External factors		
1. The technical level of purchased equipment	Technical block	1. Provision with spare parts and components for equipment repair
1. The degree of progressiveness of borrowed technology 2. Installed process schedules	Technological block	1. Restrictions on the supply of materials, tools, providing the technological cycle
1. Availability of state programs for subsidizing the development of the PM industry	Economical block	1. The need for the company's products from the market
	Resource block	1. Logistics of the enterprise 2. Level of energy supply
1. Legislative and regulatory acts restricting the activities of enterprises	Management block	1. Malfunctions in infrastructure operation
Internal factors		
1. Equipment performance 2. Available production area 3. The level of proportionality in the bandwidth of equipment groups	Technical block	1. The intensity of input of new capacities 2. Mode of use of equipment 3. Excessive downtime
1. The degree of automation and mechanization of production processes 2. The degree of development of technology workers	Technological block	1. The technical level of purchased equipment
1. The level of investment in the means of production and in its organization	Economical block	1. The technical level of purchased equipment
1. The depreciation policy of the enterprise 2. Entrepreneurial activity	Resource block	1. The technical level of purchased equipment

Source: author`s elaboration.

In the work of M.V. Dadalova [5] a methodology is presented for assessing the efficiency of production capacity management at enterprises in the glass industry, but there are some drawbacks:

- the absence of a valid point scale for the results of qualitative and quantitative assessments;
- in the parameter of quality of production capacity management there is an item “quality of production capacity planning”, which does not exactly indicate what kind of planning was meant (calendar, tactical, strategic);
- in the parameter of quality of production capacity management there is an item "Performance of functions on the management of production capacity" and in the manual it is not specified how to determine the degree of fulfillment (or non-fulfillment) of management functions in the enterprise;
- the points for the quality parameters and the effectiveness of the definition of the production capacity are divided into three: 0, 2.5 and 5. The presence of a 2.5 point partially complicates the calculation process in multiplying by the significance of the parameter.
- in the parameter for determining the effectiveness of production capacity management in textile enterprises, there is an item "product competitiveness level", which is based only on the product quality level, which does not fully reveal the competitiveness of products.

According to the theory of famous modern economists as M. Porter, the first factor of competitiveness is quality and the second factor is the price of products. Therefore, to evaluate the competitiveness of products only on the basis of quality is not entirely true. In addition, it is necessary to evaluate the effectiveness of the use of equipment and not the competitiveness of products, which is the marketing function.

4 DISCUSSION

Considering a number of shortcomings of the method of M.V. Dadalova we have presented a methodology for evaluating the efficiency of managing production capacity in textile enterprises (Tables 1, 2). One of the advantages of the methodology is the inclusion of the item “Average coefficient of total efficiency of all equipment (OEE)” in the quality control parameter of production capacity. Another distinctive feature of the methodology is the reassessment of the significance of the parameters of the scale by experts in the textile industry. In addition, the scores for the quality parameters and the performance of the definition capacity management to simplify the calculations are divided into three integers: 0, 5 and 10.

In order to improve the methodology for assessing the competitiveness of light industry enterprises, a questionnaire was developed and an expert assessment of the factors of enterprise competitiveness was conducted. In the course of the study, experts evaluated on a five-point scale the weight of each of the four proposed groups of factors assessing the competitiveness

of an enterprise, namely, the competitiveness of a product, financial, production and marketing factors. A ranking of the main indicators for evaluating each factor was also carried out.

To check the degree of reliability of the expert assessment for each group of indicators, the coefficient of concordance *W* was calculated, which shows how much the experts' opinions are coordinated, that is, belong to the same general population of estimates. The coefficient of concordance is calculated by the formula:

$$W = \frac{12 \sum_{i=1}^{n} (r_i - \overline{r})^2}{N^2 (n^3 - n)} \quad (1)$$

where: 12 is a constant in the formula for calculating the coefficient of concordance proposed by Kendall; *n* is the number of indicators; *N* is the number of experts; r_{ij} is rank of the *i* th indicator determined by the *j* th expert; r_i is the sum of the ranks of the *i* th indicator for all experts; $\overline{r}$ is average score of all indicators ($r = N(n+1)/2$); *W* is Kendall coefficient of concordance [14].

The value of the coefficient of concordance can vary in the range from 0 to 1, where its equality to one means complete consistency of expert opinions and equality to zero indicates that there is no connection between the estimates.

In the case when $0.2 \leq W \leq 0.4$, there is a weak consistency of expert opinions and with $W \geq 0.6$ it can be said that there is a strong consistency of expert opinions. In addition, to determine the weights of each factor we used the Fishbourne formula (for all *i* from 1 to n):

$$a_i = 2*(n-r_i+1)/n*(n+1) \quad (2)$$

where: a_i is the weight coefficient of the *i* th criterion, *n* is the number of evaluation criteria, r_i is rank assigned to the *i* th indicator.

The results of the expert assessment of the importance of competitiveness factors and checking the consistency of expert opinions are presented in Tables 2 and 3.

On Table 2 is presented expert assessment of the importance of quality factors of production capacity management in textile enterprises and on The number of indicators (*n*) is 5. Five experts (*N*) were involved.

The average score of all indicators ($\overline{r}$) is 15. Then we get:

$$W = 12*111/25*(125-5) = 1332/3000 = 0.44 \quad (3)$$

The degree of consistency of expert estimates can be considered acceptable, since *W*=0.44 > 0.40.

According to experts, the most significant is the financial factor and the least - the production factor. Similarly, we find weighting factors for the effectiveness of production capacity management in textile enterprises.

Table 3 is showed expert assessment of the importance of factors of productivity of production capacity management.

Here, too, *n* is 5, and *N* -5. The average score of all indicators ($\overline{r}$) is 15. Then we get:

$$W = 12*189/25*(125-5) = 2268/3000 = 0.75 \quad (4)$$

The degree of consistency of expert estimates can be considered complete, since *W* = 0.75 > 0.60.

And the most significant, according to experts, is the average total efficiency ratio of all equipment and the least is the investment provision of production capacity.

Table 2 Expert assessment of the importance of quality factors of production capacity management in textile enterprises

Evaluation Criteria/ /Experts	Quality of capacity planning	Performance of capacity management functions	The motivation of staff in the use of production capacity management	Staffing	Methodical security
1 expert	5	4	4	2	1
2 expert	4	3	2	1	2
3 expert	5	3	5	4	3
4 expert	4	5	3	4	1
5 expert	4	5	2	4	2
Overall	***22***	***20***	***16***	***15***	***9***

Source based on expert`s assessment.

Table 3 Expert assessment of the importance of factors of productivity of production capacity management in textile enterprises

Evaluation Criteria/ /Experts	Sustainability of production plans	Investment provision of production capacity	The ratio of production capacity (annual)	Average total efficiency ratio of all equipment (OEE)	Utilization of equipment
1 expert	4	1	3	5	4
2 expert	5	1	2	4	2
3 expert	4	3	3	5	2
4 expert	5	1	3	5	1
5 expert	4	2	3	5	3
Overall	***22***	***8***	***14***	***24***	***12***

Source based on expert`s assessment.

We have presented a methodology for assessing the efficiency of production capacity management in textile enterprises (Tables 4 and 5). On Table 4 we presented methods for assessing the quality of production capacity management in textile enterprises and on Table 5 are showed methods for assessing results of the performance of production capacity management in textile enterprises.

The assessment is carried out by the expert commission, which includes leading experts with extensive experience in the field of textile industry. And the answers to the questions of staff motivation in the use of production capacity management can be purchased only through a questionnaire.

To determine the values of the parameters of the investment support of production capacity, the sustainability of the implementation of production plans, the calculation of the rate of renewal of production capacity and the level of use of production capacity must be based on the primary documentation of the enterprise. And as an indicator of the competitiveness of products manufactured at these facilities, product quality has been selected and this item is faced with the task of determining the share of quality products complying with state standard (GOST) or ISO standards.

Table 4 Methods for assessing the quality of production capacity management in textile enterprises

Quality parameters capacity management	Parameter value	The significance of the parameter	Points
Quality of capacity planning	- there is no plan for the development of production capacity - there is a plan, but not linked to common enterprise strategy - the plan for the development of production capacity is an organic part of the overall strategy of the enterprise	0.27	0 5 10
Performance of capacity management functions	- not performed - partially performed - fully implemented	0.24	0 5 10
The motivation of staff in the use of production capacity management	- not motivated - poorly motivated - high level of motivation	0.20	0 5 10
Staffing	- not enough security qualified personnel - partially qualified personnel - fully qualified staff	0.18	0 5 10
Methodical security	- missing - partial security - full security	0.11	0 5 10
Capacity management quality ratio			K_{qCM}

Source: author`s elaboration.

Table 5 Methods for assessing results of the performance of production capacity management in textile enterprises

Quality parameters capacity management	Parameter value	The significance of the parameter	Points
Sustainability of production plans	Absolute value actual deviations from planned: - above 10% - about 5 to 10% - up to 5%	0.21	0 5 10
Investment provision of production capacity	Investment in PM in total investment structure: - up to 30% - from 30 to 40% - over 40%	0.11	0 5 10
The ratio of production capacity (annual)	- from 2 to 5% - from 5 to 10% - over 10%	0.21	0 5 10
Average total efficiency ratio of all equipment (OEE)	Average total efficiency ratio of all equipment - to 0.4 - 0.41-0.79 - 0.8-1	0.28	0 5 10
Utilization of equipment	Utilization of equipment: - less than 60% - 61-80% - 81-100%	0.19	0 5 10
The capacity management performance efficiency ratio			K_{rCM}

Source: author`s elaboration.

After determining the values of the relevant parameters of quality and effectiveness of production capacity management, we will calculate the integral efficiency factor of capacity management:

$$K_{CM} = \sqrt{\mathrm{K}_{\mathrm{qualCM}} \cdot \mathrm{K}_{\mathrm{resCM}}} \quad (5)$$

where K_{qualCM} is quality factor PCM and K_{resCM} is a coefficient of performance PCMP.

The calculation of the quality factor PCM is made according to the formula

$$K_{qualICM} = \frac{\sum_{i=1}^{n} \mathrm{K}_{\mathrm{val.qual}} * \mathrm{d}_{\mathrm{i}}}{\mathrm{K}_{\mathrm{qual.max}}} \quad (6)$$

where d_i is the significance of this parameter, $K_{val.qual}$ *is* value of this parameter; $K_{qual.max}$ *is* a maximum value of this parameter.

The calculation of the coefficient of the effectiveness of the UPM is made according to the formula:

$$\mathrm{K}_{\mathrm{resCM}} = \frac{\sum_{i=1}^{n} \mathrm{K}_{\mathrm{val.res}} * \mathrm{d}_{\mathrm{i}}}{\mathrm{K}_{\mathrm{res.max}}} \quad (7)$$

where d_i is the significance of this parameter; K_{resCM} *is* value of this parameter; $K_{res.max}$ *is* a maximum value of this parameter.

After calculating the integral index we need an appropriate scale for analyzing the level of management of the use of production capacity in textile enterprises. In the course of the dissertation research we developed a scale for evaluating the management of production capacity in textile enterprises based on expert assessments; leading experts in the textile industry were selected as experts: chief specialist of the "Uztekstilprom" association, chief technologist, chief engineer, head of the production department and a financial manager of textile enterprises that have solid experience and rich experience (Table 6).

On Table 6 proposed scale for evaluating production capacity management in textile enterprises, experts devided evaluation value into five levels, as well as: critical, unsatisfactory, satisfactory, good and perfect.

The proposed necessary measures to improve the management of production capacity are not exhaustive; they only indicate the main direction of identifying the reasons for the decline in production capacity. Here, in our opinion, it would be appropriate to use the cause-and-effect method of Eliyahu Goldratt [6] and based on this methodology to construct a diagram of the current reality tree and to determine the root causes.

The approbation of the methodology for assessing the level of efficiency of use of production capacity of textile enterprises was carried out at three enterprises operating in Namangan region on the basis of calculation and statistical data for 2017, the results of which are given on Table 7.

Table 6 Scale for evaluating production capacity management in textile enterprises

The result of the integral indicator	Evaluation value	Necessary activities to improve production capacity management
from 0 to 0.30%	Critical	There is an urgent need to audit the financial and marketing activities of the enterprise and make a technical inventory. Analyze the possibility of diversification of production. Urgent measures should be taken to increase the level of capacity utilization.
from 0.31 to 50	Unsatisfactory	It is necessary to calculate the break-even point of production. Measures should be taken to increase the level of capacity utilization.
from 0.51 to 70	Satisfactory	Conduct continuous monitoring of equipment downtime, identify bottlenecks of production capacity. Take measures to ensure the balancing of production capacity.
from 0.71 to 0.85	Good	It is necessary to conduct continuous monitoring of equipment downtime, identify bottlenecks of production capacity. Take measures to ensure the balancing of production capacity and to ensure the connectivity of the equipment fleet. It is advisable to create a development strategy for the use of production capacity.
from 0.86 to 1	Perfect	You can expand the scale of production; consider attracting investment in fixed assets of the enterprise. It is advisable to improve the development strategy of the use of production capacity.

Source: author`s elaboration.

Table 7 The results of the evaluation of the level of efficiency of use of production capacity of research enterprises

Enterprises name	The ratio of the quality of production capacity management	Capacity management performance factor	The result of the integral indicator	Evaluation value
"Namangan Tukimachi Sanoat" LLC	0.78	0.76	0.59	Satisfactory
JV LLC "Uchkurgonteks"	0.85	0.86	0.73	Good
"Namangan Tukimachi Sanoat Textiles" LLC	0.73	0.84	0.61	Satisfactory

Source: author`s calculations based on research.

As can be seen from the Table 7, the results of the integral indices of Namangan Tukimachi Sanoat LLC, JV Uchkurgonteks LLC, Namangan Tukimachi Sanoat Textile LLC are respectively 0.59, 0.73 and 0.61. Judging by the evaluation results, it is clear that only at JV LLC Uchkurgonteks the level of efficiency of managing production capacity is good, while at Namangan Tukimachi Sanoat LLC and Namangan Tukimachi Sanoat Textile LLC the level of efficiency of managing capacity utilization is satisfactory that confirms the availability of reserves to improve the efficiency of management of capacity utilization.

5 CONCLUSIONS

Thus, the use of the methodology proposed by the authors for evaluating the management of production capacity in textile enterprises, based on the application of a point method for evaluation and characterized by the use of weights, will determine the level of efficiency of the production capacity management process in textile enterprises, and justify possible ways to improve competitiveness for each product.

In the case of a low level of the coefficient of efficiency of management of the use of production capacities, a number of measures should be taken to improve the management efficiency of the use of production capacities in enterprises.

The method proposed by us is distinguished by the strength of a comprehensive assessment of the entire process of managing the use of the production capacity of textile enterprises and it can also be applied in other industrial sectors such as mechanical engineering, light industry and food industry. But along with the advantages, this method has its drawbacks: the method does not reflect the influence of indicators of production capacity management efficiency on the financial results of the company. In addition, it will not be able to assess the competitive advantages of an enterprise in any way, which is very important in increasing the share of an enterprise in the market. In our opinion, should continue research in this area.

6 REFERENCES

1. Abryutin M.S.: Enterprise Economics: Training, Delo i service, 2004, pp. 35-36
2. Ahmad M.M., Dhafr N.: Establishing and improving manufacturing performance measures, Robotics and Computer Integrated Manufacturing 18(3-4), 2002, pp. 171-176, https://doi.org/10.1016/S0736-5845(02)00007-8
3. Cline W.: The future of international trade in textiles and apparel, Washington: International Economics. 1992, 225 p.
4. Doeringer Dickerson C.G.: Textiles and apparel in the global economy, 3rd ed. NJ: M$P–Hall.; Nordas H. K. 2004, pp. 125-127
5. Dadalova M.: Management of production capacity at the enterprises of the glass industry, The dissertation on the degree of candidate of sciences, Belgorod, 2009, pp. 85-86
6. Eliyahu M. Goldratt: Late Night Discussions on the Theory of Constraints, 1998, pp.76-78
7. Forster E., Ryants B.: Methods of correlation and regression analysis. A guide for economists, 1983, 304 p.
8. Forza C., Salvador F.: Information flow for high-performance manufacturing, International Journal of Production Economics 70(1), 2001, pp. 21-36, https://doi.org/10.1016/S0925-5273(00)00038-4
9. Güneçıkan Ö.: Kapasite Planlaması ve Optimim Stok Kontrolü Yönetimi, Kahramanmaraş Üniversitesi, Sosyal Bilimler Enstitüsü, Yayımlanmamış YüksekLisans Tezi, 2008, 481 p.
10. Lee J.: Competitiveness of textile and apparel industries in the United States and Japan, Graduate Theses and Dissertations, Iowa State University, 2013, 96 p., https://lib.dr.iastate.edu/etd/13517
11. Krivyakin K., Tursunov B., Hakimov Z.: Estimation methodology of efficiency of production capacity management at textile enterprises, Bulletin of Science and Practice 4(1), 2018, pp. 228-241
12. Lohman C., Fortuin L., Wouters M.: Designing a performance measurement system: A case study, European Journal of Operational Research 156(2), 2004, pp. 267-286, https://doi.org/10.1016/S0377-2217(02)00918-9
13. Milewska E.: It systems supporting the management of production capacity, Management Systems in Production Engineering 1(25), 2017, pp 60-67, DOI 10.1515/mspe-2017-0009
14. Jacobs R.F., Chase R.B.: Operations and Supply Chain Management: The Core, 4th Ed., 2015, 398 p.
15. Stephanopoulos G., Ng C.: Perspectives on the synthesis of plant-wide control structures, Journal of Process Control 10(2-3), 2000, pp 97-111, https://doi.org/10.1016/S0959-1524(99)00023-2
16. Skogestad S.: Control structure design for complete chemical plants, Computers and Chemical Engineering 28(1-2), 2004. pp. 219-234, https://doi.org/10.1016/j.compchemeng.2003.08.002
17. Jovan V., Zorzut S., Žnidaršič A.: Utilization of key performance indicators in production control, IFAC Proceedings Volumes 39(14), 2006, pp. 173-178, https://doi.org/10.3182/20060830-2-SF-4903.00031