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THE FORECASTING THE LEVEL OF DEVELOPMENT OF INNOVATIVE POTENTIAL OF TEXTILE ENTERPRISES

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Background and objectives. The analysis of the main shortcomings of modern forecasting of innovative development of textile enterprises shows the need to build a well-functioning system for forecasting innovative development; development of a methodology for forecasting promising areas of innovative development, taking into account the peculiarities of the functioning of textile enterprises. Therefore, an urgent problem arises of finding effective mechanisms for objectively identifying the weak and strong aspects of the innovative activity of textile enterprises, establishing further priorities for the formation and development of the innovative potential of enterprises, determining the main vectors of innovative development, taking into account the competitiveness and results of R&D (research and development work).

Methods: The methods used: factor analysis – to identify the most significant indicators that affect the level of use of innovative potential; cluster analysis of K-means – for a reasonable division of enterprises into groups according to the levels of integrated business performance / use of innovation; taxonomy method – to determine the boundary value of the levels of development of innovative potential as a result of the integration of individual business objects for each of the clusters into one structure; discriminant analysis – for object recognition for deciding which business objects to integrate into the business structure.

Findings: As a result of predicting the level of development of the innovative potential of textile enterprises, groups of factors were identified that stimulate and discourage the development of the innovative potential of textile enterprises.

Conclusion: To improve the efficient operation of textile enterprises, it was proposed to use special tools for managing innovation potential: active expansion of business activities, attraction of innovations, containment of achieved market positions, search for effective methods of using innovations, selective growth of certain types of activities, differentiated attraction of innovations, and revision of certain activities.

Keywords: forecasting; development level; innovation potential; textile enterprises; efficiency; factor analysis; K-means cluster analysis; taxonomy method; discriminant analysis.

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
26	8	5

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ПРОГНОЗУВАННЯ РІВНЯ РОЗВИТКУ ІННОВАЦІЙНОГО ПОТЕНЦІАЛУ ТЕКСТИЛЬНИХ ПІДПРИЄМСТВ

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Постановка проблеми та завдання. Аналіз основних недоліків сучасного прогнозування інноваційного розвитку текстильних підприємств показує необхідність побудови налагодженої системи прогнозування інноваційного розвитку; вироблення методики прогнозування перспективних напрямів інноваційного розвитку з урахуванням особливостей функціонування промислових підприємств. Тому виникає нагальна проблема пошуку ефективних механізмів об'єктивного виявлення слабких і сильних аспектів інноваційної діяльності текстильних підприємств, встановлення подальших пріоритетів щодо формування та розвитку інноваційного потенціалу підприємств, визначення основних векторів інноваційного розвитку з урахуванням конкурентоспроможності та результатів НДДКР (науково-дослідної та дослідно-конструкторської роботи).

Методи. Використані методи: факторного аналізу – для виявлення найбільш значущих індикаторів, що впливають на рівень використання інноваційного потенціалу; кластерний аналіз К-середніх – для обґрунтованого поділу підприємств на групи за рівнями інтегрованої бізнес-результативності / використання інновацій; метод таксономії – для визначення граничної величини рівнів розвитку інноваційного потенціалу в результаті інтеграції окремих бізнес-об'єктів для кожного з кластерів в одну структуру; дискримінантний аналіз – для розпізнання об'єктів для прийняття рішення про те, які бізнес-об'єкти слід інтегрувати в бізнес-структуру.

Результати: в результаті прогнозування рівня розвитку інноваційного потенціалу текстильних підприємств, були виділені групи факторів, які стимулюють і дестимулюють розвитку інноваційного потенціалу промислових підприємств.

Висновки: для поліпшення ефективної діяльності текстильних підприємств було запропоновано використання спеціальних інструментів управління інноваційним потенціалом: активне розширення бізнес-діяльності, залучення інновацій, стримування досягнутих позицій на ринку, пошук ефективних методів використання інновацій, селективне зростання певних видів діяльності, диференційоване залучення інновацій, ревізія певних видів діяльності.

Ключові слова: прогнозування; рівень розвитку; інноваційний потенціал; текстильні підприємства; ефективність; факторний аналіз; кластерний аналіз К-середніх; метод таксономії; дискримінантний аналіз.

Introduction. The main prerequisites of innovative development at textile enterprises are to increase and increase the efficiency of using all components of innovative potential, that is, integration of financial, market, resource, information, innovative, intellectual, scientific, technological, personnel, organizational and managerial potential of innovative enterprises (Sergacheva, 2017) references should be made in parentheses indicating the name and year – see sample (Bandura *et al.*, 2018; Belous, *et al.*, 2017).

The methodology for forecasting promising areas of innovative development should meet the following criteria (Bondarchuk *et al.*, 2011; Boychuk, 2016; Fedorak, 2019; Fedulova, 2013): based on a study that should be meaningful and constructive; The forecast should be carried out on the basis of quantitative data; presence of analysis of quality characteristics of enterprise activity and innovative changes; The existence of a logical relationship between formalized and informal characteristics of the processes and phenomena under study; The maximum possible consideration of even unverified, incomplete, inaccurate or contradictory information on current and future developments; Analysis of trends and trends today; explicit and hidden consumer demands, market opportunities, etc. The fundamental factors determining the forecasting of key areas of innovative development are: the intellectual and technological ability to use and introduce the achievements of science and technology into the production process; level of realization of technical and economic possibilities of production and marketing; foreign economic relations of the enterprise on the use of scientific and technical results; the use of channels for the promotion of goods and services that require the involvement of modern information and computer technologies; cost generation through efficient resource-saving technologies; implementation of joint projects for the development of knowledge-based products or technologies; patent ownership, know-how, etc. (Ganushchak-Efimenko *et al.,* 2016; Gurochkina, 2015; Hobta *et al.,* 2009).

Determining the components of predicting the innovative development of light industry enterprises makes it possible to systematically use them and combine them with modern principles of behavior of business entities that dictate constant change and modernization of the world market. The multifactorial nature of the operating conditions of modern light industry enterprises causes the adaptation of components of the innovation process forecasting into a successful business strategy (Honcharenko *et al.*,2020; Kosteniuk, 2019; Moiseenko *et al.,* 2014; Nifatova *et al.*, 2018).

The ability of modern textile enterprises to be competitive and produce high-quality products is primarily determined by their level of development and the state of their innovative potential. Thus, the innovative potential of textile enterprises, taking into account the peculiarities of their activities, requires an

assessment of the level of their development, since it is the assessment of the innovative potential that will determine the main drivers of success and the key advantages of the enterprise, as well as the level of innovation of products and technologies, the use of which, as a result, forms the basis for the innovation competitiveness of textile enterprises (Palyvoda *et al.*, 2013; Puzyrova, 2019; Puzyrova, 2020; Serdyuk *et al.*, 2014). The innovative potential of the enterprise is a multi-vector economic concept with polystructural filling, which significantly complicates the task of analyzing and evaluating its implementation. Therefore, these issues need to be given considerable attention from the point of view of determining a unified methodology for assessing the use of innovative potential and diagnosing its implementation in the changing conditions of today (Sergacheva, 2017; Shcherbak *et al.*, 2012; Shilova *et al.*, 2012; Sidorchuk, 2014).

Therefore, there is an urgent need to search for new innovative startups, deepened ties with stakeholders, and a constant search for innovation in the business plane. The existing strategies of enterprises to improve the production, economic, financial, personnel, technological aspects of activities and other important processes determine the vectors of the future effective development of the enterprise and should be based on non-standard, innovative approaches to meet the needs of the market and consumers. In today's difficult conditions, the innovative potential, its formation and development is quite complex, but the most necessary component of ensuring the stable functioning, development, sustainability and business activity of any enterprise (Varenyk *et al.*, 2019;Voloshchuk *et al.*, 2015; Yankovets, 2008). That is why the complex indicator of the enterprise's ability to activity in the innovation plane is its innovative potential. The effective full realization of the innovative potential of textile enterprises determines their ability to continuous, cost-effective, production and commercial activities and the perception of new plans to improve their activities as innovative areas of development. It follows that only a complete readiness to perceive innovative development directions by the enterprise team will be the basic factor that will help to quickly introduce innovative approaches and implement innovative activities in order to achieve the desired results (Zakharchenko *et al.*, 2012; Zubko *et al.*, 2016).

Materials and methods.

Data description. The initial data for assessing the level of development of innovative potential of textile enterprises are given in Table 1. The research base consisted of 28 indicators of business and innovation of 10 textile enterprises for 2017–2019 years.

Table 1

System of Indicators Affecting the Level of Integrated Business Performance/Use of Innovation by Textiles

Indicators	Designation
Average number of employees, persons	x_1
Fixed assets (thousand UAH)	x_2
Types of innovative products sold	x_3
Volume of innovative textile products sold	x_4
Finished products (thousand UAH)	x_5
Cost of innovative products sold (thousand UAH)	x_6
Proceeds from: sales of products (goods, works, services)	x_7
Number of innovative products introduced	x_8
Acquisition of machinery, equipment and software	x_9
Financial result from operating activities: profit (thousand UAH)	x_{10}
Number of new and/or improved types of machines, equipment	x_{11}
Equity (thousand UAH)	x_{12}
Gross profit (thousand UAH)	x_{13}
Number of patents, copyright certificates	x_{14}
Proceeds from targeted financing (thousand UAH)	x_{15}
Financial result from operating activities: profit (thousand UAH)	x_{16}
Proceeds from operating leases (thousand UAH)	x_{17}
Number of new processes put into production	x_{18}
Export of innovative products	x_{19}
Number of research results acquired	x_{20}
Expenditure on payment: goods (works, services) (thousand UAH)	x_{21}
Sales expenses (thousand UAH)	x_{22}
Administrative expenses (thousand UAH)	x_{23}
Labor expenses (thousand UAH)	x_{24}
Material costs (thousand UAH)	x_{25}
Number of innovations introduced	x_{26}
Number of new processes put into production	x_{27}
Other reserves (thousand UAH)	x_{28}

Method description.

STEP 1. At the first stage, factor analysis was used. Using this method, you can identify the most significant indicators that affect the level of use of innovative potential. The rows of the final factor analysis table are equal to the number of indicators, the columns are equal to the number of factor loads of indicators. Factor loads reflect the correlation (dependence) of indicators and factors, the presence of red color indicates which factor the indicator belongs to, the sign (+) shows direct influence, the sign (-) shows negative influence. In this study, 2 factors were identified. The first reflects the integrated performance of enterprises. The second factor reflects the level of use of innovation. Factor analysis was performed with STATISTICA. In general, the situation of

increasing the level of development of innovative potential as a result of the integration of individual, including innovative, business objects, depending on two factors, is described by the following Equation (1):

$$I_i = \sum_{j=1}^{N} F_j, \quad (1)$$

where I_j is the value of the innovative potential of the i-th integrated enterprise;

Fj – *j*-th factor (integrated business performance/level of innovation utilization);

N is the number of detected factors.

The magnitude of each factor is determined by Equation (2):

$$F_j = \frac{1}{Expl.F_j} \times \sum a_{ij} \times X_{ij}, \quad (2)$$

where $Expl.F_j$ is the factor load of the *j*-th aspect of integrated business performance/use of innovation;

aij – value of indicator

Xij; Xij – *ij*-th indicator.

STEP 2. In the second stage, cluster analysis of K-medium was used to reasonably divide enterprises into groups according to the achieved level of integrated business performance/use of innovations.

The methodology for using K-medium cluster analysis is as follows:

2.1. Prelaim all indicators to a dimensionless view using Equation (3):

$$z_{ij} = \frac{x_{ij} - \bar{x}_j}{S_j}, \quad (3)$$

where *xij* is the *j-th* indicator of the integrated business performance/use of innovation of the *i-th* integrated enterprise;

xj – average of this indicator for all integrated enterprises;

Sj is the standard deviation of this indicator for all integrated enterprises.

2.2. Minimizing the standard deviation of all indicators from the center of identified clusters (Equation (4)):

$$\min\left[\left[\sum_{i=1}^{k}\sum x(j) \in S_i \left\| x^{(j)} - \mu \right\|^2\right]\right], \quad (4)$$

where $x^{(j)} \in R^n$;

$\mu_i \in R^n$;

μ_i – cluster centroid (center) R_i.

STEP 3. In the third stage, the taxonomy method was used. This method allows you to determine the boundary value of the level of development of innovative potential as a result of the integration of individual, including innovative, business objects for each of the clusters in the form of an integral indicator.

Stages of taxonomic analysis:

3.1. Matrix generation from significant (highlighted in red) indicators (Equation (5)):

$$X = \begin{pmatrix} x_{11}x_{12}\ldots x_{1n} \\ x_{21}x_{22}\ldots x_{2n} \\ \ldots\ldots\ldots\ldots \\ x_{m1}x_{m2}\ldots x_{mn} \end{pmatrix}, \quad (5)$$

3.2. Standardization of the original matrix (5) and compilation of the reference matrix, where 0 is the best value (Equation (6)):

$$x^0 = [x_1^0, x_2^0, \ldots x_n^0]. \quad (6)$$

3.3. Calculation of multivariate Euclidean distance (Equation (7)):

$$L_i = [\sum_{i=1}^{n} (x_i - x_i^0)^2]^{1/2}. \quad (7)$$

3.4. Calculation of the average Euclidean distance (Equation (8)):

$$\overline{L} = \frac{1}{N} \times \sum_{i=1}^{N} L_i \cdot \quad (8)$$

3.5. Calculation of standard deviation (Equation (9)):

$$\sigma = \frac{1}{N}[\left[\sum_{i=1}^{N} \left(L_i - \overline{L}\right)^2\right]]^{1\backslash 2}. \quad (9)$$

3.6. Calculation of an integral taxonomy indicator, which characterizes the level of development of innovative potential as a result of the integration of individual, including innovative, business objects (Equation (10)):

$$\eta_i = 1 \quad \frac{L_i}{\overline{L} + 2\sigma} \cdot \quad (10)$$

The resulting value of the taxonomy indicator is interpreted as follows: the higher the degree of integration of objects and the level of their use of innovations, the closer its value is to 1. Visualization of the level of development of innovative potential was done using the dendogram (modification of cluster analysis) of the STATISTICA application package.

STEP 4. The fourth step is a discriminant analysis for recognizing objects to decide which indicators separate (i.e., "discriminate") data sets (so-called "groups"). Discriminant analysis is used here to determine the potential

efficiency of entering a new business object into an integrated business structure. To do this, linear functions are compiled to recognize the belonging of a business object to a specific cluster. The calculated maximum value of one of the two recognition functions indicates that the business object belongs to one of the clusters and makes a corresponding decision.

Results and discussion. At the first stage, factor analysis was carried out to identify indicators that have an impact on the achieved level of integrated business performance and the level of innovation utilization (Table 2).

Table 2

Results of factor analysis. Identification of indicators of integrated business performance/use of textile innovation (STATISTICA 10 listing)

Variable	Factor Loadings (Unrotated) (data) Extraction: Principal components (Marked loadings are >0,700000)	
	Factor 1	Factor 2
x_1	0,95767	-0,127322
x_2	0,85974	-0,504269
x_3	-0,54951	0,615343
x_4	0,653250	0,71571
x_5	0,87062	-0,256222
x_6	-0,553222	-0,82454
x_7	0,90110	-0,091595
x_8	-0,44270	0,653259
x_9	-0,38977	-0,83256
x_{10}	0,77082	-0,553222
x_{11}	-0,65412	0,674083
x_{12}	0,85368	-0,514211
x_{13}	0,94328	-0,253242
x_{14}	-0,40503	0,725915
x_{15}	0,19137	-0,001054
x_{16}	0,82535	-0,543797
x_{17}	0,75540	-0,599146
x_{18}	-0,67898	0,537160
x_{19}	-0,38977	0,724885
x_{20}	-0,54403	-0,806571
x_{21}	-0,90423	-0,318673
x_{22}	-0,60186	0,401518
x_{23}	-0,89799	-0,012248
x_{24}	-0,82876	-0,062404
x_{25}	-0,91013	-0,412174
x_{26}	0,401518	0,84191
x_{27}	-0,50186	0,558867
x_{28}	-0,65498	0,556255
Expl.Var	15,50256	6,699616
Prp.Totl	0,55366	0,339272

Source: calculated by authors.

The first factor included 13 indicators (Table 2): the average number of employees; fixed assets; finished products; revenues from: sales of products (goods, works and services); financial result from operating activities: profit; equity; gross profit; financial result from operating activities: profit; income from operating leases; expenses for payment: goods (works, services); administrative costs; labour costs; material costs.

The second factor included 12 indicators: types of innovative products sold; the volume of innovative textile products sold; cost of innovative products sold (thousand UAH); Number of innovative products introduced; acquisition of machinery, equipment and software; number of new and/or improved types of machinery, equipment; number of patents, copyright certificates; number of new technological processes introduced into production; export of innovative products; Number of research results obtained; The number of innovations introduced; Number of new processes introduced into production. Three indicators (income from earmarked financing, marketing costs, other stocks, it turned out that the achieved level of development of innovative capacity does not affect.

The results of the factor analysis showed that the level of development of the innovative potential of textile enterprises is fully characterized by the two factors obtained. The first factor can be described as the achieved integrated performance of the business activities of individual business entities. It describes 55,366% of the variance and has the greatest impact on the technical, economic and organizational components of creating and developing an integrated business structure. The second factor describes 33.9272% dispersion. It characterizes the level of use of innovation by an individual enterprise. In accordance with Table 2, the magnitude of the effect of the first factor on the level of development of the innovative potential of textile enterprises is described by Equation (11):

$$F_1 = 1/15{,}50256 \cdot (0{,}95767x_1 + 0{,}85974x_2 + 0{,}87062x_5 + 0{,}90110x_7 + 0{,}77082x_{10} + 0{,}85368x_{12} + 0{,}94328x_{13} + 0{,}82535x_{16} + 0{,}75540x_{17} - 0{,}90423x_{21} - 0{,}89799x_{23} - 0{,}82876x_{24} - 0{,}91013x_{25}). \quad (11)$$

Thus, it was found that for groups of enterprises such indicators as: the average number of employees; fixed assets; finished products; proceeds from sales of products (goods, works, services); financial result from operating activities: profit; Equity and gross profits have a positive impact on the level of development of the innovative potential of textile enterprises, as they allow for the fuller use of available material, financial and human resources for effective activities in the vector of innovative development.

It was established that factors such as: financial result from operating activities; income from operating leases; expenses for payment: goods (works,

services); Sales costs administrative costs; labour costs; material costs have a negative value and require the introduction of optimization solutions for their further improvement.

The magnitude of the influence of the second factor on the level of development of innovative potential is determined by Equation (12):

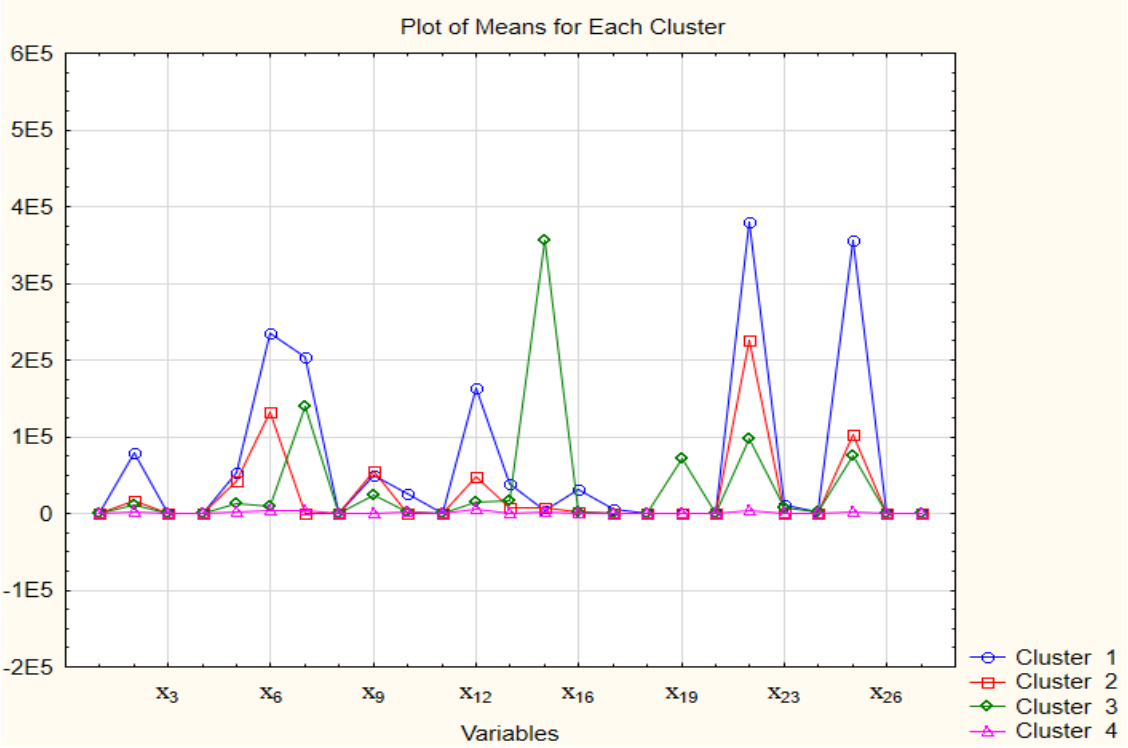
$$F_2 = 1/6{,}699616 \cdot (0{,}615343x_3 + 0{,}71571x_4 - 0{,}82454x_6 + 0{,}653259x_8 - 0{,}83256x_9 + 0{,}674083x_{11} + 0{,}725915x_{14} + 0{,}537160x_{18} + 0{,}724885x_{19} - 0{,}806571x_{20} + 0{,}84191x_{26} + 0{,}558867x_{27}). \quad (12)$$

Thus, it was established that for groups of enterprises such indicators as: types of innovative products sold; the volume of innovative textile products sold; Number of innovative products introduced; number of new and/or improved types of machinery, equipment; number of patents, copyright certificates; number of new technological processes introduced into production; export of innovative products; The number of innovations introduced; The number of new technological processes introduced into production positively affects the level of development of the innovative potential of textile enterprises, since it is they that meet the requirements of the market environment in the implementation of innovative products, the number of innovations introduced to the market, the export of innovative products and the introduction of new technological processes into production.

Indicators such as: cost of innovative products sold; acquisition of machinery, equipment and software; the number of research results is negative, since their share is very scarce and insufficient to ensure the full effective realization of innovative potential and innovative development of textile enterprises.

In the second stage, a cluster analysis of K-medium was carried out for the well-founded division of textiles into groups on the level of development of innovative potential. The K-average graph is shown in Figure 1.

Fig. 1 shows that in terms of the level of innovation potential development, all textile enterprises included in the integrated business structure are divided into four clusters. The number and composition of textile enterprises included in the obtained clusters are presented in Fig. 2–5.



Source: created by authors.

Fig. 1. **Graph of average values of indicators of the level of development of innovative potential of textile enterprises included in the integrated business structure**

	Members of Cluster Number 1 (Data) and Distances from Respective Cluster Center Cluster contains 1 cases
	Distance
П9	0,00

Source: calculated by authors.

Fig. 2. **Composition of 1 cluster**

	Members of Cluster Number 2 (Data) and Distances from Respective Cluster Center Cluster contains 1 cases
	Distance
П8	0,00

Source: calculated by authors.

Fig. 3. **Composition of 2 cluster**

	Members of Cluster Number 3 (Data) and Distances from Respective Cluster Center Cluster contains 1 cases
	Distance
П10	0,00

Source: calculated by authors.

Fig. 4. **Composition of 3 cluster**

	Members of Cluster Number 4 (Data) and Distances from Respective Cluster Center Cluster contains 7 cases
	Distance
П1	1177,367
П2	922,295
П3	810,615
П4	1118,891
П5	958,187
П6	1272,177
П7	2411,563

Source: calculated by authors.

Fig. 5. **Composition of 4 cluster**

Table 3

Results of cluster analysis. Define the composition of textile clusters within the integrated business structure (STATISTICA 10 listing)

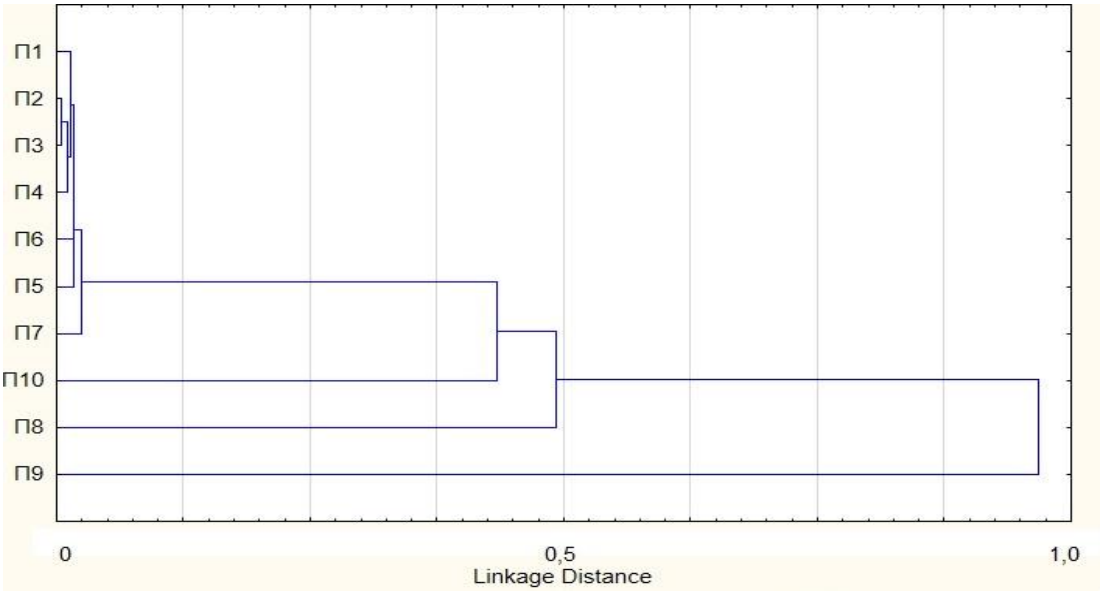
Enterprise	Cluster/ Number of enterprises	Identifying the level of susceptibility of the population and UTC resistance to COVID-19
П9. PJSC "Cherkassk Silk Factory"	1 /1	High level of integrated business performance High level of innovation utilization
П8. PJSC "Knitted Factory "Rose"	2 /1	Medium level of integrated business performance Low utilization of innovation
П10. CJSC "Worsted and Cloth Company "Cheksil"	3/1	Medium level of integrated business performance Medium level of innovation utilization
П1. Garment factory "TK STYLE" П2. Garment factory "TK-Korosten" П3. Garment factory "TK-Lubny" П4. PJSC "Steblevska cotton spinning and weaving factory" П5. OJSC "Boguslavskaya Cloth Factory" П6. JSC "Trading House "YAROSLAV" П7. JSC "Sofia"	4/7	High level of population susceptibility to COVID-19 High level of infrastructure development

Source: created by authors.

As the data of Table 3 on the identification feature: "the level of integrated business performance/use of innovations": PJSC "Cherkassk Silk Factory" also got into Cluster 1, where there is a high level of integrated business performance and a high level of innovation use; the second cluster included an enterprise – PJSC "Knitted Factory "Rose" with an average level of integrated business performance and a low level of innovation; the third cluster included the company CJSC "Worsted and Cloth Company "Cheksil" with an average level of integrated business performance and an average level of innovation; the

enterprises got to the fourth cluster: Garment factory "TK STYLE", Garment factory "TK-Korosten", Garment factory "TK-Lubny", PJSC "Steblevska cotton spinning and weaving factory", OJSC "Boguslavskaya Cloth Factory", JSC "Trading House "YAROSLAV", JSC "Sofia" which are characterized by the high level of susceptibility of the population to COVID-19 and the high level of development of infrastructure.

In the third stage, integral indicators of the level of development of innovative potential for each of the clusters were calculated using taxonomy using the 5–10 equations. The value of the integral indicator of the level of development of innovative potential shows the boundary where the transition from one model of management of the development of innovative potential to another is carried out. The visualization of the indicator of the level of development of innovative potential of different enterprises was made in the form of a dendogram (Figure 6–7) using the STATISTICA program.



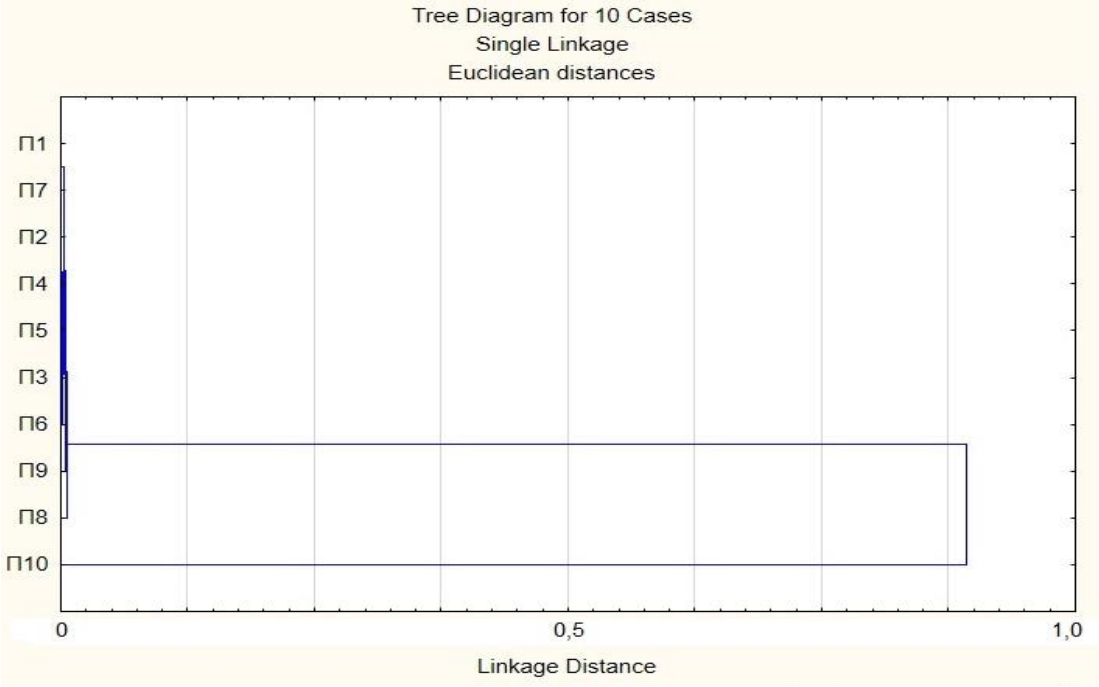
Source: created by authors.

Fig. 6. **Dendogram of integrated indicators of the level of integrated business performance of textile enterprises**

An integral indicator of the level of integrated business performance of textile enterprises is used to visualize the results in matrix form and is located on the ordinate (OY) axis.

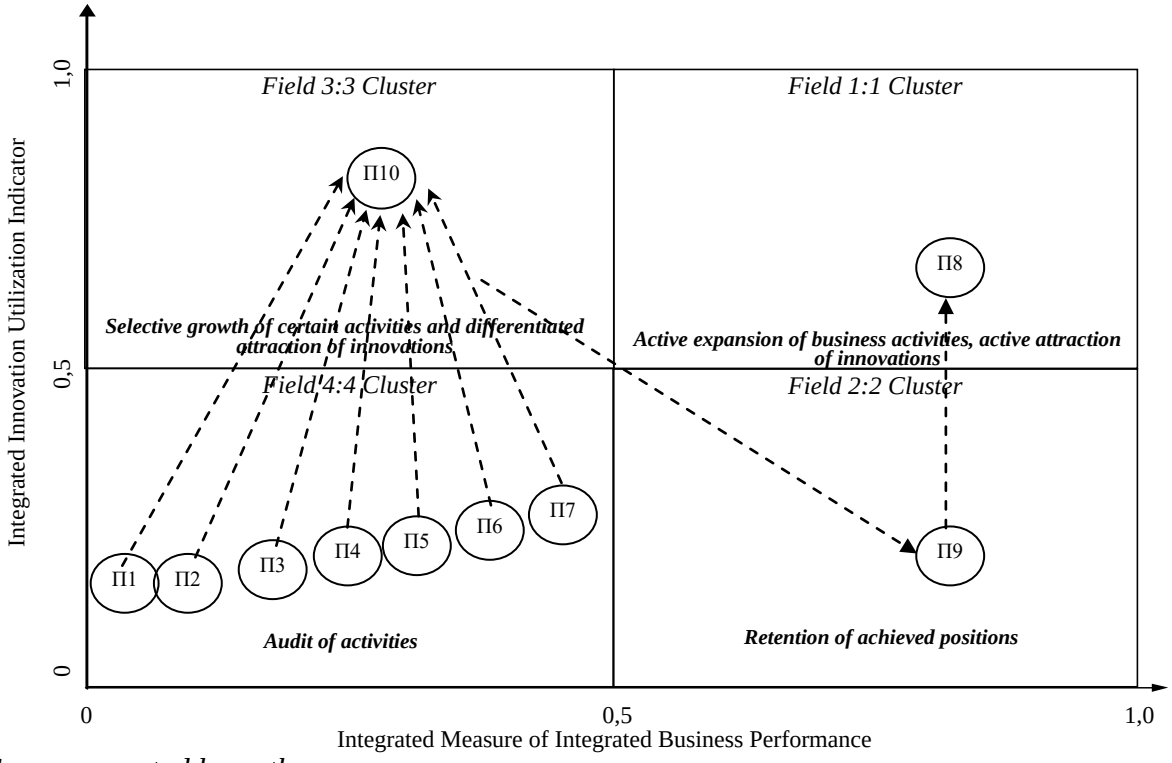
An integral indicator of the level of use of innovations by textile enterprises is used to visualize the results in matrix form and is located on the abscissa (OX) axis.

The positioning matrix of individual business entities depending on the value of the integral taxonomic indicator of the level of innovation indicator development is presented in Fig. 8.



Source: created by authors.

Fig. 7. **Dendogram of integral indicators of the use of innovations by textile enterprises**



Source: created by authors.

Fig. 8. **Map of position of individual business entities depending on the value of the integral taxonomic indicator of the level of innovation indicator development**

At the last stage, discriminant analysis was used. With its help, the organization was organized to monitor the dynamics of the change in the value of innovative potential in the identified clusters. In the event of a deterioration or improvement of the situation, appropriate measures should be taken. The result of the discriminant analysis is shown in Table 5.

Table 5

Results of discriminant analysis. Monitoring of changes in the level of development of the innovative potential of textile enterprises. (STATISTICA 10 listing)

Discriminant function of changing the level of development of innovative potential of textile enterprises of the *i*-th cluster	Condition for using the *i*-th cluster innovation capacity management model	Proposed methods for managing innovation potential
$Int_1 = 0{,}262 + 0{,}81x_1 + 0{,}74x_2 + 0{,}75x_3 + 0{,}98x_4 + 0{,}27x_5 - 0{,}51x_6 + 0{,}21x_7 + 0{,}07x_8 - 0{,}86x_9 + 0{,}75x_{10} + 0{,}86x_{11} + 0{,}91x_{12} + 0{,}75x_{13} + 0{,}81x_{14} + 0{,}74x_{16} + 0{,}75x_{17} + 0{,}98x_{18} + 0{,}27x_{19} - 0{,}51x_{20} - 0{,}21x_{21} - 0{,}07x_{22} - 0{,}86x_{23} - 0{,}75x_{24} - 0{,}86x_{25} + 0{,}91x_{26} + 0{,}75x_{27}$	$Int_1 = max$	Introduction of measures for active expansion of business activities, active attraction of innovations, financing and stakeholders
$Int_2 = 0{,}321 + 0{,}73x_1 + 0{,}83x_2 + 0{,}62x_3 + 0{,}99x_4 + 0{,}19x_5 - 0{,}42x_6 + 0{,}19x_7 + 0{,}06x_8 - 0{,}77x_9 + 0{,}82x_{10} + 0{,}83x_{11} + 0{,}92x_{12} + 0{,}79x_{13} + 0{,}73x_{14} + 0{,}83x_{16} + 0{,}62x_{17} + 0{,}99x_{18} + 0{,}19x_{19} - 0{,}42x_{20} - 0{,}19x_{21} - 0{,}06x_{22} - 0{,}77x_{23} - 0{,}82x_{24} - 0{,}83x_{25} + 0{,}92x_{26} + 0{,}79x_{27}$	$Int_2 = max$	Ensure that market positions are maintained and find effective ways to use innovation
$Int_3 = 0{,}428 + 0{,}69x_1 + 0{,}86x_2 + 0{,}59x_3 + 1{,}02x_4 + 0{,}17x_5 - 0{,}40x_6 + 0{,}17x_7 + 0{,}05x_8 - 0{,}75x_9 + 0{,}88x_{10} + 0{,}88x_{11} + 0{,}93x_{12} + 0{,}81x_{13} + 0{,}69x_{14} + 0{,}86x_{16} + 0{,}59x_{17} + 1{,}02x_{18} + 0{,}17x_{19} - 0{,}40x_{20} - 0{,}17x_{21} - 0{,}05x_{22} - 0{,}75x_{23} - 0{,}88x_{24} - 0{,}88x_{25} + 0{,}93x_{26} + 0{,}81x_{27}$	$Int_3 = max$	Selective growth of certain textile activities and differentiated attraction of innovations
$Int_4 = 0{,}555 + 0{,}59x_1 + 0{,}88x_2 + 0{,}49x_3 + 1{,}03x_4 + 0{,}13x_5 - 0{,}37x_6 + 0{,}13x_7 + 0{,}03x_8 - 0{,}66x_9 + 0{,}98x_{10} + 0{,}98x_{11} + 0{,}99x_{12} + 0{,}88x_{13} + 0{,}59x_{14} + 0{,}88x_{16} + 0{,}49x_{17} + 1{,}03x_{18} + 0{,}13x_{19} - 0{,}37x_{20} - 0{,}13x_{21} - 0{,}03x_{22} - 0{,}66x_{23} - 0{,}98x_{24} - 0{,}98x_{25} + 0{,}99x_{26} + 0{,}88x_{27}$	$Int_4 = max$	Control and audit of certain activities, equipment modernization, increased share of financing, use of own raw materials

Source: created by authors.

The use of the proposed dixriminant method of monitoring the level of development of innovative potential allows: to identify a possible deterioration (improvement) of the situation, to quickly propose a change in management methods and relevant mechanisms of influence.

Conclusion. As a result of forecasting the level of development of the innovative potential of textile enterprises, we identified groups of factors that stimulate or hinder the successful development of the innovative potential of textile enterprises. As a result, we grouped enterprises into four clusters according to the integral indicators of the levels of integrated business performance and the use of innovation. In order to improve the efficiency of these enterprises, we offer for each of the group of enterprises that belong to a certain cluster the following methods of managing innovative potential: for PJSC "Cherkasy Silk Plant" (cluster 1) – the introduction of measures to actively expand business activities, actively attract innovations, financing and stakeholders; for PJSC "Knitting Factory "Rosa" (cluster 2) – preservation (retention) of achieved positions in the market and search for effective methods of using innovations; for CJSC "Stone-cloth company "Cheksil" (cluster 3) – selective growth of certain types of activities of the textile industry and differentiated attraction of innovations; for enterprises that fell into cluster 4 – Garment factory "TK STIL", Garment factory "TK-Korosten", Garment factory "TK-Lubny", PJSC "Steblevska cotton spinning and weaving factory", OJSC "Boguslavskaya cloth factory", OJSC "Trading House "YAROSLAV", CJSC "Sofi" we propose to carry out control and audit of certain types of activities, modernization, reconstruction of equipment, increase the share of financing, and, if possible, switch to using our own raw materials.

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Conflict of interest. V. Shcherbak justified the methodology of the study and identified groups of factors that stimulate and discourage the development of the innovative potential of textile enterprises. P. Puzyrova proposed the use of special tools for managing innovative potential for textile enterprises.

Abbreviations:

%	Percentage
CJSC	Close (private) joint stock company
Eq.	Formula of calculation
Expl. Var	Explanatory Variable
Fig.	Figure
JSC	Joint stock company
OJSC	Open (public) joint stock company
PJSC	Public joint stock company
Prp. Totl	Percentage of the total variance explained
R&D	Research and Development work
STATSTICA	Statistical analysis software package
Var	Variable
П1, … , П10	Enterprise1, ..., Enterprise10

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