РОЗДІЛ ІІІ
Економіка та управління підприємствами

UDK 334.71:630(477)

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https://doi.org/10.29038/2411-4014-2020-03-67-76

BUSINESS PROCESS FLEXIBILITY OF THE UKRAINIAN FOREST SECTOR: MANAGEMENT, ASSESSMENT AND STRATEGIC DIRECTIONS OF CHANGES

The article deals with the improvement of the system managing the forest sector business processes based on some flexibility. Some flexibility significance of business processes carrying out by entities in the current economic environment has been confirmed. The flexibility of the business processes in the forest sector has been proved as a core driver of its effective functioning. Moreover, it ensures the production mobility with changes of customer needs. The own interpretation of the concept of "flexibility" has been given, as well as the flexibility assessment technique of business processes has been improved and tried out in business processes of the forest sector. The control system has been studied as it is based on the implementation of industrial strategies taking into account the flexibility of any production activities.

Keywords: flexibility, management of flexibility of production activities, management of flexibility, forest sector, industrial strategy.

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УПРАВЛЕНИЕ ГИБКОСТЬЮ ПРОИЗВОДСТВЕННОЙ ДЕЯТЕЛЬНОСТИ ПРЕДПРИЯТИЙ ЛЕСНОГО ХОЗЯЙСТВА УКРАИНЫ: ОЦЕНКА СОСТОЯНИЯ И СТРАТЕГИЧЕСКИЕ НАПРАВЛЕНИЯ ИЗМЕНЕНИЙ

В статье усовершенствована система управления производственной деятельностью предприятий лесного хозяйства на основе гибкости. Подтверждено значение гибкости производственной деятельности субъектов хозяйствования в современных условиях функционирования. Доказано, что гибкость производственной деятельности лесохозяйственного предприятия является определяющим фактором его эффективного функционирования, обеспечивает мобильность производства с изменением потребностей потребителей. Подано собственное толкование понятия «гибкость», усовершенствована методика оценки гибкости производственной деятельности и апробирована она в деятельность предприятий лесного хозяйства. Доказано, что система управления базируется на реализации производственных стратегий, учитывающих уровень гибкости производственной деятельности.

Ключевые слова: гибкость, управление гибкостью производственной деятельности, управления гибкостью, лесное хозяйство, производственная стратегия.

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УПРАВЛІННЯ ГНУЧКІСТЮ ВИРОБНИЧОЇ ДІЯЛЬНОСТІ ПІДПРИЄМСТВ ЛІСОВОГО ГОСПОДАРСТВА УКРАЇНИ: ОЦІНКА СТАНУ ТА СТРАТЕГІЧНІ НАПРЯМИ ЗМІН

У статті вдосконалено систему управління виробничою діяльністю підприємств лісового господарства на засадах гнучкості. Виявлено, що на результат виробничої діяльності впливають засоби виробництва, якість робочої сили, правильно та чітко розроблений план виробничого процесу та гнучкість виробництва.

Підтверджено значення гнучкості виробничої діяльності суб'єктів господарювання в сучасних умовах функціонування. Доведено, що гнучкість виробничої діяльності лісогосподарського підприємства є визначальним чинником його ефективного функціонування, що забезпечує мобільність виробництва зі зміною потреб споживачів. Подано власне тлумачення поняття «гнучкість», удосконалено методику оцінювання гнучкості виробничої діяльності та апробовано її у діяльності підприємств лісового господарства.

Охарактеризовано діяльність державних підприємств лісового господарства України. Проаналізовано напрями господарської діяльності лісогосподарських підприємств, а саме заготівлю деревини, що є основним видом лісокористування у частині задоволення потреб суспільства в лісових ресурсах; переробку деревини та реалізацію лісопродукції на внутрішньому та зовнішньому ринках.

Досліджено, що система управління базується на реалізації виробничих стратегій та враховує рівень гнучкості виробничої діяльності. Запропоновано послідовність розробки виробничої стратегії лісогосподарських підприємств, що включає показник гнучкості та ймовірність його зростання. Виявлено, що досягнення необхідного рівня гнучкості забезпечить виробничому процесу можливість впроваджувати результати науково-технічного прогресу, що, в свою чергу, вплине на зменшення або ж уникнення нераціональних витрат матеріальних ресурсів та підвищення ефективності виробничої діяльності суб'єктів господарювання.

Підсумовуючи, зазначимо про необхідність врахування гнучкості виробничої діяльності підприємства, що дасть можливість приймати ефективні управлінські рішення щодо можливостей та напрямів розвитку кожного суб'єкта господарювання.

Ключові слова: гнучкість, управління гнучкістю виробничої діяльності, управління гнучкістю, лісове господарство, виробнича стратегія.

Problem statement. The forestry of Ukraine functions as an independent type of activity and is strategically important for the national economy, and rightly so, since not only economic development of the country, but also ecological and social development, depend on its state and rational use.

In these days forestry enterprises are financially squeezed due to curtailment of the national support programs, trade restrictions, the introduction of a moratorium on the export of timber, lack of state support, and difficult economic and political situation in the country.

Therefore, in order to timely identify and meet the demands of the primary consumer groups, attract new customers, increase profitability and cost-effectiveness, gain and retain leadership in the market, it is necessary to ensure manufacturing flexibility of both an individual enterprise and of the forestry activity as a whole.

Reaching the appropriate flexibility degree of forestry enterprises will allow focusing on the needs of consumers, and to quickly adapt to changing environmental conditions while conserving natural resources and achieving economic and social effects.

Analysis of recent researches and publications. Having investigated the opinions of a number of national scholars who focused on the problem of management and, in particular, on the flexibility of an enterprise, we believe they should be divided into the following groups:

- O. Kuzmin (2014), O. Melnyk (2014), M. Adamiv (2014), A. Khilukha (2014), L. Lipych (2014) who dealt with the problem of management as a process in their scientific research works [1];

- research works of the scholars who focused on the analysis of the strategic enterprise flexibility: I. Ihnatyeva (2013), N. Khlistunova (2013), O. Laburtseva (2014) [2-3];

- the scholars who concentrated on particular elements of flexibility, such as productive and financial, technical, organizational, personnel, - Y. Petrovych (2009), S. Komarynets (2011) etc. [4-5].

In their writings, the scholars proved the importance and the necessity of considering flexibility of enterprise development, assessment methodologies and directions of improvement. However, some issues, including the problem of manufacturing flexibility, remain open and call for further study.

The aim of the article is to deepen theoretical and methodological foundations and improve the manufacturing management system of forestry enterprises with a purpose of identifying the prospects of their growth.

The main results of the study. Efficient production activity, which depends on the means of production, labor force and its quality, proper and clearly developed production process, is the key to operation of any industrial enterprise. By synthesizing theoretical studies of national and foreign scholars who dealt with the aspects of production activity, we shall propose its definition as a set of actions of workers who utilize means of production to transform available resources into end products by flexibly changing them with the changing needs of consumers [6].

In modern emergent conditions, flexibility is an important property which creates an opportunity to quickly adjust and change production facilities in order to expand the line of goods, at the same time taking into consideration the impact of internal and external factors, each of which has a specific effect on the ability of an enterprise to adapt [6].

It is impossible to assess the degree of flexibility without considering its elements. In our opinion, the following resources should become the main points of research of overall manufacturing flexibility: technical, technological, personnel and financial. These particular elements should be diagnosed to obtain a synergistic effect in assessing the degree of manufacturing flexibility.

At the same time, there should be an increased focus on the fact that production activity will be flexible only then when every single element of it can be characterized by a given property since the production of goods requires the participation of all the elements of manufacturing. In case an individual element lacks flexibility it is then excluded from the technological process of manufacturing new goods, and, accordingly, the possibility of implementing this process disappears.

The main reasons why business leaders focus their attention on the flexibility level improvement and achievement are determined and indicated below.

1) flexibility is the production process ability both to adapt to the consumers' needs and to introduce new technologies, work organization as well as production advanced methods. Therefore, these characteristics will reduce time and costs for the equipment readjustment in the production of the wide range of products.

2) some practices, proving businesses whose features are most prone to changes in the production process and economic performance in general, are characterized by some lower specific costs incidental to the manufacture of existing or new products.

3) the achievement of any product competitiveness is impossible without any production cost lowering due to some technical and technological re-equipment and to the release of new products having significant demands among consumers.

4) the flexibility rate of the production processes and enterprises as a whole, largely, depends on the ability to absorb innovations and adopt them to the market needs reducing the cost and price for products in quick changes of their types.

5) some flexibility lack makes impossible to utilize and develop the intellectual potential of the company in full and as a result to have an effect on the product and enterprise competitiveness.

To analyze the manufacturing flexibility, it is necessary to improve the methodology for assessing it. This will, therefore, give a chance to identify existing problems and bottlenecks, to comprehensively reveal the state of flexible manufacturing and to suggest ways of achieving it. Figure 1 illustrates the procedure for assessing the manufacturing flexibility of an enterprise.

The given method was approbated in the state forestry enterprises of Ukraine. Now, the forest sector as a business activity is characterized by the critical state: the state of forests does not meet the economic and

environmental requirements, the forest area has declined more than tripled for the last millennium, the anthropogenic reorganization of forest landscapes occurs, their natural productivity is constantly reducing, and biodiversity is depleting. Excessive logging depletes forest plantations whose natural protective functions are below the potential.

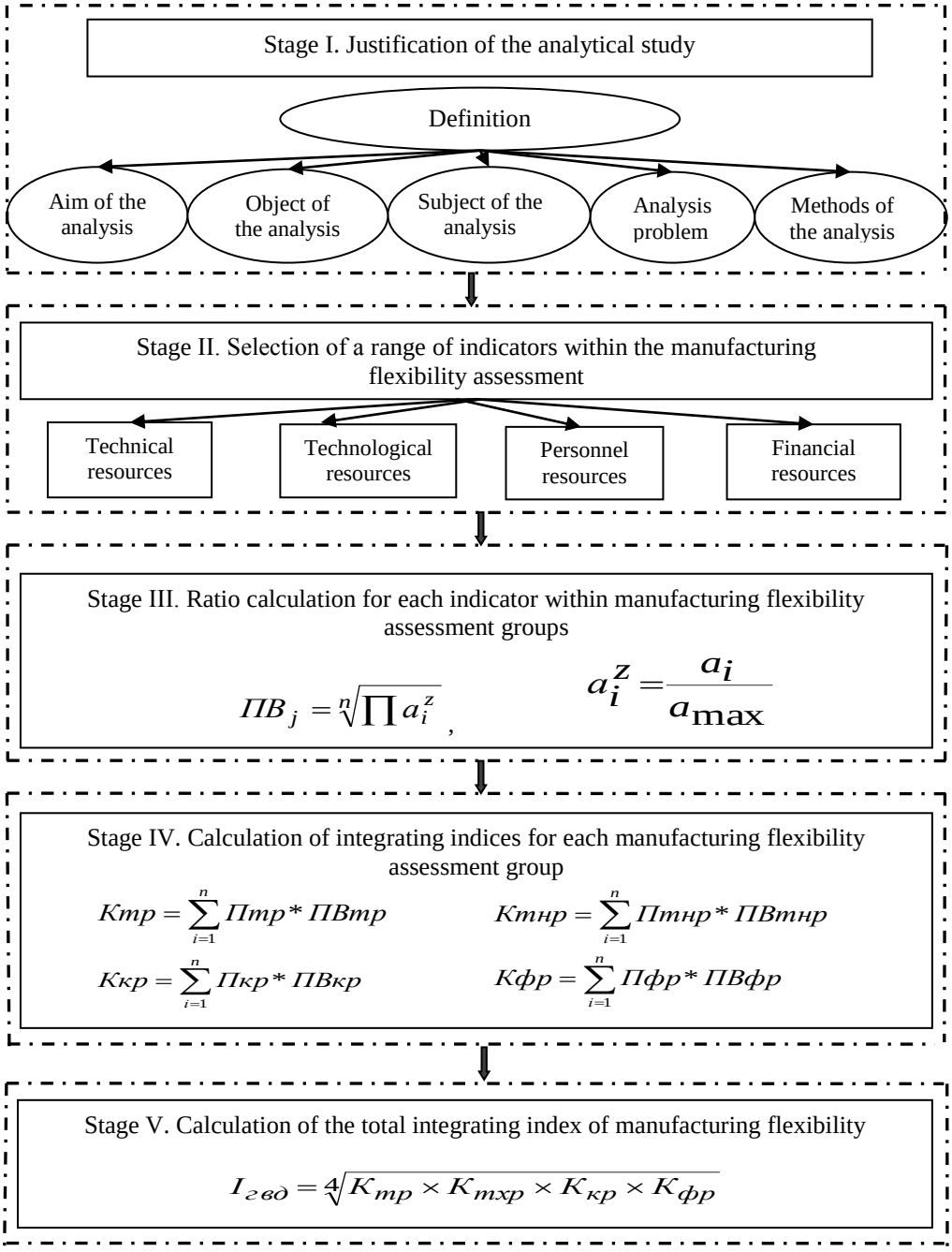


Figure 1. *Procedure for assessing production flexibility of an enterprise*
Source: [6]

where $ПВ_j$ stands for ratio of the *i*-indicator of the *j* assessment group;

n – stands for number of indicators in the group;

a_i^z – standardized indicator value, calculated as the ratio of the indicator's actual value to the maximum value of the *i*-indicator;

$К_{тр}$, $К_{тнр}$, $К_{кр}$, $К_{фр}$ – integrating group index by resource type (technical, technological, personnel and financial respectively);

$П_{тр}$, $П_{тхр}$, $П_{кр}$, $П_{фр}$ – indicators of various groups by resource type (technical, technological, personnel and financial respectively);

$ПВ_{тр}$, $ПВ_{тхр}$, $ПВ_{кр}$, $ПВ_{фр}$ – indicators ratio by resource type (technical, technological, personnel and financial respectively).

$Ігвд$ – integrating index of manufacturing flexibility;

$К_{тр}$ – integrating group index of technical resources;

$К_{тнр}$ – integrating group index of technological resources;

$К_{кр}$ – integrating group index of personnel resources;

$К_{фр}$ – integrating group index of financial resources.

The main characteristic feature of the forestry enterprises is in the peculiarities of their industrial activity impact on the environment. If the industrial plants are producing wealth by the destruction of the environment in one way or another, the activities of forestry enterprises, by contrast, is aimed at the environment improvement because of the fact that forests are not only raw materials of any industry, but also they carry out some multilateral creating functions. We can expect to get a positive effect outside the forestry sector through the preservation, enhancement and management of forest resources.

The total area of forest land Ukraine is amounts to 10.4 mln. hectares. Forests of Ukraine by its location and purpose perform mainly environmental (water conservation, safety, sanitation, health and other) functions and have limited operational purpose [7].

Subordinate State Forest Resources Agency of Ukraine as a central executive body in the field of forestry and hunting, is 73% (7.6 mln. hectares) of forests Ukraine [7].

Key points of the State Forest Resources Agency economic activities are:

1) logging as the main forest management in terms of the society needs in forest resources and which must take into account the forest management principles, such as continuity, sustainable forestry and rational use of available resources. Particular attention should be paid to the preservation of forest areas, improvement of their state and expanded reproduction of forests;

2) processing of wood which is not a complex activity, as most enterprises possessing the woodworking shops, forest resources and use them uneconomically, in other words they throw the cast around. As a result of timber harvesting, a large quantity of wood wastes which are so-called secondary raw materials of any forestry activities can be used as a raw resources in the process of making different types of products;

3) marketing of forest products is carried out both internally and externally at markets. The main attention is paid to forestry enterprises exporting forest products and in their turn contributing to the development of enterprises, providing the opportunity to expand some production capacity and improving the overall financial position.

Forest management is implemented by state enterprises (permanent forest users) who are responsible for the full range of forest work - planting of forests for the felling.

As of 01.01.2016 State Forest Resources Agency of Ukraine administers 364 objects of state property of which 323 are functioning; 15 are being reorganized, liquidated; 2 are newly-formed and have not yet begun economic activity; 15 are located on the temporarily occupied territory of Crimea and the city of Sevastopol; 5 state enterprises are situated within Donetsk and 4 within Luhansk Regional Forestry and Hunting Administrations – the territories which are not controlled by state authorities [7].

To analyze the manufacturing flexibility, we have selected the top 10 enterprises as to their market share index. This group includes forestry enterprises of Kyiv, Zhytomyr, Ivano-Frankivsk and Lviv regions. This is primarily due to their geographical location, climatic conditions and the availability of raw materials.

The results of calculating the integrating manufacturing flexibility index (hereinafter: $І_{гвд}$) of the forestry enterprises and their interpretation are presented in Table 1.

Thus, a cluster of some high flexibility, in our opinion, should be characterized by the best indicator values in each group of indicators and the close degree of the utilization of available resources to technically reasonable quantities.

The cluster of some sufficient flexibility has indicator values, which are close to the available limits, but economic, technical and technological capabilities increase in the business entity efficiency.

Indicators making possible to relegate the enterprises into the inflexible cluster, which are characterized by values limiting the production flexibility integral index. Some decrease is seen in the production due to some aging of technical and technological means, the reduction of staff and as a consequence – the downfall of the key financial indicators.

Table 1

Results of calculating manufacturing flexibility of forestry enterprises of Ukraine, 2012-2018

Enterprise	Years						
	2012	2013	2014	2015	2016	2017	2018
1	2	3	4	5	6	7	8
SE “Brody Forestry ”	0,681	0,682	0,668	0,593	0,630	0,621	0,631
SE “Teterivske Forestry”	0,707	0,688	0,684	0,603	0,553	0,561	0,574
SE “Bilikorovychi Forestry”	0,714	0,740	0,664	0,760	0,745	0,750	0,756
SE “Horodnytsia Forestry”	0,717	0,632	0,744	0,660	0,649	0,657	0,660
SE “Slovechne Forestry”	0,647	0,637	0,553	0,521	0,603	0,594	0,612
SE “Radomyshl Forestry”	0,711	0,716	0,720	0,718	0,722	0,728	0,730
SE “Vyhoda Forestry ”	0,629	0,633	0,668	0,541	0,568	0,578	0,580
SE “Korostyshiv Forestry”	0,658	0,661	0,669	0,638	0,640	0,648	0,651
SE “Malyn Forestry ”	0,618	0,625	0,633	0,640	0,634	0,629	0,631
SE “Osmolodske Forestry ”	0,627	0,557	0,591	0,512	0,526	0,533	0,547

	$0,659 \le I_{гвд} \le 1$	high flexibility cluster
	$0,547 \le I_{гвд} < 0,659$	sufficient flexibility cluster
	$0,434 \le I_{гвд} < 0,547$	inflexible cluster
	$I_{гвд} < 0,434$	cluster of crisis state

Source: Calculated by author

The cluster in crisis state is characterized by minimal values of the integral index of some flexibility, recession, the limit of natural resources and the potential lost for the production.

Thus, the results of the study show that most enterprises rest within high flexibility or sufficient flexibility clusters, whereas only two forestry enterprises are ranked as inflexible. Thus, Radomyshl Forestry and Bilikorovychi Forestry State Enterprises maintain a stable position in a cluster of high flexibility over the analyzed period; Slovechne Forestry and Malyn Forestry - in a cluster of sufficient flexibility. All other forestry enterprises are characterized by a variable integrating manufacturing flexibility index.

The present-day development of the market economy, the limit of available resources, the available risks of the external and internal environment of enterprise activities, the intense level of some competition at the market, determine the leaders’ need in search of the unique and specific business tools led to some effective advancement of each industrial activity.

Under such conditions, there is a need in the effective use of lever mechanisms in the industrial management. This issue is particularly important for enterprises belonging to the forest sector, where the nature of business processes is a considerable length of the production cycle, during which several entities managing by it are changed. Thus, it is difficult to control and regulate the production process and its outcome, the implementation of production under natural conditions as all of the mentioned before depend on these conditions. In general, this transition will lead to the development of such organizational and economic measures because of their flexibility that will be considered as a complex control system.

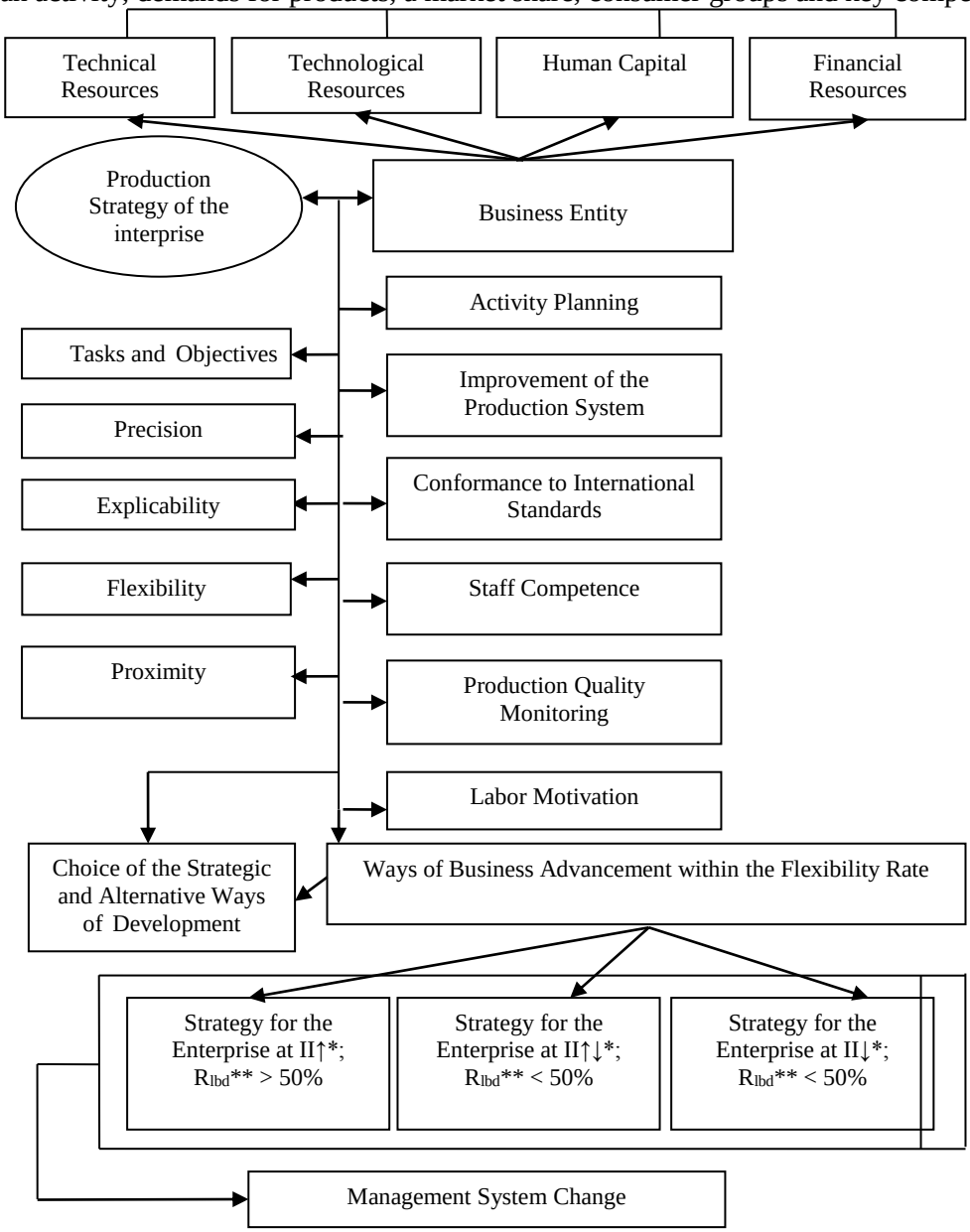
As is evident from the foregoing, all of the functions performing by the enterprise must exist to provide the management system with the production activities in the enterprise, and some primary information about the market environment shall be available with taking into account factors influencing on the necessary resources and flexibility.

We believe that management strategy of enterprises belonging to the forestry sector, in particular, their industrial activity, should consider a combination of approaches, principles of activities, available resources and their effective use to achieve some objectives. However, it should be flexible and modified according to the requirements of the market environment, and ready to adapt in time to future circumstances unaccounted before, and mutually coordinated with achieved indicators, factors and consistent with the purposes and

goals of the enterprise.

To develop a production strategy, like any development strategy, the companies must have some reliable information about the economic situation of the market, the degree of the competition at this market, the possibility of fluctuations in supply and demand, advantages and disadvantages of the investigated activities of any entity.

It should be noted that the choice of the production strategy cannot take into consideration a single index, and respectively, choosing such a strategy, the management staff should take into account the volume of such an activity, demands for products, a market share, consumer groups and key competitors, etc.



* II – integral index of the production flexibility

** R_{lbd} – likelihood ratio of business development

Figure 2. *Cycle of the Production Strategy Development of Enterprises Belonging to the Forestry Sector*

Source: Developed by author

The industrial strategy implementation should be helpful in the settlement of some economic, social and environmental issues, namely, in the guarantee of the maximum possible forest resources and forest

management regulation, promotion of the social and cultural sphere evolution, the conservation of forests, and the improvement of their conditions for the fields of economy.

Taking into account these factors, a sequence of the production strategy advancement for enterprises belonging to the forestry sector has been offered within the framework of the flexibility rate, and the likelihood of its growth (Figure 2).

However, the likelihood of the threat shall be expected when we talk about the delayed deliveries of products, some low quality of timber products set by technological and economical standards, the optimal size of invested funds and resources because of this manufacturing strategy.

To choose the strategy, initially, the likelihood range of the enterprise development is calculated under the formula:

$$Rlbd = \frac{n}{N} * 100\ \%\ , \qquad (1)$$

where n – a number of indicators constantly increasing; N – the total number of indicators, which are used.

Calculating the likelihood range of the State Enterprise "Brody Forestry Enterprise", based on the moving average method during the period from 2012 up to 2018, it has been found out only 18 from 31 indicators of flexibility of the production activities which will be increased. Thus, the development of the district forestry will be equal to:

$$Rlbd = \frac{18}{31} * 100\% = 58{,}06\%$$

Thus, the probability of the industrial activity advancement of the investigated enterprise will be equal to 58.06% in the future.

These calculations, as well as variation in the integrating index of flexibility and the strategy for achieving the manufacturing flexibility of forestry enterprises, are presented in Table 2.

Table 2

Strategies for achieving manufacturing flexibility of forestry enterprises

Enterprises	II	R_{lbd}	Strategies
1	2	3	4
SE “Brody forestry ”	II↑	$R_{lbd} > 50\%$	The strategy of a moderate expansion envisages some increase in the production volume of existing products, the release of new products, as well as the new markets and some technology evolution.
SE “Radomyshl forestry”	II↑	$R_{lbd} < 50\%$	
SE “Bilikorovychi forestry”	II↑↓	$R_{lbd} > 50\%$	Any strategy of the internal diversification is characterized by remaining strong stable market positions, as well as by using some existing capacities of the tapped market and the upgrading technological production base.
SE “Horodnytsia forestry”	II↑↓	$R_{lbd} > 50\%$	
SE “Slovechne forestry”	II↑↓	$R_{lbd} > 50\%$	
SE “Teterivske forestry”	II↑↓	$R_{lbd} < 50\%$	The strategy strengthening market positions lies in maintaining the constant search of new consumers, consumer groups and some increase market share. The market development strategy involves the search for new product markets for existing products.
SE “Korostyshiv forestry”	II↑↓	$R_{lbd} < 50\%$	
SE “Malyn forestry ”	II↑↓	$R_{lbd} < 50\%$	
SE “Vyhoda forestry”	II↑	$R_{lbd} < 50\%$	The diversified growth strategy includes the strategy of the horizontal diversification aimed at changing product types in some markets or market activity changes.
SE “Osmolodske forestry”	II↑	$R_{lbd} < 50\%$	

Source: Compiled by the author

Such manufacturing strategies, in our opinion, should be backed by a sustainable use of available resources in order to increase production, expand the technological capabilities of production while using the available technical and technological base, proper qualification and training of personnel, financial resources, and with a due account of the degree of manufacturing flexibility and the likelihood of its increase.

Achieving the necessary level of flexibility will provide an opportunity to introduce the production process of scientific and technological progress, which in turn will affect the reduction or avoidance of wasteful consumption of material resources, will stimulate the accumulation of available internal resources and reserves of efficiency of industrial activity.

Conclusions. Summarizing the above, it should be noted that flexibility has to become one of the defining characteristics of not only the activities of forestry enterprises, but also of any other business. This will facilitate the adoption of managerial decisions regarding the opportunities and growth directions of each enterprise.

Diagnostics of manufacturing flexibility of Ukrainian forestry enterprises in accordance with a certain algorithm will allow reaching the approved development plan taking into consideration the flexible state of technical, technological, personnel and financial resources, which will ultimately lead to positive results.

Thus, we can state that flexibility of manufacturing activities of any enterprise is the key factor of their effective implementation, which leads to the adaptable and resilient production structure and, as a consequence, an enterprise as a whole.

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Стаття надійшла до редакції 06.04.2020 р.