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Modeling of an effective strategy of the process of product implementation with reference to seasonality

Abstract. *Introduction.* It is impossible to solve actual economic problems of enterprises without building strategies and forecasting the results of their functioning. A well-established implementation process increases product demand, competitiveness, as well as improves the image of the company and financial stability in general. Particular attention should be paid to studying the impact of seasonality. In this context, special attention should be paid to the activity of enterprises that sell light industry products, such as blankets and plaids, because this industry is also impacted by seasonal fluctuations that a specific nature, which is a consequence of both changes in nature and human needs. Therefore, when considering the variability of consumer demand, the presence of a large number of enterprises of different forms of ownership, increasing uncertainty and the existence of many risks, it is important to form an effective implementation strategy, which is a general plan for achieving the aims. *The purpose* of the article is to analyse the impact of factors relating to the process of selling light industry products and propose a model of strategy to increase its efficiency, taking into account seasonality. *Results.* The authors of the research have formed an algorithmic model of construction of the implementation process with the consideration of the factors increasing its efficiency. The practical aspect of its application is given on the example of the enterprise with foreign capital, which sells products of light industry with regard to seasonality. The conducted analysis made it possible to determine the forecast amount of proceeds from sales of production for each quarter of 2019, as well as to define the lower and upper limits of the forecast. *Conclusions.* The application of the proposed model in order to forecast revenue from sales of enterprise products with regard to seasonality will make it possible to increase the efficiency of the implementation process, eliminate existing risks and streamline management of the specified process in certain quarters in the context of seasonal fluctuations.
Keywords: Process of Implementation; Products; Factor of Seasonality; Algorithmic Model; Strategy; Forecast Indicators
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Моделювання ефективної стратегії процесу реалізації продукції з урахуванням фактору сезонності

Анотація. У статті досліджено чинники впливу на ефективність реалізації в контексті процесно-орієнтованої системи ведення діяльності на підприємстві. Особливу увагу приділено визначенню впливів фактору сезонності на прикладі підприємств, які реалізують продукцію легкої промисловості (ковдри та пледи). Ця галузь обрана об'єктом дослідження, оскільки їй притаманний вплив сезонних коливань, який є наслідком як змін природних умов, так і людських потреб. Визначено індекси сезонності на прикладі підприємства з іноземним капіталом для здійснення прогнозу виручки від реалізації продукції з урахуванням сезонних коливань. Використано метод аналітичного вирівнювання за рівнянням прямої. Результатом проведеного аналізу є побудова моделей для прогнозу виручки від реалізації продукції в розрізі кварталів. Визначено прогнозний обсяг виручки від реалізації продукції підприємства для кожного кварталу 2019 р., а також нижню і верхню межі прогнозу. Проведені розрахунки показують, що найменшу виручку у сумі 3671 тис. грн. (111,99 тис. євро, за курсом станом на 28.08.2018 р.: 1 EUR – 32,78 UAH) підприємство отримає у другому кварталі, що підтверджують значення нижньої та верхньої меж прогнозу, які цього кварталу є найвищими – 20119 тис. грн. (613,76 тис. євро, за курсом станом на 28.08.2018 р.: 1 EUR – 32,78 UAH) та 27462 тис. грн. (837,77 тис. євро, за курсом станом на 28.08.2018 р.: 1 EUR – 32,78 UAH) відповідно. Найбільший дохід слід очікувати у четвертому кварталі у розмірі 6627 тис. грн. (202,16 тис. євро, за курсом станом на 28.08.2018 р.: 1 EUR – 32,78 UAH). Усі використанні методи та елементи сформовано у алгоритмічну модель побудови процесу реалізації в напрямку збільшення його ефективності.
Ключові слова: процес реалізації; продукція; фактор сезонності; алгоритмічна модель; стратегія; прогнозні показники.

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Моделирование эффективной стратегии процесса реализации продукции с учетом фактора сезонности

Аннотация. В статье исследованы факторы влияния на эффективность реализации в контексте процессно-ориентированной системы ведения деятельности на предприятии. Особое внимание уделено определению влияния фактора сезонности на примере предприятий, реализующих продукцию легкой промышленности (одеяла и пледы). Данная отрасль выбрана объектом исследования, поскольку ей также присуще влияние сезонных колебаний, которое является следствием изменений как природных условий, так и человеческих потребностей. Определены индексы сезонности на примере предприятия с иностранным капиталом для осуществления прогноза выручки от реализации продукции с учетом сезонных колебаний. Использован метод аналитического выравнивания по уравнению прямой. Результатом проведенного анализа является построение моделей для прогноза выручки от реализации продукции в разрезе кварталов. Определены прогнозный объем выручки от реализации продукции предприятия для каждого квартала 2019, а также нижний и верхний пределы прогноза. Проведенные расчеты показывают, что наименьшее выручку в сумме 3671 тыс. грн. (111,99 тыс. евро, по курсу на 28.08.2018 г.: 1 EUR – 32,78 UAH) предприятие получит во втором квартале, подтверждающие значение нижней и верхней границ прогноза, которые этого квартала являются самыми высокими – 20119 тыс. грн. (613,76 тыс. евро, по курсу на 28.08.2018 г.: 1 EUR – 32,78 UAH) и 27462 тыс. грн. (837,77 тыс. евро, по курсу на 28.08.2018 г.: 1 EUR – 32,78 UAH) в соответствии. Наибольший доход следует ожидать в четвертом квартале в размере 6627 тыс. грн. (202,16 тыс. евро, по курсу на 28.08.2018 г.: 1 EUR – 32,78 UAH). Все использованные методы и элементы преобразованы в алгоритмическую модель построения процесса реализации в направлении увеличения его эффективности.

Ключевые слова: процесс реализации; продукция; фактор сезонности; алгоритмическая модель; стратегия; прогнозные показатели.

1. Introduction

The purpose of any enterprise's activity is the sale of finished products, execution of works, provision of services and, eventually, generation of profits. The transformation processes of the economic system require continuous development and improvement of the enterprise management system, search for and application of the latest advanced methods and tools aimed at ensuring the negative impact of various factors on the performance of the enterprise. It is impossible to solve actual economic problems of enterprises without building strategies and forecasting the results of its functioning. A well-established implementation process ensures increasing demand for products, competitiveness and image of both the company and the overall financial stability. Therefore, when considering the variability of consumer demand, a large number of enterprises of different forms of ownership, increasing uncertainty and the existence of many risks, it is important to form an effective implementation strategy, which is a general plan aimed at achieving the goals.

2. Brief literature review

In economic literature, there are many scientific works by domestic experts who investigate the implementation of finished products at enterprises. Special attention is paid to the issue of accounting for and selling finished products, substantiation of expences relating to their storage, marketing strategies, formation of pricing, etc.

Among the foreign scientists who researched issues relating to the sale of products, including problems of sales management and decision analysis, we should mention T. N. Ingram, R. W. La Forge, M. R. Williams and C. H. Schwepker Jr. (2015) [1]. T. T. Nagle and G. Müller (2017) [2] are investigating the choice of pricing methods in the direction of profitability growth. F. M. Belz (2017) [3] focuses on sales growth in the context of increased product productivity, S. Malininas, V. Docienė, J. Daubarienė and A. Vaitiekus put forward recommendations for improving the management of product sales (2017) [4]. However, the above listed works, in general, have a marketing character.

A. Kumar, A. Adlakha and K. Mukherjee (2016) [5] conducted a study that provides valuable information on how to use real time sales data to develop a dynamic automated model to stimulate product sales and strategies for lowering prices using fuzzy logic for retail. However, the article does not contain relevant empirical data for testing models. Considering the research approach, the research findings can only be valid for the selected product category.

Despite the large number of scientific works, the issue of improving the effectiveness of the implementation process, as the basis of the company's activities in the direction of profit, remain poorly developed. According to Cater and Pucko (2010) [6], the implementation of strategies was a key factor in the emergence of strategic management at the end of the twentieth century. Therefore, it is important to study the properties of an effective implementation strategy. The problem of modeling sales strategies using a combination of analytical and economic and mathematical methods of forecasting the outcome of the sales process, by taking into account impact factors of different levels, deserve detailed justification.

3. The purpose of the article is to analyse the impact of factors relating to the process of selling light industry products and propose a strategy model to increase its efficiency with regard to seasonality.

4. Results

For a production enterprise, the receipt of a finished product usually has a cyclic continuous character. The cycle of obtaining the result of entrepreneurial activity is characterised by three main processes: supply, production and sales itself. The process approach to the company's activities is a theoretical basis to identify business process perspectives as part of the strategic development of the enterprise. Economic processes taking place in entrepreneurial activity are a set of similar types of operations that are aimed at fulfilling a certain economic task. That is, the interaction of material, technical, labour and financial resources, which results in the creation of products, performed work or provided services.

However, in scientific and educational literature, everything is limited, mainly, to the selection of the three main economic processes - supply, production, implementation.

All means of enterprises are aimed at ensuring the profitability of the implementation process as the basis of activity. A group of scientists at the German Technical University, namely A. Myrodia, K. Kristjansdottir and L. Hvam (2017) [7], analysed the impact of the implementation of thde product configuration system (PCS) on improving the accuracy of cost calculations and improving product profitability. Companies that have implemented the PCS have made significant advances in order to better control their products range, make the right decisions at the stage of sales, and increase sales of the best products.

Thus, it is necessary to form a reasonable range of products for each activity, which can positively affect overall

profitability. We consider the level of profitability by type of economic activity in Ukraine.

The data in Table 1 indicate ambiguous fluctuations in the profitability level of the implementation of activities. This fact is explained by the impact of various features that accompany the functioning of enterprises of various sectors of the economy. J. Pollack and D. Adler (2016) [9] prove the existence of a relationship between the effectiveness of project management, the use of information technology and profitability of sales. P. Turyakira, E. Venter and E. Smith (2014) [10] tested the correlation between factors that affect the level of competitiveness of small and medium-sized enterprises in the long run, such as increased sales volumes, growth rates and shares market, on the basis of which they formed recommendations on how to improve the profitability of the enterprise.

Tab. 1: **Cost-effectiveness of the sales process of enterprises by types of economic activity for 2012-2017**

	Level of profitability (loss), %					
	2017	2016	2015	2014	2013	2012
Total	8.9	7.4	1.0	-4.1	3.9	5.0
agriculture, forestry and fishery	22.7	32.4	41.7	20.6	11.3	21.7
industry	***6.6***	***4.2***	***0.9***	***1.6***	***3.0***	***3.4***
including light industry	***5.6***	***7.7***	***7.3***	***2.2***	***3.8***	***3.0***
building	1.8	-0.4	-7.6	5.8	0.0	-0.1
wholesale and retail trade	19.4	15.8	-0.9	-12.8	10.2	12.2
information and telecommunications	13.6	8.5	0.5	-1.6	11.8	10.5
financial and insurance activities	2.2	-4.8	-8.9	-15.2	5.9	6.1
real estate transactions	7.4	-8.1	-33.4	-46.9	3.1	2.8
scientific and technical activities	19.2	17.6	-1.1	-29.1	-1.3	0.3
health care	3.3	4.5	-0.6	-3.7	3.1	2.7
other services	0.6	5.1	7.3	-1.0	-0.9	2.6

Source: Compiled by the authors based on [8]

Thus, the construction of an effective sales process in the long run is ensured by taking into account the factors impacting the volume of sales and, as a consequence, the size of sales proceeds. To build an effective strategy in terms of the sales process, it is necessary to take into account a number of factors. They are listed below.

1. Exogenous factors (the state of commodity and market conditions, fluctuations in demand and supply, changes in demand elasticity, market price movement, changes in the intensity of competition, transformation of the institutional segment).
2. Endogenous factors (the amount of production costs; sales volume; the market share of a certain enterprise; the quality and competitiveness of goods; human capital (competence of personnel, labour productivity); strategy and pricing policy at the enterprise; the technical and organisational level of production).

At the same time, innovation and social development have caused the emergence of new factors affecting the company's operations, such as intermediary online sales orientation (N. Hu, N. S. Koh and S. K. Reddy, 2014; K. Cao, J. Wang, G. Dou and Q. Zhang, 2018) [11-12], corporate health (C. C. Ngwakwe, 2017) [13], product exclusivity and its design presentation (V. Mirabi, H. Akbariyeh and H. Tahmasebifard, 2015) [14].

One of the important factors that can lead to fluctuations in the effectiveness of the sales process is the factor of seasonality. From a managerial point of view, seasonal models carry valuable information for enterprise executives. This information can be used to answer short-term demand issues as well as inventory management issues.

Most often, this factor takes into account enterprises of such types of economic activity, where seasonality occurs only due to natural conditions (agriculture and forestry). However, there are industries where seasonality can not be accurately predicted, since its occurrence is unpredictable. For example, predicting sales, the researchers determined the seasonal index of the print media industry (A. M. Garcia, G. Pak, F. Oduro, D. Thompson, K. Erazo and J. Gilkey Jr, 2017) [15], sales of vehicles (M. Sivak and B. Schoettle, 2017; L. Yang and B. Li, 2017) [16-17]. We think that the factor of seasonality has a significant impact on the process of sales of products in light industry. This assumption will be considered on an example of the implementation of blankets and plaids classified within the Harmonized Commodity Description and Coding System (HS). In the world and in Ukraine the following HS codes are used as indicators of road plaids and blankets trade:

- 6301 20: Blankets and road plaids of wool or fine animal hair;
- 6301 30: Blankets and road plaids of cotton;
- 6301 40: Blankets and road plaids of synthetic fibers;
- 6301 10: Electric blankets;
- 6301 90: Other blankets and road plaids, of which other fibers may include other fibers of animal origin (for example, silk), other fibers of vegetable origin (for example flax, hemp, eucalyptus fibers) and artificial fibers (for example, bamboo, viscose) [18].

In 2015, Ukraine ranked 34th among exporters of blankets and plaids and exported USD 6.2 million worth of these goods, which is 0.1% of the total exports of blankets and plaids in the world. The dynamics of export deliveries of blankets and plaids to the world market by Ukraine is positive. In particular, in 2001, on the world market, Ukraine supplied blankets and rugs to the amount of USD 34 thousand. In 2002, the amount was USD 36 thousand, whereas in 2015, the figure reached USD 6.2 million. In 2017, the export of blankets and plaids amounted to USD 8,195.2 thousand, which is 18.2% more than in 2016 [8].

Tab. 2: **Comparative characteristics of products of the largest producers of sub-industry**

Products	Manufacturer	Quality	Price UAH (EUR*)	Quantity	Assortment
Blankets	Billerbeck	high	400-3,800 (12.20-115.92)	209	Sheep wool, camel wool, cashmere, bamboo, cotton, silk tuju, down, viscose, eucalyptus
	Ecopuh	high	188-4,680 (5.73-142.77)	136	Down
	Gedeon	medium	100-800 (3.05-24.41)	50	Sintepon
	Hoteline	high	133-3,076 (4.06-93.84)	70	Calico, Satin, cotton, tech, polyester
	IGLEN	high	200-2,600 (6.10-79.32)	205	Down, woolen, polyester, duet
Pillows	Billerbeck	high	37-1,400 (1.13-42.71)	233	Down feather, antiallergenic, orthopedic, with ointment cover, couch
	Ecopuh	high	140-2,000 (4.27-61.01)	104	Down, semipulmonary, feathered
	Gedeon	medium	60-450 (1.83-13.73)	20	Sintepon, bamboo, silk
	Hoteline	medium	50-500 (1.52-15.25)	30	Sintepon, silicone, silk, fdown, bamboo
	IGLEN	high	130-1,800 (3.97-54.91)	101	Down feather, orthopedic, woolen,
Rugs	Billerbeck	high	450-2,000 (13.73-61.01)	200	Various types of fabrics
	Ecopuh	high	130-300 (3.97-9.15)	50	Woolen, cotton, poncho, fleece
	Gedeon	high	140-1,000 (4.27-30.50)	152	Acrylic, bamboo, cotton, wool, myrofiber
	Hoteline	medium	150-250 (4.57-7.63)	45	Woolen, cotton

Note: * - converted to EUR according to the exchange rate on 28/08/2018: EUR 1 - UAH 32.78.

Source: Authors' own research

The production of this type of products is carried out by more than a dozen of Ukrainian enterprises, the largest of which are listed in Table 2.

According to Table 2, we can conclude that the German family company, the Billerbeck feather and down factory, takes a significant place among manufacturers and exporters of blankets and rugs. Today TM Billerbeck products are sold in Germany, Switzerland, Hungary and Ukraine. Representations of the company are open all over the world.

Since the company Billerbeck Ukraine manufactures not only pillows and mattress covers, but also has a large share in manufacturing of blankets of different grades, which are most often sold in the autumn and winter period, it can be argued that its activity is affected by seasonality. Therefore, when analysing the results of the factory, and especially when planning production and sales indicators, one should take into account not only the market conditions, the presence of factors of production, but also the seasonal nature of the production itself. This will allow the optimal use of labour and other enterprise resources.

The analysis of seasonal fluctuations, as a rule, is carried out by calculating the seasonal indexes based on the average values of the investigated indicator. However, in addition to seasonal fluctuations, the results of Billerbeck Ukraine have a certain tendency to changes. Therefore, when analysing them, it is necessary to neutralise the trend change. This will allow us to forecast the performance of the feather and down factory for the future, taking into account seasonal fluctuations, and contribute to more efficient management of the enterprise.

The methodology of analysis of seasonal fluctuations and forecasting consists of several stages of work. Firstly, we will calculate the seasonal Billerbeck Ukraine indexes based on quarterly sales revenue for the period of 2014-2017, using the method of the ratio of simple average values by the formula (1):

$$Is = \frac{\bar{Y}_i}{\bar{Y}_{total}} \times 100\%, \quad (1)$$

where:

$\bar{Y}_i$ - the average indicators of sales revenue, which we calculate for each quarter according to the data of the last 4 years;

$\bar{Y}_{total}$ - the average indicator of sales revenue, which we will calculate for all the initial data.

The results of the calculations of seasonal indices based on formula (1) are presented in Table 3.

The results of the calculations in Table 3 show the highest values of the seasonal index in the 4th quarter - 31.5%, which means that in the autumn and winter period, which is associated with high demand for feather and down products, as well as in the first and third quarters the indicators are almost identical. In the summer (II) quarter we see the lowest index of seasonality - 17.2%. If we consider the calculations carried out by us graphically, then we will see the so-called seasonal wave of the analysed index (Figure 1).

To carry out further forecast of proceeds from product sales in terms of seasonal fluctuations, we use the method of analytical equalization by the equation of the line:

$$\hat{Y} = a_0 + a_1 t, \quad (2)$$

where t is the serial number of each quarter (time factor) for the four consecutive years.

The parameters a_0 and a_1 of the model (2) are the least squares method. After calculations we obtained the following trend equation:

Tab. 3: **Calculation of the seasonality indices of proceeds from sales of the enterprise «Billerbeck Ukraine Feather and Down Factory» for 2014-2017**

Quarter	Revenues from sales of products (UAH thousand)*				Total for 4 years UAH thousand	On average, UAH thousand (Y_i)	Indices of Seasonality, % (I_s)
	2014	2015	2016	2017			
1	*2*	*3*	*4*	*5*	*6=2+3+4+5*	*7=6/4*	*8*
I	6,371.5	5,455.5	6,502.0	4,988.4	23,317.4	5,829.35	25.7
II	3,642.2	4,104.8	4,344.5	3,461.2	15,552.7	3,888.18	17.2
III	5,521.1	6,021.2	5,640.3	5,932.5	23,115.1	5,778.78	25.5
IV	7,469.4	6,606.4	6,990.2	7,478.8	28,544.8	7,136.20	31.5
Total	23,004.2	22,187.9	23,477.0	21,860.9	90,530.0	Y_{total}= 22,632.51	–

Note: * - converted to EUR according to the exchange rates:
EUR 1- UAH 10.93 (2014); EUR 1- UAH 18.64 (2015); EUR 1- UAH 25.57 (2016); EUR 1- UAH 28.72 (2017).

Source: Calculated by the authors based on the financial statements of Billerbeck Ukraine

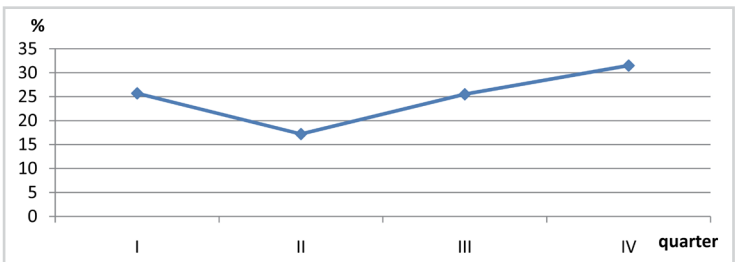

Fig. 1: **Seasonal wave of proceeds from the sales of Billerbeck Ukraine products in 2014-2017**
Source: Compiled by the authors

$$\hat{Y}t = 22632.51 + 228.61t. \quad (3)$$

If we substitute the t value in equation (3), we obtain the theoretical series of the indicators of revenue from sales of products ($\hat{Y}t$). The results of calculations are given in Column 2 of Table 4. Seasonal (seasonal wave) indices are defined as the percentage of actual (empirical) and theoretical (calculated on the basis of the trend equation) indicators of revenue from sales of products. The calculation results are given in Column 3 of Table 4).

The seasonal wave will help to predict the activity of the enterprise. After all, the possibility of timely consideration of the factor of seasonality provides favourable conditions for the future effective functioning of the entity. To calculate the forecast values, we use the following forecast model [19, 210]:

$$Y't = I_k \hat{Y}_t, \quad (4)$$

where:

$Y't$ - the forecast value of sales proceeds at time t;

I_k - the average seasonal index of k quarter;

$\hat{Y}_t$ - the estimation of value of proceeds from sales of products at time t.

Calculated on the basis of this model, the forecast value of proceeds from sales of products, with a certain probability, will differ from actual values by the value, which represents the width of the interval of the predicted values of the analysed index:

$$t\frac{\sigma_{\varepsilon t}}{\sqrt{n}}, \quad (5)$$

where:

t is the given coefficient of confidence, which guarantees with a certain probability the prognosis boundary;

n - the number of years in the sample;

The mean square deviation of the random component is calculated by the following formula:

$$\sigma_{\varepsilon t} = \sqrt{\frac{\sum {\sigma_{\varepsilon t}}^2}{n-1}}. \quad (6)$$

The width of the interval of the forecasted values of sales proceeds by formula (6) for each quarter will be determined with a probability of 0.954 ($t = 2$), which is optimal for such calculations. In addition, we define the average (for each quarter) seasonal indexes as simple average arithmetic of the seasonal indices given in column 3 of Table 4. The results of calculations are given in Table 5.

The calculation of dispersions $\sigma_{\varepsilon t}{}^2 = \sum_{t=1}^{n}(Yt - \hat{Y}t)^2$ was carried out according to the data of Table 4, and we subsequently summed up the quarterly figures. The results of these calculations are given in Column 2 of Table 5. Having calculated the average quarterly seasonal indicators (Column 1 of Table 5), we obtained the models to forecast sales proceeds from sales of the quarters:

Model for the first quarter:
$\hat{Y}_{t\,I} = 0.242\ (22632.51 + 228.61t)$;

Model for the second quarter:
$\hat{Y}_{t\,II} = 0.159\ (22632.51 + 228.61t)$;

Model for the third quarter:
$\hat{Y}_{t\,III} = 0.234\ (22632.51 + 228.61t)$; (7)

Model for the fourth quarter:
$\hat{Y}_{t\,IV} = 0.242\ (22632.51 + 228.61t)$.

We calculate the limits of the predicted values of the analysed index by using the following formula:

$$\hat{Y}_{t+k} - t\,\frac{\sigma_{\varepsilon t}}{\sqrt{n}} \le \hat{Y}_{t+k} \le \hat{Y}_{t+k} + t\,\frac{\sigma_{\varepsilon t}}{\sqrt{n}}. \quad (8)$$

We determine the forecast amount of proceeds from sales of the enterprise for each quarter of 2019 by the formulas (7), as well as the lower and upper limits of the forecast by the formula (8). The results of the calculations are given in Table 6.

The actual figures of proceeds from sales of the company Bilberbek Ukraine for 2014-2017 and the forecast for 2019 are provided in Figure 2. The method used to calculate the forecast performance of the enterprise with regard to seasonal fluctuations can be calculated for a period of two to three years. To do this, it is required to have sufficient amount of information that covers 5-6 previous years.

The methods used have allowed us to predict the lower and upper limit of the proceeds from sales. According to the data, management decisions made to either eliminate or diminish the impact, as well as the application of measures to level the factor, will increase the efficiency of the sales process and, consequently, improve the financial position of the enterprise.

Forecasting diagnostic indicators, carried out by using analytical methods, allows us to construct models that provide more accurate predictions and flexibility of planning. C. Dibrell, J. B. Craig and D. O. Neubaum (2014) have proven that the formal processes of strategic planning of enterprises and the flexibility of planning are positively related, and each of them is positively associated with innovation. In addition, innovation completely mediates the relationship between enterprise productivity and the formal process of strategic planning and planning flexibility [19]. Therefore, our method is formed within a model, the algorithm of which can be used to formulate strategies for product sales taking into account the impact factors with regard to the activity of any enterprise. In our case, the model focuses on the seasonality factor (Figure 3).

Tab. 4: **Calculation of the seasonality indices of proceeds from sales of the Billerbeck Ukraine Company for 2014-2017 on the basis of a linear trend (3)**

Year	Quarter	Revenue from sales products, UAH thousand * (Yt)	Ŷt	Indices of seasonality, % (Is = Yt : Ŷt ·100)
2014	I	6,371.5	22,861.12	27.87
	II	3,642.2	23,089.73	15.77
	III	5,521.1	23,318.34	23.68
	IV	7,469.4	23,546.95	31.72
2015	I	5,455.5	23,775.56	22.95
	II	4,104.8	24,004.17	17.10
	III	6,021.2	24,232.78	24.85
	IV	6,606.4	24,461.39	27.01
2016	I	6,502.0	24,690.00	26.33
	II	4,344.5	24,918.61	17.43
	III	5,640.3	25,147.22	22.43
	IV	6,990.2	25,375.83	27.55
2017	I	4,988.4	25,604.44	19.48
	II	3,461.2	25,833.05	13.40
	III	5,932.5	26,061.66	22.76
	IV	7,478.8	26,290.27	28.45
Total		90,530.0	393,211.12	X

Note: * - converted to Euros according to the exchange rate:
EUR 1- UAH 10.93 (2014); EUR 1- UAH 18.64 (2015); EUR 1- UAH 25.57 (2016); EUR 1- UAH 28.72 (2017).

Source: Calculated by the authors

Tab. 5: **Culculation of a random variable** $t\,\frac{\sigma_{\varepsilon t}}{\sqrt{n}}$

Quarter	Average seasonal index I_k	$\sigma_{\varepsilon t}{}^2 = \sum_{t=1}^{n}(Yt - \hat{Y}t)^2$	$\sigma_{\varepsilon t} = \sqrt{\frac{\sum_{\sigma_{\varepsilon t}} 2}{n-1}}$	$t \cdot \frac{\sigma_{\varepsilon t}}{\sqrt{n}}$
I	0.242	136,335,615.4	21,317.9	21,317.9
II	0.159	1,697,985,024.2	23,790.6	23,790.6
III	0.234	1,434,106,407.9	21,864.0	21,864.0
IV	0.287	1,269,191,076.0	20,568.5	20,568.5

Source: Calculated by the authors

Tab. 6: **Forecast of revenue from sales of enterprise Billerbeck Ukraine in 2019, UAH thousand (EUR thousand *)**

Quarter	Forecast revenues from sales in 2019	Lower limit of forecast	Upper limit of the forecast
I	5,588 (170.47)	15,730 (479.87)	26,906 (820.80)
II	3,671 (111.99)	20,119 (613.76)	27,462 (837.77)
III	5,403 (164.83)	16,461 (502.17)	27,267 (831.82)
IV	6,627 (202.16)	13,942 (425.32)	27,192 (829.53)

Note: * - converted to Euros according to the exchange rate on 28/08/2018:
EUR 1- UAH 32.78.

Source: Calculated by the authors

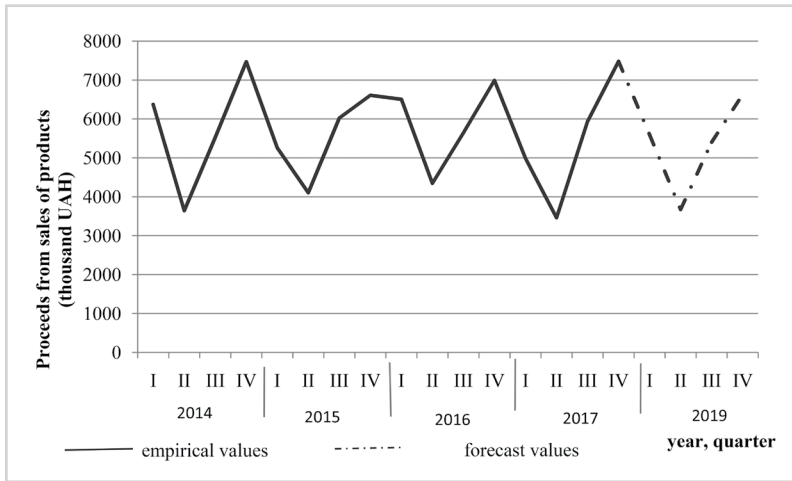

Fig. 2: **Revenues from sales of the Billerbeck Ukraine products for the period 2014-2017 and the forecast for 2019**
Source: Compiled by the authors

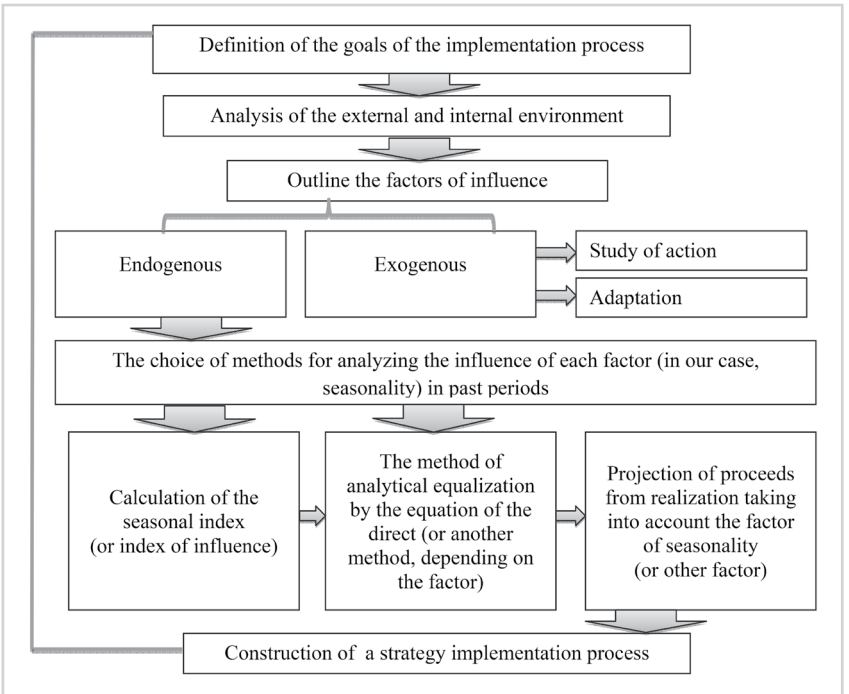

Fig. 3: **Algorithmic model of strategy implementation process**
Source: Compiled by the authors

This algorithmic model, constructed with the use of analytical methods with respect to seasonality, allows us to formulate plans for the sales of products of the enterprise, evaluate the sales and adjustments and choose the most effective functional strategy for enterprise development. J. Rajasekar (2014) believes that successful implementation of the strategy is the key to the survival of any company [20]. Taking into account the fact that many enterprises cannot withstand rapid growth of competition, despite the presence of a reliable process of strategy formation, it is important to use a reliable algorithm for its implementation. The proposed algorithmic model of the sales processwith regard to the seasonal factor will enable us to minimise risks and increase the profitability of the enterprise.

5. Conclusions

In order to provide effective operation of an enterprise under modern economic conditions, it is required to develop and implement a specific model of strategic development. Such a model should determine enterprises' activities, formulate the objectives and ensure the efficient use of available resources. The seasonal character inherent in the enterprises of many branches of the economy greatly complicates the analysis of their activities, and therefore hinders planning and construction of a strategic model for effective future work. This is why we have considered the methodology for analysing the activity of enterprises in terms of the impact of seasonal factors and constructed an effective strategy model for the implementation at those entities which, seemingly, are not seasonal.

The use of the above methodology makes it possible to forecast the performance of such enterprises, to promote a more efficient use of all available resources and to try to reduce the impact of seasonality by conducting other types of work at a time when the seasonal wave tends to decrease. The proposed algorithmic model for constructing a strategy for the sales process with regard to the factor of seasonality can be used to enhance enterprise activity and support managerial decisions.

The aim of further research is to identify other economic factors (indicators or factors) that impact the construction and selection of a business strategy to ensure effective functioning of enterprises.

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