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Integration System of Education, Science and Production: Editorial Introduction

Dear colleagues! We are glad to inform you about the next expansion of our cooperation and this special edition is the result of a partnership between the *Independent Journal of Management & Production (IJM&P)* and West Ukrainian National University, and his partners from Mykolas Romeris University from Lithuania and various universities in Ukraine and India.

The first paper in this collection, presented by *Karpenko and co-authors* demonstrates the successful attempt to formulate a methodological approach to developing the operational strategy of retailers based on the requirements of the corporate strategy chosen in accordance with the stage of the industry life cycle. The development of this methodological approach was carried out based on the Hill's model and the systems approach. Eventually, a logical diagram of the process of developing an operational strategy is presented, indicated by a list of incoming and outgoing information.

The research of *Antoniuk et al.* considers the role of the State Audit Service of Ukraine in the realization of financial state control based on the analysis of reports of the State Audit office of Ukraine in 2019. The paper gives answers on important questions about external and internal audit in the Ukrainian context.

Peyravi et al. determine the impact of human resource management on intrapreneurship and organizational innovation in their article. Research results emphasize on the impact of job selection process, training process, reward, and motivational techniques on organizational innovation, and intrapreneurship.

The approach, the algorithm, and the intelligent decision support system of management for forecasting of time fund for the performance of the mechanized chemical protection of plants are suggested by *Tryhuba et al.* The developed intelligent decision support system provides further research on forecasting the time fund for the implementation of mechanized chemical plant protection and substantiation of its models for different countries and their regions.



Sydoruk and co-authors dedicated the research to the deterioration of land quality in Ukraine and abroad based on the formation of economic and mathematical model. It is established that for the realization of certain goals in the system of land use, the decisive importance should be given to the consideration and coordination of environmental, economic and social interests

Green marketing and environmental marketing as well as green marketing activities were thoroughly analyzed by *Bulsara and his counterparts*. The necessity to academically examine environmental marketing is substantiated in the research.

The paper of *Usas et al.* is dedicated to the assessment of the COVID19 impact on e-commerce in Lithuania based on scientific literature analysis and statistical data analysis. It is proved that pandemic has increased the scope of e-commerce and the range of services in Lithuania despite the deteriorating economic and social situation.

Roliak et al. offer a comparative analysis of the structural model, administrative principles, and new management initiatives in teacher professional training within the tertiary education system of neo-liberal Denmark. Within the comparative discourse of the education management characteristic features of Denmark and Ukraine, the authors have substantiated suggestions for the construction of the efficient postmodern administrative initiatives in institutions of higher learning of Ukraine as the response to the ongoing need for high-quality professional training of teachers based on a solid foundation of autonomy and effective innovative practices.

The study of *Dobrzinskiene et al.* covers the impact of profession right choice on the person's life, emphasizing the importance of vocation and the path of professional development - career. The authors underline the importance of meticulously systematization of the characteristics of a particular profession, namely a police officer.

The information model of material, technical and financial resources in construction, based on identifying and due to the existing initial conditions and developing proposals for their improvement at the level of accounting and management by improving the documentation process was suggested by *Humenna-Derii and co-authors*. It is proposed to improve financial and management accounting for the formation of new synthetic and analytical accounts, internal and intermediate management documents and the methodology of financial accounting.

Kuznetsova and colleagues conducted a study covering the peculiarities of formation of competitive strategy of the enterprises of flour-milling branch of Ukraine. The research



determines that the flour-milling industry of Ukraine is at the stage of growth and has a number of tendencies, such as: decrease in sales volumes, increase in export volumes, standardization of products and average level of competition intensity.

The features of public sector enterprises' use of international and national accounting and financial reporting standards governing the accounting of lease transactions were determined by *Rohoznyi and his counterparts*. The data obtained was based on the indexes of the official website of the Ministry of Economic Development, Trade and Agriculture of Ukraine for 2013-2020

The relevance of the study by *Bickauske et al* is due to the significant role of digital transformation in Moldova and all over the world because of the pandemic situation. The validity of results is based on the interview with experts in the field and SWOT analysis. The authors offer specific recommendations regarding the digitization of the Moldovian industry.

The concept of social skills development in a group of football activities for refugee children and youth development was thoroughly analyzed and proved by *Paskevica and her colleagues*. The study emphasizes the role of football program development and the productivity of practical efficiency which were determined by the service provider's experience in volunteering abroad as a football coach using the Football3 method.

Ishchenko and co-authors studied the current state of the organization and methods of accounting for the costs of organic production from the point of view of environmental and economic accounting in Ukraine. The features of the functions of primary documents reflecting the costs of organic production were determined and ways to improve the documentation of production processes were proposed.

The aim of the paper presented by *Prylipko and co-authors* was to study the ornithine cycle - the process of fixing ammonia and the formation of urea in the body of highly productive animals. The researchers studied the peculiarities of the Askanian meat-wool breed and outbreeds in terms of the ability to build muscle tissue as well.

Such innovative approaches in educational space as e-learning, blended learning, remote learning were the target of *Humeniuk and co-authors'* research due to the demands of modern pandemic period worldwide. The scientists proved the efficiency of Moodle platform use at ESP classes based on experiment results and statistical analysis.

The differences of social business concepts and advantages of such initiatives are elucidated in the paper by *Simanavicius et al*. Research has proven that due to the development



and perception of social business, two main directions can be distinguished: Anglo-American and European ones

The research by *Sermuksnyte-Alesiuniene and colleagues* is dedicated to the digital technologies especially IoT, which influence the food supply chain processes. The results show IoT-connected sensors and systems in food and beverage supply chain logistics offer real-time visibility and data-driven analytics, allowing stakeholders to improve performance, cut operating costs, conduct predictive maintenance to avoid downtime, and even decrease energy usage or reduce negative environmental impacts

Semenyshena et al outlined the main indicators of monitoring the effectiveness of state programs to support the agricultural sector and give proposals for improving the information support of this process, accounting tools, financial and budgetary reporting. Also, the essential role of the Key Program of Budgetary Support for the development of the agricultural sector is underlined.

We would encourage readers to continue this development by submitting themed in various fields of knowledge papers to future issues.

As Chief and Quest Editors, we would like to thank our co-editors and the contributors, as well as the other members of the editorial collective who have provided support. Moreover, they have contributed to the Journal in recognition of the international scientific community. We appreciate the intense participation of all colleagues, which has made our journal become a place of wide dissemination of knowledge.

We hope that our effort in publishing this Special Edition will be useful to our subscribers, as well as to the international scientific community.

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PECULIARITIES OF FORMATION OF COMPETITIVE STRATEGY OF THE ENTERPRISES OF FLOUR-MILLING BRANCH OF UKRAINE

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ABSTRACT

The article deals with the peculiarities of formation of competitive strategy of the enterprises of flour-milling branch of Ukraine. The paper substantiates the necessity to determine the stage of the life cycle of the industry in the process of formation of the competitive strategy. The market analysis of flour-milling industry of Ukraine is carried out on indicators: size of the market, commodity nomenclature, buyers and their behavior, raw material base and intensity of competition. The paper determines that the flour-milling industry of Ukraine is at the stage of growth and has a number of tendencies, such as: decrease



in sales volumes, increase in export volumes, standardization of products and average level of competition intensity. The following stages of the life cycle of the industry are studied: introduction, growth, maturity and decline. The paper proves the necessity of distinguishing the stage of renewal in the life cycle of the industry, which is implemented on the basis of modern technologies. The practical significance of the research consists in developing recommendations for choosing a competitive strategy of the flour mill enterprise in accordance with the stage of the life cycle of the industry. The enterprises of the flour-milling industry of Ukraine, in accordance with the stage of the life cycle of the industry are recommended to form competitive advantages on the basis of the concept of "lean production".

Keywords: competitive strategy; competitive advantage; competition intensity; industry life cycle; flour milling industry; the concept of "lean production"

1. INTRODUCTION

It is a well-known fact that flour is one of the main food products of the population, so the development of the flour industry is an important aspect of the functioning of economic and social components of countries. In the market of the flour-milling industry of Ukraine there are negative tendencies:

- reduction of the number of enterprises: for the last three years (2018-2020), more than 100 flour milling enterprises were closed;
- drop in production: for the same period the production of flour decreased by more than 300 thousand tons.

For successful foreign economic activity, flour-milling enterprises of Ukraine need a competitive advantage that will enable to create a larger consumer value for foreign consumers and will allow to compete with world flour producers.

Namely, there is a necessary to develop a competitive strategy based on the creation of the unique value for the consumers and to choose the direction that would provide a competitive advantage based on it in the long run.

An important aspect in the formulation of the competitive strategy of the flour milling enterprises of Ukraine is the assessment of the state of the competitive environment of the flour milling industry, which includes the analysis of such industry characteristics: market size, customers, base and competition. The research of these characteristics gives the



possibility to determine the life cycle stage of the branch, and therefore to predict the further development. As a result, enterprises are able develop a competitive strategy, that with the regard to current market situation takes into account changes in the in the future of the industry, helps to outstrip competitors' strategy and ensures leading positions in the branch.

2. LITERATURE REVIEW

The research of the features of the flour-milling industry was conducted in many countries around the world.

Konstantinidis et al. (2021) conducted a comparative analysis of the flour and food industries of Greece. The research offers that the flour-milling industry is defined as a budget-forming sector with high competition.

Sarkar (2020) investigated flour milling methods for the Asian market and more that 100 types of flour in the Asian market were identified.

Lazaro (2019) analyzed the financial statements of Spanish flour mills to detect fraud with the payment of industrial and business taxes in Spain. Meanwhile the study of the peculiarities of the formation of competitive strategies of flour mills is not widely spread.

The problems of implementing a competitive strategy, ensuring competitive advantage and the features of competitive strategies for different industries have been studied by many scientists.

Keskin and Senturket (2021) researched the unique possibilities and competitive strategies of exporting firms. The research results proved that an efficient competitive strategy in synergy with the unique characteristics of the firm provide a competitive advantage in foreign markets. Identification of the possibility of intensive competition to reduce the relationship between the benefits of services and export performance is an important result of the research.

Malik, Ghaderi and Andargoli (2021) determine that supply chain control is necessary to create an effective competitive strategy. The authors proved the necessity to ensure the transparency of the supply chain, for its thorough research and improvement. These factors will ensure the company with a competitive advantage.

Karhunen and Ledyeva (2021), Adechian, Baco and Olarinde (2021) considered the key factors in the formation of competitive strategy in various fields. In farming field, an important factor is the diversification of social ties (Karhunen & Ledyeva, 2021), while in

hotel business belonging to a retail chain does not provide a competitive advantage (Adechian, Baco & Olarinde, 2021).

The researchers Liu, Wu and Chan (2021) and Barforoush, Etebarian and Naghsh (2021) identified the impact of implementing eco-management by enterprises on the effectiveness of competitive strategy. According to research results, it was identified that implementation of measures aimed at preserving the environment gives the company a competitive advantage and strengthens its prospects for the further development in a competitive environment (Barforoush, Etebarian & Naghsh, 2021).

At the same time, neglecting environmental factors leads to a drop in the financial performance of the firm, that consequently results in the loss of competitive position (Liu, Wu and Chan, 2021).

In the process of formation of the competitive strategy, it is important to choose an effective method of analyzing the competitive environment and opportunities of firms. He, Liu, Zhou (2021) offer to apply a "three-stage" competitive optimization model. The algorithm provides a strategic direction and the ways of protection against market risks.

Khurshid, Alhidari and Tabassum (2021) state that the formation of a competitive strategy should be based on the model of integrated total quality and socially responsible management (TQM-CSR). The usage of the method and the implementation of relevant recommendations provides a competitive advantage, an effective competitive strategy, improving the quality of life of staff and society in general.

Sahin and Bisson (2021) considers that for the successful operation of airlines it is necessary to integrate competitive intelligence into the process of forming a competitive strategy.

In the scientific literature the formation of a competitive strategy based on the concept of life cycle is not highlighted. Therefore, in our opinion it's actual to investigate the features of this process.

The purpose of the article is to study the features of the competitive environment of the flour-milling industry of Ukraine, to develop recommendations for the formation of competitive strategy of enterprises based on the concept of the life cycle of the industry and to determine the life cycle stage of the flour-milling industry of Ukraine.

3. METHODOLOGY

In the paper, the methodology of Porter (1998) was applied in order to determine the stage of the life cycle of the flour-milling industry of Ukraine. The methodology consists in market research based on the following characteristics: the size of the market, commodity nomenclatures, behavior of buyers, raw material base and competition intensity. The method of statistical analysis was used to explore the above-mentioned market characteristics.

To determine the product nomenclatures of the flour-milling industry of Ukraine, a survey of 30 managers and 20 large flour-milling Ukrainian enterprises was conducted.

To calculate the intensity of competition in the flour-milling industry of Ukraine, the method developed by Ilyshev, Ilysheva and Selevich (2010) is used, which in turn consists in calculating the indicators:

- a level of market profitability, which is calculated on the basis of market profitability assessment;
- a market growth rate in comparable prices;
- an indicator of intensity of competition;
- an indicator of the intensity of competition by market share distribution.

A generalized characteristic of the competition intensity is calculated as a geometric mean of listed indicators.

Determination of the competition concentration in the flour market was carried out based on the analysis of quantitative (Herfindahl-Hirschman index) and qualitative (barriers to entry / exit, the nature of products, the possibility of non-price competition) indicators.

4. Results and discussions

In the analysis of competition in the market, in our opinion, the key priority is to determine the stage of the life cycle of the market, which makes it possible to identify the type of competition specific for the industry and possible activities.

The stage of the life cycle of the flour-milling industry of Ukraine is determined based on M. Porter's methodology (Porter, 1998), which includes the following aspects of analysis: the size of the market, commodity nomenclatures, behavior of buyers, raw material base and competition intensity.

4.1. Market size

To study the size of the flour milling market, we analyzed the data of the State Statistics Service of Ukraine (SSSU) on flour production in Ukraine during 2000-2020 (Figure 1).

Based on the analysis results, there is a noticeable tendency of decrease in the production of flour in Ukraine: for the period 2000-2010 - (-14.5%); 2010-2015 - (-16%); 2015-2020 - (-38%).

That is, over the past 5 years, flour production in Ukraine has decreased by almost a third.

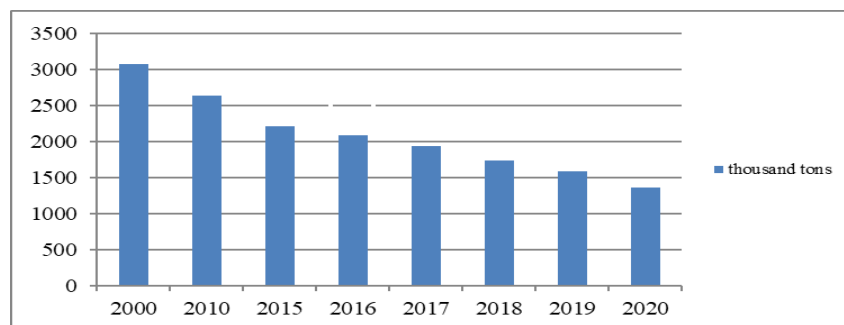


Figure 1: Flour production in Ukraine 2000-2020

Source: calculated according to the State Statistics Service of Ukraine data

During the marketing year (2019/2020), the amount of flour produced for domestic consumption in Ukraine and sent for export was analyzed, and it was found that 21% of flour produced in Ukraine is exported to foreign markets (Figure 2).

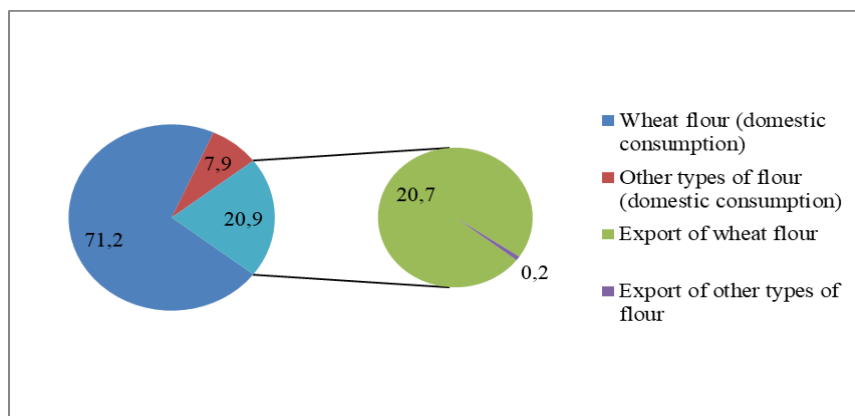


Figure 2: The structure of production and export of flour in Ukraine, during the marketing year (2019/2020)

Source: calculated according to the State Statistics Service of Ukraine data (2020)

The indicator calculated by us tends to increase in the recent years due to the growth of flour exports (Figure 3).

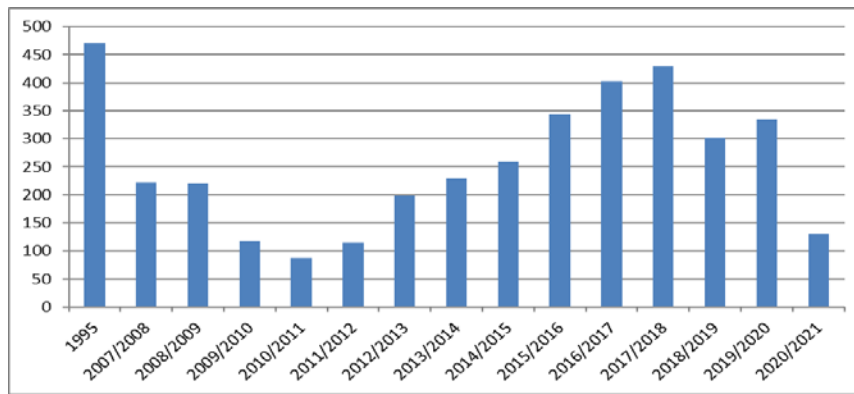


Figure 3: Dynamics of flour exports of Ukraine during 1995-2021
 Source: calculated according to the data of State Customs Service (2021)

According to the research results, it was determined that during 2011-2018 there was an increase in the flour export by Ukrainian enterprises.

However, during the last three years (2018-2021) there has been a decrease in the export of flour, which is mainly due to a reduction in exports of Ukrainian flour to Korea.

According to data of the State Customs Service of Ukraine (2020), in 2018, 40% of Ukraine's flour exports were directed to the Korean market, by 2020 Korea reduced imports of Ukrainian flour, so Ukrainian flour mills were refocused on the African direction, and in 2019 the share of exports to Korea decreased to 17.3% of the total flour exports (Figure 4).

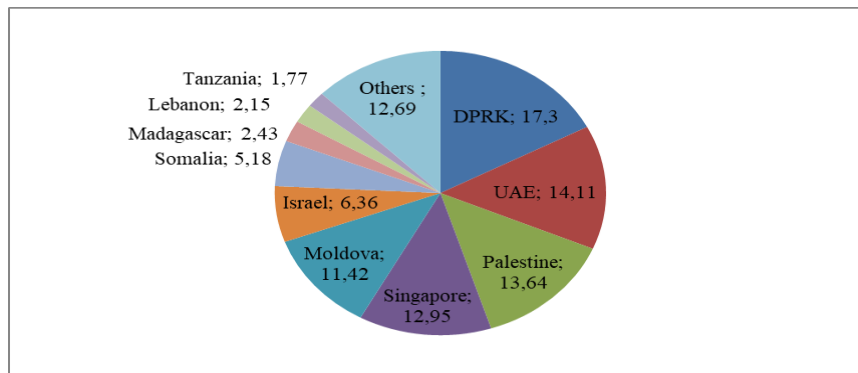


Figure 4: The share of importing countries of Ukrainian flour in the marketing year 2019/2020

Source: calculated according to the data of State Customs Service of Ukraine

The results of the analysis show that the flour milling market is characterized by a decrease in production and sales and at the same time by increase in exports and profitability of the industry.

4.2. Product nomenclatures

The analysis of product nomenclatures was carried out based on the analysis of activity of 20 largest producers of flour in Ukraine. The information base is formed by a

survey of 30 managers of the surveyed enterprises on their product range, the results of the analysis are shown in table 1.

Table 1: Production of wheat flour at flour mills of Ukraine

Flourproducer Typesofflour	Vinnytsia bakery plant №2	Dnipromlin	Stolychnyymln	Novopokrovsky bakery plant	CPF "Roma" B	Bakery plant «Talnoe»	Krolevets bakery plant	Kulindorovsky BP	Enpil	Vinnytsya-mlyn	Khmelnitsk-mlyn	VASYLKIVHLIBOPRODUKT	Zernari	Mac Var Ecoproduct	Ridnyyprodukt	Terminal“ VectorDiyi”	Volyn'zernoproduct	Olenivs'kyybakery plant	Ahro-yuh-Servis	Bilotserkivkhiboproduct
Wheatgrits	+	+					+										+			+
Premium wheat	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
Wheat of the first grade	+	+	+	+	+	+	+	+	+		+	+	+			+		+	+	+
Wheatofthesecondgrade	+	+	+				+				+	+				+				+
Whole-wheatflour	+	+	+	+		+	+				+			+		+				+
Siftedrye			+		+				+											
Pilledrye		+	+								+									+
Pilledwholemeal			+											+						
Wheat-pilledwholemeal		+												+						

In addition to above mentioned types of flour, Ukraine produces flour of durum wheat, corn, buckwheat, oats, soybeans, barley and cherry. The structure of flour production in Ukraine during 2017-2020 is shown in Figure5.

Thus, the market of the flour-milling industry has up to 20 types of flour and is characterized by insignificant commodity differentiation.

Ukrainian flour mills produce flour according to DSTU 46.004-9. According to the specified state standard, flour is evaluated as per the following general indicators: taste, smell, color, crunch, pest infestation, content of metal impurities, humidity, ash content, grinding size and acidity. The main distinguishing feature by Ukrainian standards is the amount of gluten.

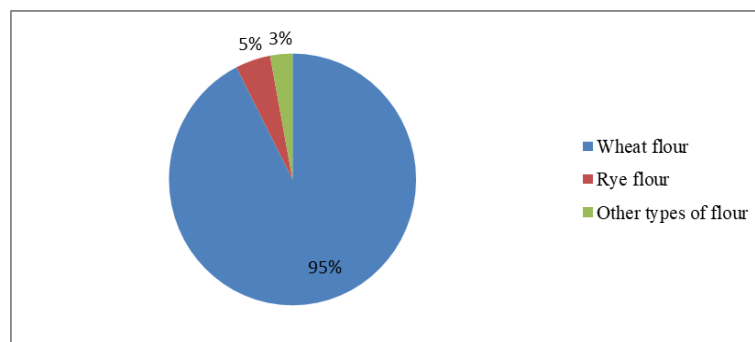


Figure 5: The structure of flour production in Ukraine
 Source: calculated according to the State Statistics Service of Ukraine, 2020

The results of the analysis show that the flour-milling industry of Ukraine is characterized by standardization, insignificant product differentiation and high-quality products.

4.3. Behavior of buyers

Products of the flour-milling industry of Ukraine are aimed at the needs of the population of Ukraine, the needs of enterprises-producers of bread, bakery and flour products and for export.

A research based on the data by SSSU (2019) shows that in 2019 compared to 2000 the population of Ukraine has decreased by 15%, while over the past 5 years (from 2015 to 2019) the population has decreased by 2%.

Based on the analysis of the SSSU report on the balances of consumption of basic foodstuffs (2019), we analyzed the consumption of bakery products in Ukraine (Figure 6)

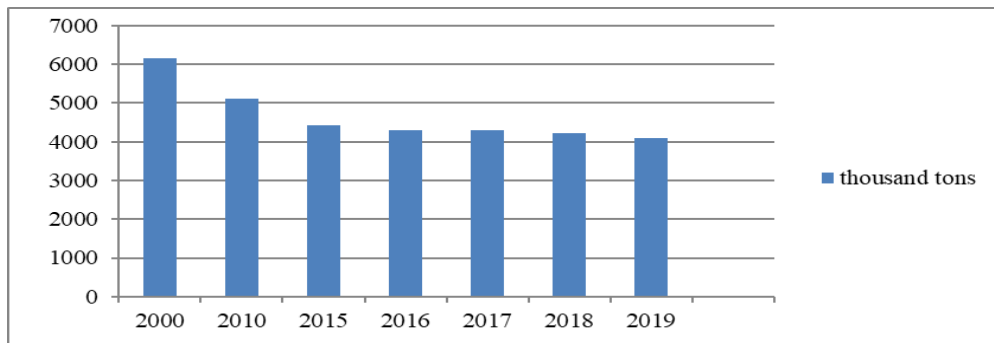


Figure 6: Consumption of bakery products (bread and pasta in terms of flour source: cereals, flour, legumes) in Ukraine 2000-2019

Source: Calculated according to the State Statistics Service of Ukraine report on the balances of consumption of basic foodstuffs (2019)

The performed analysis indicates that in Ukraine during 2000-2019, the consumption of bakery products decreased by a third, while in 2019 as compared to 2015 - by 7.2%.

Per capita consumption also decreased. In 2019, compared to 2015, per capita consumption decreased by 5.5%.

Comparing the per capita consumption of bakery products in Ukraine and other countries of the world, it is to be noted that the consumption of bread is related to the cultural aspects of the producing countries. Ukraine consumes more bakery products than Australia, the United States, Italy and Kuwait, but less than Turkey, Egypt, Iran and Syria (Figure 7).

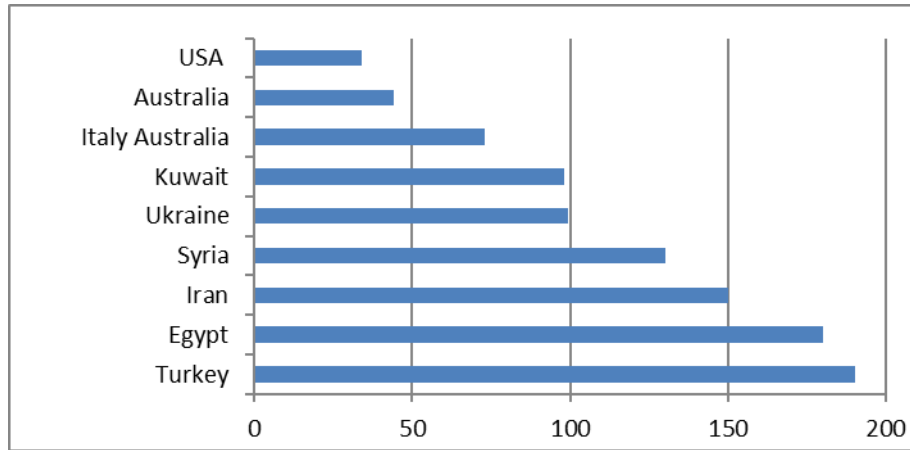


Figure 7: Consumption of bakery products per capita in the countries of the world, kg / person, 2020

Source: calculated according to data of APKInform(<https://www.apk-inform.com/public/uk>)

Although the consumption of bakery products in Ukraine declined during the research period, based on the analysis of statistic data, it was determined that the production of this category of goods has increased (Figure 8).

The total production of bakery products during 2013-2019 increased by 185%, due to:

- increase in production of bread and bakery products; production of flour confectionery, cakes and short-term cakes -by more than twice;
- increase in the production of crackers and biscuits; production of flour confectionery, cakes and pastries for long-term storage - by 1.5 times;
- doubling the production of pasta and similar flour products.

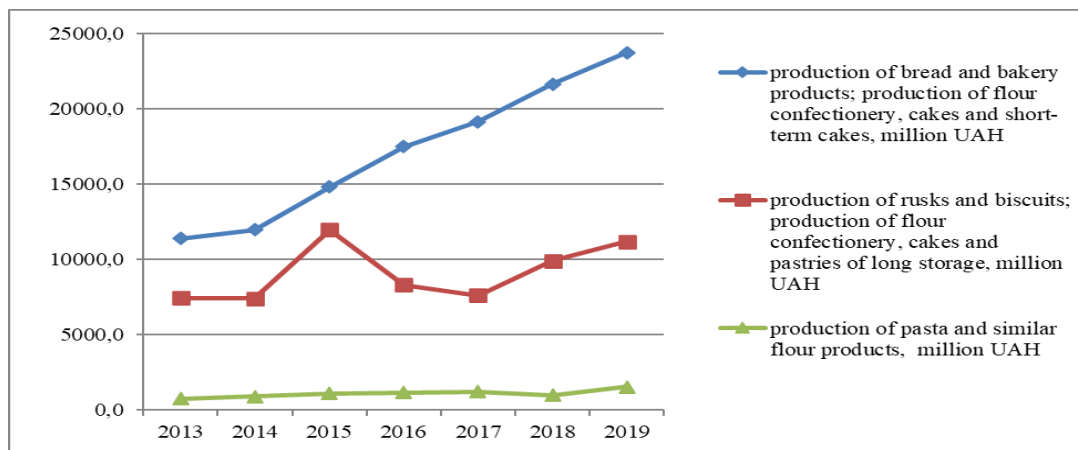


Figure 8: Dynamics of bakery production in Ukraine in 2013-2019.

Source: Calculated according to the State Statistics Service of Ukraine data (2019)

The results of the analysis indicate a decrease in flour consumption by the population and at the same time point out a raise in demand on flour by bakery enterprises.

4.4. Raw material base

A well-known raw material base for the flour-milling industry is the industry of grain production. According to the analysis of SSSU data, it was determined that grain production is growing (Figure 9).

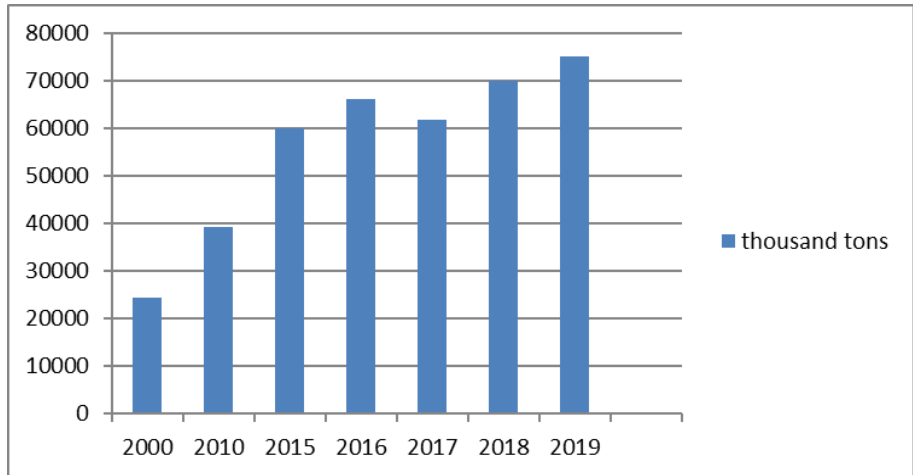


Figure 9: Production of cereals and legumes in Ukraine in 2000-2019.
 Source: Calculated according to the State Statistics Service of Ukraine data (2019)

Starting from 2000 to 2019, grain production increased by more than three times. At the same time, there is a tendency of price increase on cereals and legumes (Figure 10).

Only in 2019 there was a decline of the market price by 8.7% as compared to 2018, although while comparing with 2017 the price in 2019 is higher by almost 2%.

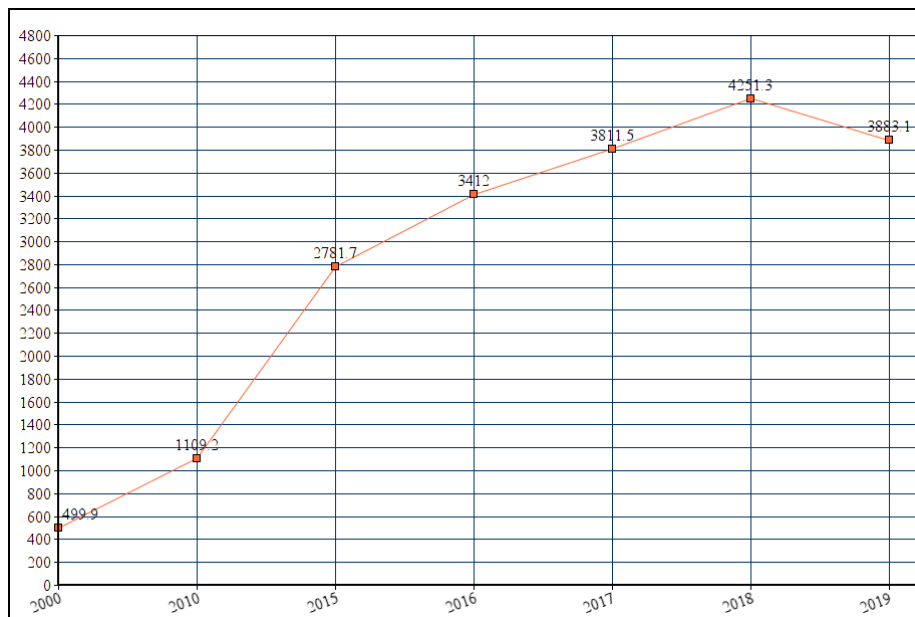


Figure 10: Dynamics of grain prices in Ukraine during 2000-2020
 Source: Calculated according to the State Statistics Service of Ukraine data (2019)

The research results indicate an increase in the raw material base of the flour-milling industry as well as rise in raw material prices.

4.5. Competition intensity

According to the analysis of SSSU data, there is a tendency of reducing the number of market participants in the flour industry (Figure 11).

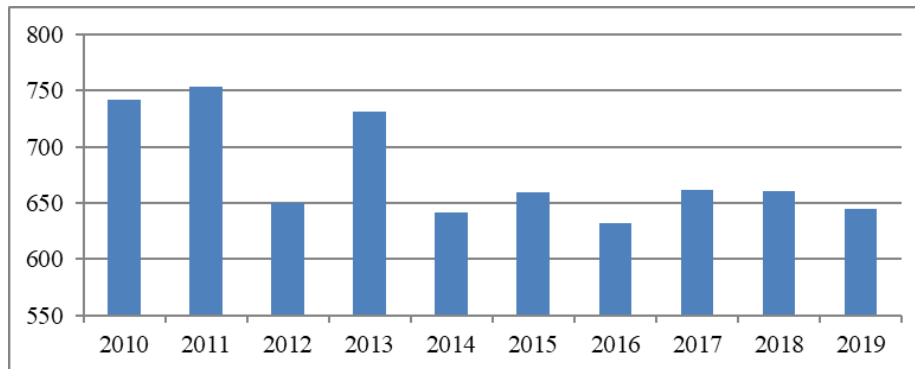


Figure 11: Dynamics of the number of flour-milling enterprises of Ukraine during 2010-2019
 Source: Calculated according to the State Statistics Service of Ukraine data (2019)

Meanwhile, during the research period, a significant market share is made up by privately owned enterprises - about 60%.

With a large number of flour producers in Ukraine, 48% of produced flour is manufactured by 10 largest producers (Fig. 12).

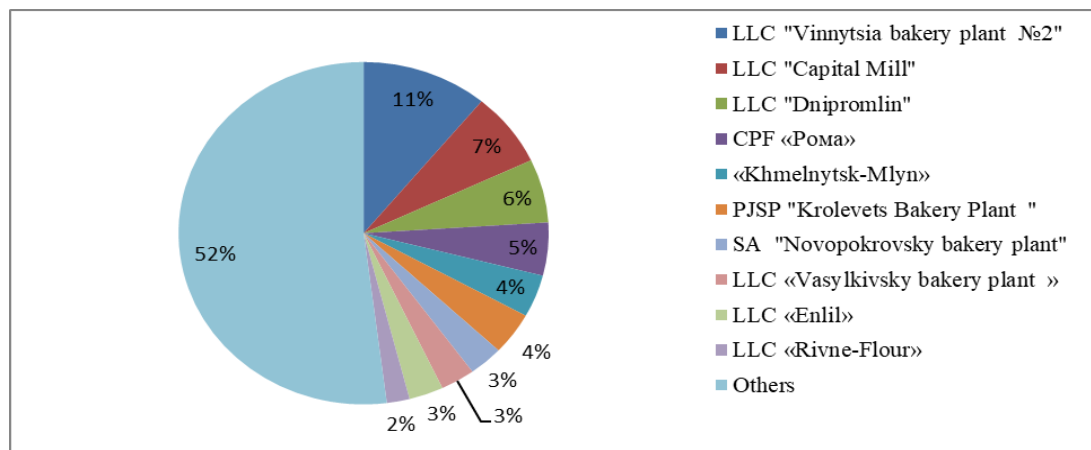


Figure 12: The share of enterprises in the total production of flour in Ukraine in 2020,%
 Source: Calculated according to the Association of Flour Mills of Ukraine (2020)
 (https://www.ukrmillers.com)

An important characteristic feature of competition in the industry is its intensity. We have carried out the calculation of the competition intensity on the basis of the methodology developed by AM Ilishv, NN Ilysheva and TS Selevich (Ilyshev, Ilysheva & Selevich, 2010). The results of the analysis are given in table 2.

The first component of the analysis is the level of market profitability (Ur), which is calculated based on the assessment of market profitability.

Table 2: Indicators of competition intensity of the flour-milling industry of Ukraine (2010-2020)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Market profitability	0,26	0,22	0,26	0,35	0,66	0,52	0,04	0,30	0,32	-0,64	-0,14
Level of profitability	0,74	0,78	0,74	0,65	0,44	0,48	0,96	0,70	0,68	-	-
Market growth rate	-	1,16	1,05	1,15	0,93	1,76	1,33	1,15	0,83	1,34	0,96
Indicator of competition intensity	-	0,5	0,5	0,5	0,5	0	0,5	0,5	0,5	0,5	0,5
Indicator of the competition intensity by market share	-	-	-	-	-	0,33	0,28	0,24	0,18	0,2	0,19
General intensity index	-	-	-	-	-	0	0,367	0,29	0,25	0,32	0,30

Source: Calculated according to the State Statistics Service of Ukraine data (2020)

Market profitability (R_m) is calculated based on the activity assessment of market participants, according to the formula:

$$R_m = \frac{P_r}{V_m} \cdot \frac{12}{t'}, \quad (1)$$

where

P_r – is a profit received by market participants during the analyzed period;

V_m – is an assets of market participants during the analyzed period;

t' – is a duration of the analyzed period (months).

Assuming that $0 < R_m < 1$, the level of profitability of the industry is calculated by the formula:

$$U_r = 1 - R_m \quad (2)$$

For 2018, the market profitability of the flour and cereals industry is:

$$R_{2018} = \frac{17551851,1}{54849534,7} \cdot \frac{12}{12} = 0,32 \quad (3)$$

Since, $0 < 0,32 < 1$, we calculate the level of profitability of the flour market:

$$U_{2018} = 1 - 0,32 = 0,68 \quad (4)$$

We have calculated the indicators for the years 2010-2020 in a similar way, and only for 2019 and 2020, the level of profitability cannot be calculated, as $0 < -0,64 < 1$.

The level of market profitability characterizes the intensity of competition only in synergy with the second indicator - market growth rate (T_m). Subject rate shows the annual market growth rate at comparable prices, and is calculated by the formula:

$$T_m = \frac{V_m' - V_m}{V_m} \cdot \frac{12}{t} + 1, \quad (5)$$

where

V_m' - is a gross profit of the industry during the analyzed period (thousand UAH);

V_m - is a gross profit of the industry through the base period (thousand UAH);

t - is the period of time (months).

It is considered that the limits of market growth rate make up 70% -140%, so:

- if $T_m > 1,4$ – market is with accelerated growth;

- if $1,4 > T_m > 0,7$ - market passes the stages of positional growth, stagnation and collapse;

- if $0,7 > T_m$ – a market crisis is expected.

Based on this method calculations of growth rate in 2018 were the following:

$$T_{2018} = \frac{24217378,8 - 29297286,7}{29297286,7} \cdot \frac{12}{12} + 1 = 0,83 \quad (6)$$

The indicator of growth rate is a tool to determine the indicator of competition intensity (U_t):

- if $T_m > 1,4 \rightarrow U_t = 0$ – a low level of competition;

- if $1,4 > T_m > 0,7 \rightarrow U_t = 1/2$ – an average level of competition;

- if $0,7 > T_m \rightarrow U_t = 1$ – a high level of competition.

Similarly, we have calculated the figures of competition intensity for the years 2010-2020.

The next indicator considered is the intensity rate of competition by market share distribution.

To determine it, we calculated the market share (S) of each of the 10 largest producers in Ukraine during the 2010-2021 marketing years (Table 3) according to the formula:

$$S = \frac{V}{V_m}, \text{ where} \quad (7)$$

V – is a production volume of the enterprise, thousand tons;

V_m – is a market volume, thousand tons.

The results of the calculation are shown in table 3.

Table 3: Table of distribution of market shares of competing enterprises of the flour-milling industry of Ukraine, during 2014-2021

Name of an enterprise	Flour produced in July-December of the marketing year, %								The growth rate of market share of an enterprise, %							
	2020/2021	2019/2020	2018/2019	2017/2018	2016/2017	2015/2016	2014/2015	2013/2014	2020/2021	2019/2020	2018/2019	2017/2018	2016/2017	2015/2016	2014/2015	
LLC "Vinnytsia bakery plant №2"	10	11	7	8,2	8,3	3,9	3,6	3,6	-1	4	-1	-0	4,4	0,3	0	
LLC "Dnipromlin"	9	6	6	6	6	4,6	4,4	4,4	3	0	0	0	1,4	0,2	0	
LLC "Capital Mill"	6	7	6	5,3	5,7	6,2	6,4	6,4	-1	1	0,7	-0	-1	-0	0	
CPF "Рома"	6	5	5	4,2	3,7	3,5	2,1	2,1	1	0	0,8	0,5	0,2	1,4	0	
SA "Novopokrovsky bakery plant"	5	4	3	6,4	5,8	5,7	3,1	3,1	1	1	-3	0,6	0,1	2,6	0	
LLC "Khmelnysk-Mlyn"	4	4	4	4	1,1	1	1,5	1,5	0	0	0	2,9	0,1	-1	0	
LLC "Zernari"	5	3	1	1	1	1	2	2	2	1	0	0	0	-1	0	
LLC "Enlil"	2	3	2	2	1,8	2,1	1	1	-1	1	0	0,2	-0	1,1	0	
LLC "Rivne-Flour"	3	2	2	1	1	1,7	1	1	1	0	1	0	-1	0,7	0	
LLC "Zaporizhmlyn"	2	3	2	2	1	1	1	1	-1	1	0	1	0	0	0	
Total	53	48	39	40,1	35,4	30,7	26	26,1	-	-	-	-	-	-	-	

Source: calculated according to the State Statistics Service of Ukraine data, 2021

We have calculated the average market share per enterprise (S_m) for each marketing year studied:

$$S_m = \frac{S_a}{N}, \quad (8)$$

where

S_a – is a sum of market shares of enterprises;

N – is a number of enterprises.

$$S_{2020} = \frac{53}{10} = 5,3\% \quad (9)$$

$$S_{2019} = \frac{48}{10} = 4,8\% \quad (10)$$

$$S_{2018} = \frac{39}{10} = 3,9\% \quad (11)$$

Based on the calculated data, we can determine the intensity of competition by market share distribution of the flour industry, which is calculated by the formula:

$$U_d = \frac{1 - \sqrt{\frac{1}{N} \cdot \sum (S'_i - S_m)^2}}{S_m}, \quad (12)$$

Where N – is a number of enterprises;

S' - is an average share of the analyzed year,%;

Sm - is an average share of the base year,%.

$$U_d = \frac{1 - \sqrt{\frac{1}{10} \cdot (5,3 - 4,8)^2}}{4,8} = 0,18 \quad (13)$$

Likewise, we have calculated the indicator of competition intensity by market share distribution for the years 2014-2017.

Based on the competition intensity figures by market profitability (U_r), market dynamics (U_t) and market share distribution (U_d), we have worked out a generalized characteristic of competition intensity, which is defined as the geometric mean of these indicators:

$$U_c = \sqrt{U_t \cdot U_r \cdot U_d} \quad (14)$$

$$U_c = \sqrt{0,64 \cdot 0,5 \cdot 0,18} = \sqrt{0,0576} = 0,24. \quad (15)$$

The closer the generalized intensity index is up to 1, the more intensive the competition is.

After calculation of subject indicators, we can conclude the following:

- the flour and cereals industry is characterized by an average level of profitability;
- during the last 10 years the level of competition intensity is staying at the average level;
- according to general indicator of competition intensity - competition is characterized as weak.

Based on the analysis of statistical data, we have made up the degree of intensity of industry monopolization (Tables 4, 5). The degree of monopolization is to be calculated using the Herfindahl-Hirschman Index:

$$G = (q_1)^2 + (q_2)^2 + (q_3)^2 + (q_4)^2 + \dots, \quad (16)$$

where

G – is the Herfindahl-Hirschman index;

q – is the corresponding share of enterprises operating in the market (%).

Table 4: Calculation of the Herfindahl-Hirschman index of the flour and cereals industry

Place in the ranking of enterprises	Market share, %						
	2014	2015	2016	2017	2018	2019	2020
1	13,9	6,2	8,3	8,2	7	11	10
2	7,7	5,7	5,9	6,4	6	6	9
3	6,2	4,6	5,8	6	6	7	6
4	4,8	4,5	5,7	5,3	5	5	6
5	4,1	3,7	3,7	4,2	3	4	5
6	4	3,5	3,2	4	4	4	5
7	3,2	2,8	3	3,3	2	3	4
8	2,1	2,6	2,2	3,2	2	3	3
9	1,7	2,1	1,8	2,6	2	3	2
10	1,7	1,3	1,8	1,9	1	2	2
Total, %	49,4	37	41,4	45,1	38	48	52
Others, %	50,6	63	58,6	54,9	62	52	48
Total number of enterprises	641	659	632	662	661	645	
Average share of enterprises, %	0,08	0,10	0,09	0,08	0,10	0,08	
Herfindahl-Hirschman index	371	165	220	242	190	298	336

Source: Calculated according to the data of “Association of Flour Mills of Ukraine”, 2020

(<https://www.ukrmillers.com>)

For the flour-milling industry of Ukraine in 2019, the Herfindahl-Hirschman index makes up:

$$G=(11)^2+(7)^2+(6)^2+(5)^2+(4)^2+(4)^2+(3)^2+(3)^2+(3)^2+(2)^2+(0,08)^2*635=$$

$$=121+49+36+16+16+9+9+9+4+4=298 \quad (17)$$

Table 5: Comparative table of characteristics of flour market concentration

Signs of concentration	Market structure model		Signs of concentration for the flour market over the years								
	With free competition	Wit monopolistic competition	2003	2010	2014	2015	2016	2017	2018	2019	2020
1. Quantitative characteristics	Unconcentrated	moderately concentrated									
- Herfindahl-Hirschman index	G<800	800<G<1800	300	800,36	371	165	220	242	190	298	336
2. Qualitative features											
- barriers of entry / exit	absent	not high	Not high								
- nature of products	similar	differentiated	homogeneous - on the segment of bulk and coarse flour, differentiated - on the segment of fine flour								
- the possibility of non-price competition	absent	significant reliance on advertising, trademarks significant reliance on advertising, trademarks	significant reliance on advertising, trademarks								

According to the results of the analysis, it was determined that only quantitative characteristics have been changed in the flour milling market. In the early 2000s, a free

competition dominated in the market, with increasing production volumes, and by 2010 a monopolistic type of competition was formed in the market. Since 2014, the production of the flour industry began to decline and, according to our calculations, the market has returned to free competition, which is still relevant today.

Based on the method of Porter (1998), we have identified the main characteristics of the flour-milling industry (Table 6).

According to the analyses results of the life cycle stage of the flour-milling industry of the enterprise on the basis of Porter's method, we determine that most characteristics of the flour-milling industry of Ukraine belong to the stage of maturity.

Table 6: Determination of the life cycle stage of the flour-milling industry of the enterprise based on the method of Porter (1998)

Aspect of analyses	Branch characteristics	Characteristics of the industry according to the method of Porter			
		Introduction	Increase	Maturity	Recession
Market size	reduction of sales and production; export growth; increase in the profitability of the industry.	excess capacity; a certain volume of export; insignificant profits	increase in sales and production; export growth; high growth rates of profitability of the industry	reduction of sales and production; export growth; stable profits	reduction of sales and production; no exports; marginal profits
Commodity nomenclatures	slight commodity differentiation; standardization; high quality of products.	lack of standardization; slight commodity differentiation	standard setting; growth of differentiation; heterogeneous product quality	slight commodity differentiation; standardization; high quality of products	slight commodity differentiation; heterogeneous product quality
Behavior of buyers	mass market; saturation; reduction of consumption; increasing demand from enterprises	mass unsaturated market; the need to stimulate demand.	an increasing group of buyers; consumption growth	mass market; saturation; reduction of consumption by population	mass market; reduction of consumption; buyers - experienced consumers of products
Raw material base	rise in raw material prices; wide choice of suppliers	wide choice of suppliers; stable raw material prices.	wide choice of suppliers; rise in raw material prices	wide choice of suppliers; rise in raw material prices	wide choice of suppliers; rise in raw material prices
Competition intensity	reduction of market participants; increase in the number of private labels; average level of competition intensity; market with free competition	a small number of enterprises; lack of private labels; low level of competition intensity	increasing number of enterprises; uprise of private labels; high level of competition intensity	reduction of market participants; increase in the number of private labels; average level of competition intensity; market with free competition	reduction of market participants; low level of competition intensity; market with free competition

Source: created by the authors

4.6. Selection of competitive strategy for flour milling enterprises of Ukraine according to the stage of the life cycle

According to critical analysis of the literature, the existing approaches to the formation of competitive strategies are reviewed and approaches that take into account such current business trends as: industry positioning, competitive cooperation, value disciplines, evolutionary theory and key competencies are identified. Under each concept a number of competitive strategies are researched that take into account such specifics of modern enterprises as: cost leadership, differentiation, focus, competitive cooperation, product leadership, operational excellence, proximity to the consumer, economic growth and resource strategy (Kuznetsova & Gorbatyuk, 2020).

The concept chosen by the company should give it a competitive advantage in the long run. Therefore, the management of enterprises need to precisely forecast the possible directions of industry development, that is possible on the bases of the life cycle concept as noted by Porter (1998). The concept developed by the author includes 4 stages: introduction, growth, maturity and decline

The introduction phase is characterized by a small number of companies, low profits, high production costs and marketing expenses (Porter, 1998). Loss-making activities may also occur, but in accordance with the growth of sales, profitability also increases. As noted by Kuznetsova and Karpenko company needs to be focused on the rapid penetration and set its rules of the game" in the industry to achieve success, namely, the realization of the benefits of the pioneering strategy.

According to M. Porter the growth stage is characterized by an increase in the number of participants in the industry, marketing costs reduction and the transition to mass production (Porter, 1998). There is a fairly rapid transition from break-even to the highest level of profitability.

Vlasyuk (2009). offers to divide the stages into three phases: formation, accelerated and slow growth.

At the stage of growth, companies can choose a strategy of adapting to changes in the industry or a strategy of initiating changes (Kuznetsova & Karpenko, 2020).

The stage of maturity is characterized by market segmentation and product standardization, price competition and consequently reduced profits (Porter, 1998). The

company needs to choose a stabilization strategy to improve certain areas of development, reduce expenses and optimize the value chain (Kuznetsova & Karpenko, 2020).

The recession stage is characterized by a decrease in the number of competitors, reduction in profits and tight cost control. Scientists emphasize that aggressive strategy of foreign competitors, introduction of substitute products and aging of resources may turn to be possible reasons for the transition to recession stage (Vlasyuk, 2009). At this phase, a relevant strategy is the one allowing to cut the expenses before sales volumes begin to reduce (Kuznetsova & Karpenko, 2020).

The life cycle stages of the industry correspond to the life cycle stages of the product. After analyzing the research conducted by domestic scientists (Matyushenko, 2013; Knyazevych, 2012; Kuznetsova & Sokurenko, 2019), we determine that many researchers single out the stage of "renewal" in the product life cycle, which consists in radical change of strategic direction of the enterprise, its technological base, based on breakthrough ideas and technologies.

We believe that the stage of "renewal" is also relevant for the life cycle of the industry. Considering the tendencies of the "recession" stage, namely the reduction in the number of enterprises, decline in profitability and product quality free niches and unmet needs of the customers are natural. This leads to the need to find new means of gaining market share, expanding the industry range and improving product quality by using new technologies.

Though, if in the phase of the enterprise life cycle (ELC) the stages of "renewal" and "recession" are considered as alternative directions, we believe that in the stage of the enterprise life cycle (ELC) the stage of "renewal" is a consequence of recession.

On the bases of a thorough analysis of the life cycle stages of the industry, we have developed recommendations for choosing a competitive strategy according to the stage of the life cycle of the industry (Figure 13).

We find it inappropriate to use the strategies of competitive cooperation, economic growth and resource strategy at the introduction stage, because at this stage the intensity of competition is quite low, there are many free market segments.

The introduction of these strategies will lead to additional investments as compared with other strategies which have not proved to be beneficial at this stage.

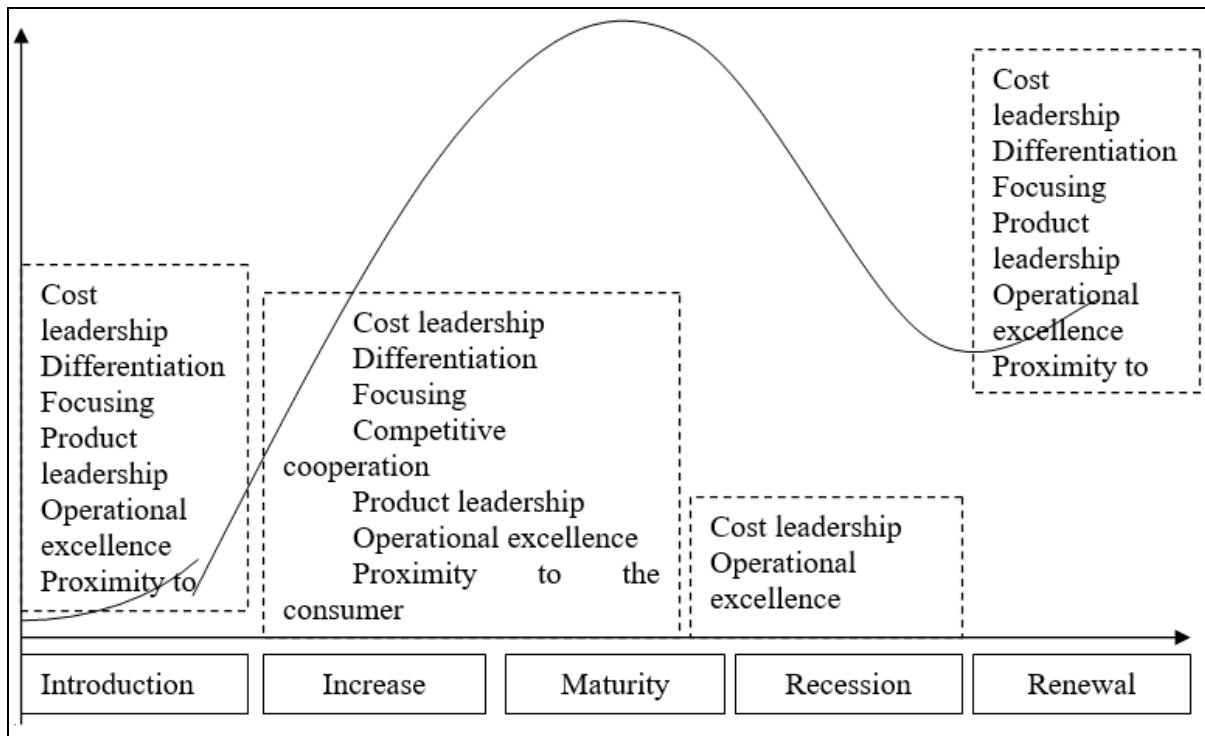


Figure 13: Selection of competitive strategies according to the stages ELC
 Source: improved by the author according to (Kuznetsova, Karpenko, 2020)

We consider that it is relevant to use these strategies at the stages of growth and maturity, when the intensity of competition and profitability of the industry increase, and there is a struggle for market free segments.

Since, at the stage of recession, the activity of enterprises with lower costs and higher profits rates is efficient, we believe it is appropriate to use strategies of cost leadership and operational excellence. At the stage of renewal, competitive strategies that correspond to introduction stage are relevant, as the industry operates according to the updated rules, in a changed market.

Thus, at the stage of “maturity”, with the regard to tendencies of decline in production it is appropriate for the enterprises of the flour-milling branch of Ukraine to form strategies of cost leadership and operational excellence.

Since the identified strategies are aimed at reducing expenses, the enterprises of the flour-milling industry of Ukraine need to choose a tool that will enable to achieve minimal expenses in order to gain a competitive advantage. Based on the analysis of scientific sources, we determine that the main modern concepts of cost minimization include: budgeting, quality management system, balanced scorecard, the concept of lean production, information systems based on MRP and ERP standards (Kuznetsova & Gorbatyuk, 2021).

Based on the analysis of these concepts, we believe that the concepts of budgeting, balanced scorecards and quality management systems take place on condition of implementing the strategies of cost management and operational excellence but are not to be deemed a main tool, as their goal is not to minimize the costs, but partially reduce them.

The concepts of lean production and introduction of information systems based on MRP and ERP standards are aimed at reducing production costs, so they can be used as a tool to minimize the expenses of flour mills in Ukraine. However, the introduction of information systems based on MRP and ERP standards requires large capital investment, which in turn will result in increase of overall cost of the enterprise.

Therefore, we believe that costs minimization of Ukrainian flour mills should be implemented on the basis of the concept of "lean production".

According to research results, the flour-milling enterprises of Ukraine are advised to form the strategies of "cost leadership" or "operational excellence" based on the concept of "lean production", which will allow Ukrainian flour mills to create a stable competitive advantage of the lowest costs.

5. CONCLUSIONS AND RECOMMENDATIONS

The results of the analysis allow us to make the following conclusions:

- a) Research of the competitive environment is to be conducted based on identification of the life cycle stage of the industry, which allows to determine the most relevant trends and promising areas of industry development.
- b) On the basis of a thorough study of the flour-milling industry of Ukraine, it is determined that the industry is at the stage of maturity, and the following characteristic trends of the industry are highlighted: reduction of production and sales; export growth; increase in the profitability of the industry; slight commodity differentiation; standardized products; reduction of consumption; increase in demand by enterprises; rising prices on raw material; reduction of market participants; increasing the number of private labels; average level of competition intensity.
- c) Based on the analysis of the concept of the life cycle of the industry, the stages of the life cycle according to M. Porter are investigated, and the selection of the renewal stage is substantiated. Recommendations for choosing a competitive strategy according to the stage of the industry life cycle are developed.



- d) The enterprises of the flour-milling industry of Ukraine, which are at the stage of maturity, are recommended to form the strategies of "cost leadership" or "operational excellence", based on the competitive advantage of the lowest costs. The necessity of introduction of the "lean production" concept at the Ukrainian flour-milling enterprises, in order to create a steady competitive advantage of the lowest expenses is proved.

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