BUSINESS MANAGEMENT AND ENERGY EFFICIENCY IN THE FOOD INDUSTRY OF MOLDOVA

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Abstract

The article underlines the necessity of a concept of modernization of the national economy in terms of the global crisis, based on production systems strengthening, implementation of innovational technologies, efficient energy management, building business on models that take into account the life cycle of technology and business in areas with high competitive potential, and also to support small and medium businesses in complementary sectors.

Keywords: modernization, energy management, industrial technologies, business models, business life cycle

JEL Classification: G30, L00, N7

Introduction

Policy modernization of the national economy of Moldova is based on attempts to conceptualize the development of innovative segments in terms of Westernization and budget austerization against the phenomena backdrop of global crisis that need to ensure a competitive economy growth, also of branches or areas with a competitive potential on international level. The period 2009-2012 is characterized by a massive effort of the state to modernize the state's tax and financial-economic policy in detriment of economic sphere. The economic modernization measures should ensure the following directions:

- Changes at technological level;
- Updating national production in science, technology, production organization in best contemporary practices;
- Complex integration in regional and global innovation processes;
- Proportionalize the production structure of the economy according to the criteria of industrial and post-industrial development, etc.

Description of the problem

General issue of the Moldovan economy is the lack of innovative technologies implementation. Development of the Moldovan economy is impossible just by making the process of modernization in the productive sector, and especially in the food sector, which has the largest share in GDP. The modernization of the Moldovan industry need a model, based on consideration of a complex phenomena and changing conditions caused by external and internal environment and taking the best international practices in the field of energy management.

Methodology and data sources

Study is based on the method of statistical analysis and synthesis of SMEs business sector development indicators and of energy consumption in food industry of Moldova.

Evolution of Moldovan food industry

According to data for 2012, some experts [7] noted a modest improvement of public expenditure management and of economic freedom index. The situation in the industry demonstrates that there were no effective remedies to enhance the sector and old business continue to use those simple and expanded Lohn production systems and the new one of franchise, with technological single-cycle scheme or low number of technological operations, does not require independent technological intelligence and does not provide any legally organizational or technological competitiveness. Meanwhile, the situation is complicated by catastrophic reduction of qualified industrial personnel. According to statistical data in 2004-2012 the share of labor costs in GDP is

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over 44%, much higher than in neighboring countries, e.g. Romania - about 16%. There aren't changes in the evolution share of the Gross Value Added in gross production in the mining and manufacturing sectors (Table 1). The correlation of added value in these sectors has declined steadily: 43.8 times in 2004, 34.8 times in 2005, 24.8 times in 2006, 23.9 times in 2007, 22.5 times in 2008, 25.5 times in 2009, 28.2 times in 2010, 28.26 times in 2011.

Table 1

The share of Gross Value Added in gross production of Moldova, %

The share of Gross Value Added in gross production	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total, including:	38,0	38,0	38,0	37,16	36,2	39,8	39,98	39,98	38,24
Branches of extractive industries	48,51	47,93	47,50	47,29	47,03	46,76	46,92	47,00	48,21
Branches of manufacturing industry	23,42	22,09	22,83	22,67	22,58	23,70	23,81	23,90	24,95

Source: Authors' calculations according to NBS

Moldova has reached a fairly high level of international integration, but this integration occurs in external trade and not in production, that's why searching for needed production resources and competitive advantages remains a permanent objective and a process of total consumption of government effort.

The dynamic of SMEs development in Moldova

Some changes in the structure of industries are insufficient manifested or have an unstable character, in order to increase and reduce the share of some areas. So, by 2010 there has been some increase in industrial enterprises, but starting from 2011 we found a sharp reduction in the number of employees in industrial enterprises, except dairy production, leather, leather and footwear, machinery and electrical equipment. In the period 2004-2012 took place a decline in the share of the main groups of goods in total production. The share of food has decreased from 51.7% in 2004 to 41.5% in 2011, while the share of wines - from 20.6% to 6.1% over the same period. Out of 40 manufacturing industries, specializing in the production of food and other, 16 have a share up to 1.0% in the structure of industrial production, 6 have a share up to 2.0%, 15 up to 6%, 2 – up to 10.0% and 1 up to 42%, two branches have the share in the range of 20 to 50%. Thus, orientation of economic policy including industry area (to shredding the national economy sectors, forming an important sector of small and medium businesses, to create an economy based on consumerism), obviously did not provide basic tasks: economic growth, sustainable and stable development within the forecasted indicators. Table 2 shows the decline of Moldova's small and medium enterprises in recent years.

Table 2

Indicators of SMEs in Moldova, 2010-2011

Year	Number of enterprises, thousand units		Number of personnel, thousand pers.		Revenue from sales		Profit before taxation	
	small	medium	small	medium	small	medium	small	medium
2010	45,6	97,7	309,4	58,8	65263,2	36,8	5456,9	41,4
2011	47,3	97,5 ↓	294,2 ↓	57,7 ↓	71887,6	34,6 ↓	5180,2 ↓	35,9 ↓

Source: Authors' calculations according to NBS

Table 3

Activity indicators of SMEs in 2013

Economic Agent			The share of SMEs in total enterprises,%	
1.	Number of enterprises, thousand	52,2	Number of enterprises	97,4
2.	Revenue from sales, bn lei	231,6	Revenue from sales	33,4
3.	Profit, bn lei	4,2	Profit	47,8

Source: Authors' calculations according to NBS

Some of the causes of these phenomena can be considered: 1.disproportion between the branches of the national economy; 2.branch management incompetent; 3 models of inefficient management at all levels.

Given the scientific conceptions related to the existence of several types of economy modernization there are: spontaneous and organic (Europe, North America), "catch-up" and inorganic (part of Europe, Latin America, Asia, Africa), forced (Asia Southeast), totalitarian, partial, etc.; analizing the results of economic reform according to strategic concepts, we can say that modernization measures in the form of national projects, undertaken in the industrial sectors of the Moldovan economy can be attributed to the combined type "catch-up" –partial, the first type can be approached as a variety of globalization, developed as a mean of harmonizing the advanced economies and their neighboring countries. We believe that this approach to modernization has a complex and systemic character, but also admits a degree of freedom in the interpretation and argumentation of national projects tools as innovative techniques for filling innovative-modernist space of reformation.

In the companies, creating new business models is conditioned in our view by the following factors: demand education, create innovative new consumer values, high speed of managerial process, extensive communication and partnership with customers, etc. In western management are emphasized and other factors, for example, intellectual productivity of personnel, intellectual networks, the complexity of systems at all levels, skills delegation and leadership positioning, self-training, adaptation to specific individual. It is obvious that in terms of creating an entrepreneurial economy in Moldova and delayed appearance of the concept of industry development, we can assume a lack of self-development perspective regarding small business and keeping a huge conceptual gap in terms of culture management of larger companies.

Modernization issues in the food industry

The current model does not correspond to the concept of management integrity system at different levels, even if the model has all the necessary elements: macroeconomic management of state, corporate strategic management, operational and tactical management.

Another typology of economic modernization allows an approach of endogenous-exogenous type based on mixed investments. However, the data show a substantial reduction of international experts in foreign investment in 2011-2013, about 3 times, namely in the Moldovan industry. Withdrawn may be considered due to the following factors:

- Lack of a clear industrial state policy during the years;
- Lack of systemic and complex approach to recover industrial sector;
- Irretrievable drawdown in short perspective of competitive advantages in terms of human resources and tech branches;
- Poor financial management at economy level, in general.

Branch nomenclature of the Moldovan economy according to the cost of R&D indicator and net product includes branches of all four groups:

1. Pharmaceutical, production of computers and media;

2.Electrical machinery, chemical, machine building;

3. Plastics production, metallurgy and metal processing;

4. Wood processing, food, textile.

Strategy to support exports as well as other policies has not reached the expected efficiency. The World Bank data show [9] that about 27% of exports do not meet ISIC nomenclature and include mostly raw and intermediate materials thus occupy large percentage of exports of goods with low added value.

In the past 10 years great popularity have outsourcing practice which has allowed to simplify the structure of the business cycle and increase specialization of enterprises [1]. Meanwhile, large companies unlike small firms retain their auxiliary functions, including logistics, marketing, energy insurance, which often influences and decrease productivity indicators and inefficient production capital, and therefore refuse some types of core activities, particularly research and development,

part of training of organizational-technical operations production, which in turn contributes to further loss of production potential and lower technological level of production.

Stagnation and market destabilization, on the one hand, characterize the Moldovan economy after 2008, and, on the other hand, strong business model vulnerability influenced by the external environment caused reduced quality of top management in generating positive financial flows from operating activities. In the post-crisis period the model-type training of firm value lost it's credibility. The formation of firm value in unstable market conditions, caused by the efficient organization of operational flow "sales-procurement-production" required solving the main problem: the strategy transformation at operation level. Thus, choosing appropriate business model for tasks development of firms could be possible in base of technological outputs elaboration to complicated managerial solutions and organizational knowledge life cycle of particular interest for the choice of management and knowing life cycle of a firm shows a special interest in choosing type of management, determine the scale and effects of the current issues, forecast of development barriers [2].

One of the features of the modern business is its reduced validity period. The classical model of business does not reflect contemporary business challenges, and in particular formation of competitive advantage of the firm through business model innovation. Therefore modern business model should include besides the six traditional components: the proposed consumer value, market share, structure of value chain, model of profit creation, competitive strategies, development strategies, a new component, innovation generalized, each of them assuming the following: the proposed consumer value is the consumer issue description in terms of expected consumer quality profiled from the point of view of utility, to meet the needs and price. Market segment represents identification of consumer target group with delimitation of its specific needs. The structure of the chain value includes firm position and position of competitors, business partners in order to identify business opportunities in creating maximum value and more qualitative satisfaction of consumer needs. The financial model of the business is the company's activity to ensure the continued operation of the operational model. Growth strategy involves describing the work to ensure sustainable development of the company.

Business models in the food industry

The business model as management method of sustainable business consists in transforming resources into economic value and description of process formation of cash flow by positioning the company in the value chain in the field/ practical economic sector [3]. Business model is determined by the design principles of the company, in particular, the choice of operational technologies, describe key business processes, determining the resources necessary for organizational system formation, which would ensure achievement of business transformation in the organization business strategy, and thus the transition from markets and products analysis to the implementation of technology and resources in terms of maximizing customer needs and minimizing the company's needs. Leap from one development phase to another, deformities in application of successive development principles and phases mix management demonstrates negative experience, confirmed by statistics on social demography of Moldovan enterprises, which, in turn, demonstrates mandatory consecutive sequence of organizations development phases regardless the model which leads them.

Historical evolution of business models comprised generally three chronological lines: 1.For effective business development, based on production in specific functional area; 2. Business development, based on marketing development function; 3. Firm efficiency, ensured by launching new production based on the use of new technologies, highly qualified human resources, specialist in the field with a strong creative potential with the development of several new products with high technology, product substitution frequency limited only by technological possibilities, the reduced role of marketing and the strong role of research and development. Moldovan economy is mainly unsuccessful in competitiveness due to transition from production model (developed in the Soviet period) to marketing model (developed by companies regardless of size, scope, its own history, with the transition to market conditions). Characteristics of economic development of the country in recent years clearly demonstrates the difficulties in seizing and sizing hazards in business development of organizations caused by poor knowledge of life cycle stages development and business organization, but also and managerial deformation at any level by production functions substitution in the marketing and efficient use and development of their production capacity as a result of mismanagement of the business model components.

Competitiveness of food industry through energy management

For increasing the competitiveness of the food and beverage industry (one of the most dynamic sectors of the industry and most important in Europe, with a significant contribution to the economic and social impact) European policy is oriented on tools like: system of export restitution and of active perfection designed for processed agricultural products, chocolate, confectionery, sweet drinks, etc; trade negotiations regarding access improvement of European companies in the global market; contribution to the drafting and implementation of legislation on food industry [10]. Currently, all food business operators are challenged to become more entrepreneurial and to use new energy trends to create new products and services. We believe that energy management use by European food industry could serve as an example for Moldovan food industry to increase their competitiveness.

With the substantial increase in the cost of energy, given the industry's consumption share of 30% in energy consumption structure, Moldova energy efficiency is low compared to European countries. Energy consumption in global food industry covers only a small part of the total cost of production (about 3%). As a result, until recently, Moldovan enterprises have been weak involved in energy management. Today, even if food industry remains a non-intensive energy industry, with increasing energy prices and environmental awareness it's also increasing the growing role of energy efficiency in Moldovan food industry.

According to the study of experts V. Moroz, Poisic M. and Ignat A. [4], the main constraints for energy efficiency in the country are: high energy consumption, increasing energy prices, technology and equipment morally and physically outdated, lack of knowledge and skills in energy efficiency and renewable energy use, excessive dependence on imported energy resources (95% import energy). They also argue that the competitiveness of the food industry is directly affected by the used technology and low efficiency of the energy sector in the country has a negative impact on industry development of local agricultural raw material processing.

It is considered that application of energy management in a company whose main objective is to ensure a judicious and efficient use of energy to maximize profits by minimizing energy costs, increase the market competitiveness of the company (Figure 1). Energy management use economic and engineering principles to control the energy consumption costs for providing services required in buildings and industry [5]. Most of energy cuts in the Europe's food industry come from improving energy efficiency by changing traditional sources of energy and the ability to couple to other energy sources.

In this context, the authors propose the following solutions targeted to reduce maintenance costs, increase competitiveness and reliability.

1. Reduce energy consumption by reducing costs, namely:
- Framing consumption in contracted values;
- Tracking the specific consumptions in locations and areas, empowering local and central monitoring;
- Taken measures from analyzed reports;
- Systems to manage energy consumption;
- Elimination of parasitic energy consumption and strengthening discipline use.

1.Increased competitiveness can be achieved by:
- Exact calculation of cost and energy intensity per location;
- Efficient use of energy resources and utilities.

2.Increase the reliability and reduce maintenance costs through:
- Analysis of the distribution quality of energy consumption;
- Analysis of incidents in case of emergencies;
- Prevention of major equipment faults by monitoring consumption parameters and preventive maintenance.

European entrepreneurs consider that implementation of energy efficiency programs at the companies will diminish energy intensity per unit of output, which will lead to a significant increase of product competitiveness on market. A significant role in the sustainability and efficiency of the food industry is: the correct selection, healthier and easier for consumers; improve product quality; reducing the purchase price for the goods; ensuring requirements for food safety; achieve effective management of the food chain and environmental compliance and directives.

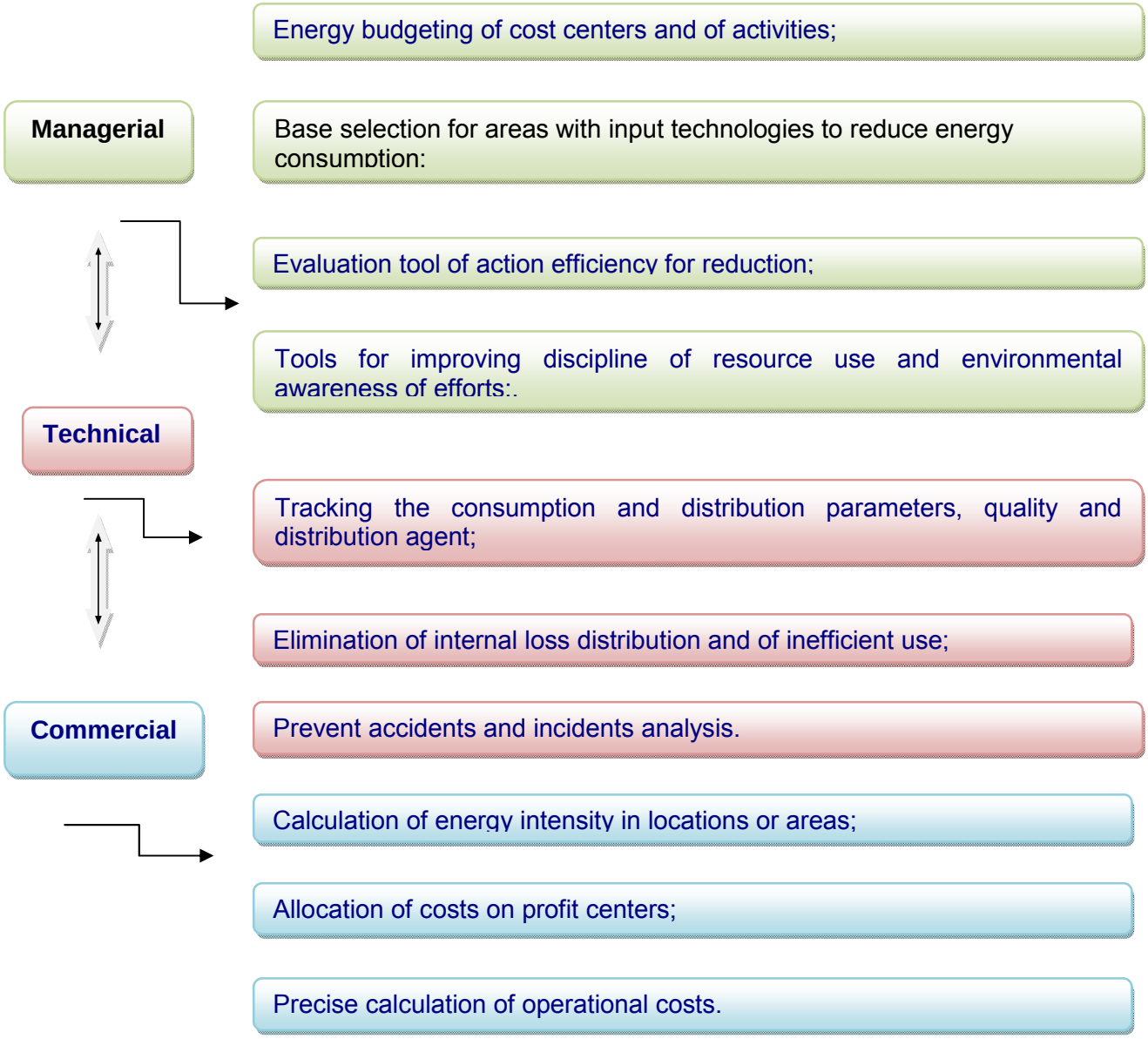

Figure 1. Model of energy management in the food industry
Source: author's elaboration

In this context, in order to support sustainable development of food industry, there are several initiatives at global, regional or national level, often undertaken by NGOs and national governments. Such an initiative in Europe is represented by the European Consultative Forum on Environment and Sustainable Development, which provides consultancy on environmental issues. Worldwide, we can mention the Energy Efficiency and Renewable Energy (REEEP) partnership, which works to reduce the barriers that limit energy absorption from renewable energy and energy efficiency technologies, with a primary focus on emerging markets and developing countries (Figure 2,3).

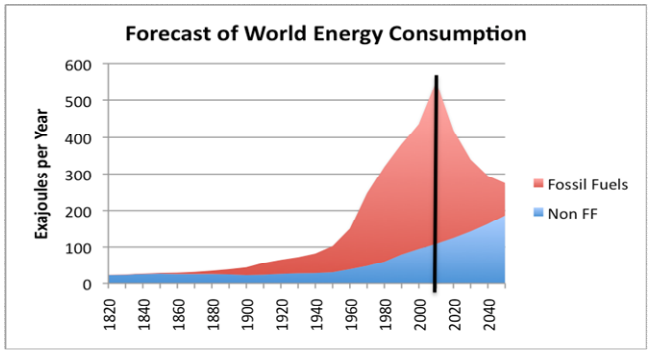

Figure 2. Forecast of World Energy Consumption, 1820-2040
Source: ourfiniteworld.com/2012/07/26/an-optimistic-energygdp-forecast-to-2050-based-on-data-since-1820/

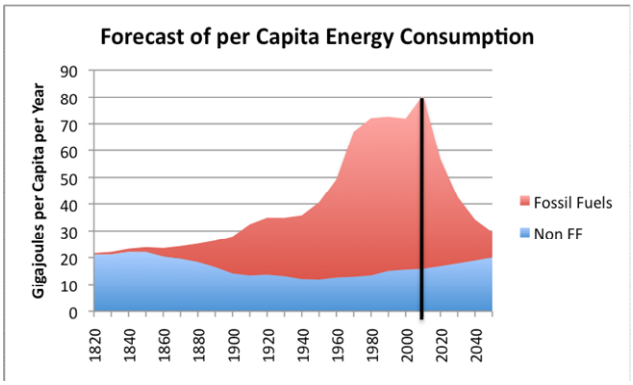

Figure 3. Forecast of per Capita Energy Consumption

Source: ourfiniteworld.com/2012/07/26/an-optimistic-energygdp-forecast-to-2050-based-on-data-since-1820/

Today, advanced technologies define the entire food production chain. Agricultural machines have eliminated human labor in many areas of production; biotechnology is an important factor for change in this sector, due to complex application of chemicals for plant breeding and food processing; most common used techniques for food preservation are thermal processing and dehydration that require significant amounts of energy, where subject of food processing become more popular in world markets. Thereby, thermal process uses about 29% of total energy in the food industry, while cooling and refrigeration process about 16% of the total energy input.

Derived technologies with computer networks and specialized software are a central force in providing infrastructure support to allow global multitude movement of components involved.

Energy management experience in the European food sector demonstrates that reduction of energy consumption can be achieved politically through technical measures (application of efficient engines, fuels and materials); replace and improve techniques and procedures; and changing social aspect by reducing consumption of various products, including those imported.

Table 4

Energy use in the food, drink and tobacco industries in the United Kingdom

Energy use	**%**
Boilers and steam	49
Direct heating (fuel)	18
Direct heating (electricity)	8
Refrigeration	6
Compressed air	2
Motors and drives	17
Total	**100**

Source: Authors' calculations

We find that entrepreneurial effort in the industry focuses mainly on production costs minimization and less on energy costs. Recently, Chamber of Commerce and Industry of Moldova in order to implement energy efficiency practices organized seminars on energy management systems at the enterprise level for professionals from this sector [6], which in some way conditioned growth of production volumes on certain types of activities (table 5).

Table 5

Value of food industry, by types of activities, mil.lei

	2007	2008	2009	2010	2011	2012	2013**
Industry – total	**26173,5**	**29988,4**	**22643,9**	**28140,1**	**34194,4**	**36362.2**	**106,8**
Manufacturing industry	**21390,3**	**24045,5**	**18080,3**	**22784,9**	**28245,1**	**30147.7**	**107,9**
Manufacture of food products and beverages	***9952,5***	***11781,4***	***9256,7***	***11737,6***	***14199,7***	***15587.6***	***106,3***
Production, processing and preserving of meat and meat products	1123,7	1467,7	1296,1	1473,7	1924,8	2435.3	103,0
Processing and preserving of fruits and vegetables	1277,8	1148,4	802,4	1042,8	1821,7	1608.2	113,7
Manufacture of dairy products	1027,6	1192,4	1043,0	1248,5	1391,2	1533.7	108,9
Manufacture of products of flour-milling industry, of starches and starch products	190,5	221,7	142,1	152,0	224,6	219.0	121,8
Manufacture of bread and pastry products	944,3	1125,6	1021,1	1114,9	1303,7	1370.2	104,9
Manufacture of sugar	442,8	876,9	340,5	1058,0	1095,7	935.8	*
Manufacture of cocoa, chocolate and sugar confectionery	405,4	467,7	419,1	481,3	542,9	546.1	108,7
Manufacture of distilled alcoholic drinks	504,3	534,3	463,2	511,1	604,3	925.4	119,6
Manufacture of wine	1766,6	2210,1	1675,6	2022,5	2073,8	2315.4	92,6
Production of mineral water and freshener beverages	313,9	333,9	254,9	323,9	397,3	401.4	92,5

Source: Authors' calculations according to NBS

Note: *missing data; **Industrial production index is for January-December 2013 reported to January-December 2012

Currently, Moldovan food industry faces series of challenges that require a reassessment of current practices in production and trade, cooperation between firms along the vertical supply chain, government influence on management activities of enterprises, in order to optimize the potential of production systems and balancing structure of industrial production (table 6).

Table 6

The structure of the food industry, by types of activities

- % -

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Industry – total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	*****
Manufacture of food products and beverages	***50,8***	***42,9***	***39,7***	***41,3***	***40,9***	***41,7***	***41,5***	***42,9***	*****
Production, processing and preserving of meat and meat products	3,2	3,5	4,5	5,1	5,7	5,2	5,6	6,7	*
Processing and preserving of fruits and vegetables	3,4	4,1	5,1	4,0	3,5	3,7	5,3	4,4	*
Manufacture of dairy products	3,6	3,8	4,1	4,2	4,6	4,4	4,1	4,2	*
Manufacture of bread and pastry products	3,4	3,5	3,8	3,9	4,5	4,0	3,8	3,8	*
Manufacture of grain mill products, starches and starch products	0,4	0,8	0,8	0,8	0,6	0,5	0,7	0,6	*
Manufacture of sugar	3,3	4,2	1,8	3,1	1,5	3,8	3,2	2,6	*
Manufacture of cocoa, chocolate and sugar confectionery	1,4	1,6	1,6	1,6	1,9	1,7	1,6	1,5	*
Manufacture of distilled alcoholic drinks	4,0	2,5	2,0	1,9	2,0	1.,8	1,8	2,5	*
Manufacture of wine	20,0	10,3	7,0	7,7	7,4	7,2	6,1	6,4	*

Source: Authors' calculations according to NBS

Note: * missing data

Conclusions

1. We believe that general problem of Moldova's economy is the lack of innovative technologies implementation.

2. Development of the Moldovan economy is impossible without achieving modernization process in the productive sector.

3. Modernization of industry from Moldova requires creating a model based on the consideration of complex phenomena and of changing conditions caused by external and internal environment.

4. Main tasks of economic modernization in Moldova are the following:

• supporting small and medium businesses to diversify brute product;

• strengthening the industrial potential by recovering large systems of production;

For the technological modernization of the economy are considered following main directions:

• ensuring at government level through coordinated management of technology at all levels;

• refocusing national efforts to fundamental science as the basis of technical and technological development, and to critical technologies for modern business and economics in the concept of the life cycle of technology and business.

6. Recent increases of energy costs encourage the food industry to optimize the use of energy. Reduction of energy consumption can be achieved by understanding potential of production systems, the interaction between energy inputs and manufacturing industrial technologies and market demands.

7. International track record can be considered effective in the recovery of Moldovan industries with high potential competitiveness in the international market.

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