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ECONOMY

INVOLVEMENT IN BUSINESS OF YOUNG GRADUATES OF VOCATIONAL EDUCATION AND TRAINING INSTITUTIONS: THE CASE OF THE REPUBLIC OF MOLDOVA

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Young people from the Republic of Moldova, who intend to initiate or to develop their business are one of the targeted support groups within the framework of the state policy. This article analyzes various aspects of engaging young people in entrepreneurial activity: a brief assessment of statistical indicators is given; support measures for young entrepreneurs, implemented by the Moldovan government and proposed by international/foreign organizations are outlined; features of young entrepreneurs and self-employed are revealed. The emphasis is placed on young graduates of Vocational Education and Training (VET) institutions. The main results and conclusions are largely based on a survey applied on graduates of vocational education and training institutions who have already set up their own business or are self-employed. The survey has been implemented during 2016-2017 with the active participation of the authors. The results of the study showed that young people are interested in entrepreneurship and that learning the basics of entrepreneurship has a significant motivating influence on the initiation of their business and self-employment. Often, the businesses of the young people are unregistered and they are combined with employment. Only one third of the respondents know about organizations that can provide them various forms of support. One of the conclusions of the study presents that positive changes can be achieved much faster by combining the efforts of different stakeholders, in this case – the government, educational institutions, non-profit organizations and external donors.

Keywords: *young entrepreneurs, involvement of young people in business, small and medium-sized enterprises (SMEs), SMEs support policies, Vocational Education and Training (VET) institutions, Republic of Moldova.*

În Republica Moldova, tinerii, care intenționează să inițieze sau să își dezvolte afacerea, constituie unul dintre grupurile-țintă vizate în cadrul politicii de stat. Articolul analizează diferite aspecte ale implicării tinerilor în activitatea antreprenorială: este prezentată o scurtă evaluare a indicatorilor statistici; sunt analizate măsurile de sprijin pentru tinerii întreprinzători, implementate de Guvernul Republicii Moldova și propuse de către organizațiile internaționale/străine; sunt dezvăluite caracteristicile tinerilor antreprenori și ale lucrătorilor independenți. Accentul se pune pe tinerii absolvenți ai instituțiilor de învățământ profesional tehnic (IÎPT). Rezultatele și concluziile principale se bazează, în mare parte, pe sondajul aplicat absolvenților IÎPT, care și-au creat propria afacere sau au o activitate independentă. Studiul a fost realizat în anii 2016-2017 cu participarea activă a autorilor. Rezultatele studiului au arătat că tinerii sunt interesați de activitatea de antreprenoriat, iar studierea bazelor antreprenoriatului are o influență motivațională semnificativă asupra inițierii activității de antreprenoriat și a desfășurării activităților independente. Adesea, afacerea tinerilor este neoficială și este combinată cu angajarea în câmpul muncii. Doar o treime dintre respondenți știu despre organizațiile care le pot oferi diferite forme de sprijin. Una dintre concluziile studiului subliniază că schimbările pozitive pot fi realizate mult mai rapid prin combinarea eforturilor diferitelor părți interesate, în acest caz ale guvernului, instituțiilor de învățământ, organizațiilor non-profit și ale donatorilor externi.

Cuvinte-cheie: *tineri antreprenori, implicarea tinerilor în afaceri, întreprinderi mici și mijlocii (IMM-uri), politici de sprijin pentru IMM-uri, instituții de învățământ profesional tehnic, Republica Moldova.*

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В Республике Молдова молодые люди, намеренные инициировать или развивать свой бизнес, являются одной из целевых групп поддержки в рамках государственной политики. В статье проанализированы различные аспекты вовлечения молодежи в предпринимательскую деятельность: дана краткая оценка статистических показателей; изложены меры поддержки молодых предпринимателей, внедряемые молдавским правительством и предлагаемые международными/иностранными организациями; выявлены особенности молодых предпринимателей и самозанятых. Акцент в работе сделан на молодых выпускниках учреждений профессионально-технического образования. Основные результаты и выводы во многом базируются на опросе выпускников учреждений профессионально-технического образования, которые уже создали свой бизнес либо обеспечили самозанятость. Опрос был реализован в 2016-2017гг. при активном участии авторов. Результаты исследования показали, что молодежь проявляют интерес к предпринимательской деятельности, а обучение основам предпринимательства оказывает значительное мотивирующее влияние на инициирование ими бизнеса и обеспечение самозанятости. Нередко бизнес молодых предпринимателей является незарегистрированным и сочетается с работой по найму. Лишь одна треть респондентов знает об организациях, которые могут предоставить им различные формы поддержки. Один из выводов исследования: позитивные изменения могут быть достигнуты значительно быстрее при объединении усилий разных стэйкхолдеров, в данном случае – правительства, образовательных учреждений, некоммерческих организаций и внешних доноров.

Ключевые слова: *молодые предприниматели, вовлечение молодых в бизнес, малые и средние предприятия (МСП), политика поддержки МСП, учреждения профессионально-технического образования, Республика Молдова.*

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Introduction. In the Republic of Moldova, as in other European countries, the state policy of development of small and medium-sized enterprises (SMEs) is aimed at supporting various groups of entrepreneurs, one of the most significant being the group of young people. Special attention to young entrepreneurs is explained by the fact that citizens under 35 years old represent a significant group of active population, in numeric terms, many of whom often cannot find a job that meets their needs in the country. The choice of the country where young people prefer to live and to work in the future depends on whether their work is claimed and paid by the society, as well as on their self-realization. Moreover, the active involvement of young people in entrepreneurial activity can also revive business itself, since young people propose innovative entrepreneurial ideas, new and daring business models, new solutions for the existing problems. Therefore, the use of various methods for involving young people in business together with their training and support at the stage of launching their own business represent important elements of the state policy and are also reflected in the activities of foreign donors and international projects operating in Moldova.

In the recent years, a special attention has been offered to young graduates of Vocational Education and Training (VET) institutions, who have professional knowledge, but no practical work experience, thus facing considerable difficulties in getting employed. In such conditions, self-employment or the establishment of a micro-business gives to young people an additional chance for developing a career in their own country.

Involving young people in entrepreneurial activities: a review of scientific materials and EU business development policy documents

A significant number of European researchers [6; 15] emphasized that there is a consistent evidence of positive advantages of stimulating youth entrepreneurship. Young entrepreneurs are more likely to hire fellow youths; they are more responsive to new opportunities and trends; they posses better IT&C related skills; young people are more present and interested in high growth sectors and young people with entrepreneurial skills are better employees. In this context, the issues of teaching entrepreneurial skills to youth, analyzed in recent years in the scientific literature, have a practical orientation in many respects – with the aim of reasoning and improving the state policy.

One of their starting points of research is to discuss the specifics of the business of young people that appear due to their age. Moreover, there is a point of view that even within the framework of young entrepreneurs, it is advisable to emphasize separate age groups. In particular, the English researcher F. Chigunta suggests that there are three phases of youth entrepreneurship: (1) *the initial stage*, (2) *the stage of development*, *growth and* (3) *the flowering stage.* The first stage comprises young people aged between 15 and 19 who are preparing for entrepreneurial activity. Young people face a transition period in which they have to make a choice between home, study, or job. The second stage includes entrepreneurs aged 20-25 who have already gained some experience, business skills and have earned the initial capital required to set up their own business. In the flowering stage the entrepreneurs are aged 26-29 years old. These entrepreneurs have a business experience already. This is the main advantage of these entrepreneurs compared to the beginners [7].

For the analysis of young entrepreneurs, the age criterion is not sufficient, being absolutely necessary to analyze various factors. This aspect was investigated by K. Lewis and S. Massey who analyzed the next young entrepreneurs according to two criteria – the entrepreneurial level of training of young people and the level of intent to start a business, and correspondingly determined 4 groups of potential young entrepreneurs [13].

Many works in the specialty literature have been devoted to the issues of entrepreneurship education. Researchers A-M. Zamfir, E-O. Lungu, C. Mocanu, have analyzed the process of choosing an entrepreneurial career among university graduates from 13 European countries and concluded that the educational profile of graduates influences their opportunities to become entrepreneurs, especially the teaching methods used, the number of years of education and the acquired skills. At the same time, during the first five years after graduation, 11.4% of graduates have become entrepreneurs [16].

The problem of involving young people in entrepreneurial activity is present largely not only in scientific materials, but also in EU policy documents. In the documents of the most European countries and at the EU level, it is now recognized that sustainable economic growth is largely determined by the development of the SMEs sector. In the main framework document of the EU, aimed at supporting SMEs – the "Small Business Act" for Europe, one of the support measures highlights the necessity to "enhance the spirit of innovation and entrepreneurship among young people. Thus, entrepreneurship becomes a key element of school curricula, especially in general secondary education. The document mentioned above ensures that these guidelines are properly taken into account in teaching materials" [8].

The necessity of the state support for entrepreneurial activities of young people is reflected in a number of subsequent documents developed by the European Commission. In 2013, the Entrepreneurship 2020 Action Plan was adopted at the EU level, aimed at strengthening the entrepreneurial potential of Europe [10]. The plan suggests three areas for immediate intervention, one of which is "Dynamising the culture of entrepreneurship in Europe: ***nurturing the new generation of entrepreneurs",*** including from the group of young people.

In order to support the young people, a special attention is devoted to the enhancement of the role of entrepreneurial education. For example, in the Guide for Entrepreneurship Educators, it is stated that reinforcing entrepreneurial education in schools, vocational education institutions and universities will have a positive impact on the entrepreneurial dynamism of economies of European countries. The necessity and efficiency of investing funds in this area is substantiated. In particular, it is stated that investing in entrepreneurship education is one of the highest return investments that Europe can make: research shows that pupils and students who have participated are three to six times more likely to start a business at some point later in life than those who did not receive entrepreneurship education [9].

Analysis of the quantitative indicators regarding the participation of young people in the economy, including in entrepreneurial activity in the Republic of Moldova

Analysis of demographic indicators shows that in the Republic of Moldova on January 1, 2018, the number of the young people (aged 15-34 years old) was 1.241 thousand people, or 32.4% of the total number of population. In the total number of youth, the proportion of men is slightly higher (51%), while the proportion of women accounts for 49%. Relatively more young people live in rural areas (56.9%), while respectively, 43.1% live in urban areas (Table 1).

Table 1

Distribution of young people from the Republic of Moldova by age groups, gender and place of residence, on January 1, 2018

Indicator	Share, %
Total	**100.0**
including young people,	**32.4**
of which:	
15-24 years old	15.2
25-34 years old	17.2
Out of the total number of young people:	
Men	51.0
Women	49.0
Out of the total number of young people:	
Urban	43.3
Rural	56.7

Source: Calculated by the authors based on the data provided by the National Bureau of Statistics of the Republic of Moldova [4].

The activity of the young people on the labour market is reflected in the following data: over a third of young people aged 15-34 years old are employed, meaning they have a job place; 64.0% are economically inactive. Among the latter, more than half (35.6%) are involved in the National Education System [4]. The high level of unemployed among young people has been observed over the past few years, which is evidenced by the indicator ILO unemployment rate. The unemployment rate in the whole economy accounts for 4.1%; for young people aged 15-34 years old, this indicator is 1.6 times higher, amounting to 6.6% (Table 2).

Table 2

ILO unemployment rate, 2017, %

Age group, years old	ILO unemployment rate
Total, including:	4.1
15-34	6.6
15-24	11.8
25-34	5.1

Source: Calculated by the authors based on the data provided by the National Bureau of Statistics of the Republic of Moldova [3].

Out of the total number of population of 15 years old and over, who are employed or are searching for a job abroad, more than half (54.1%) were young in 2017, from which 15.9% are between 15 and 24 and 38.2% – 25-34 years old. Therefore, young people, including those who graduated an educational institution, often turn out to be less in demand on the labour market due to the lack or insufficient work experience.

The analysis of the main income sources of youth showed that the most important income sources of young people (14-34 years old) are financial means coming from the wages, especially being involved in the non-agricultural sector (32.1%), and from the parents/support (23,8%). The income from the entrepreneurial activity, craft and free professional activity is less significant and amounts to only 5.3%, while the self-employed agricultural activity – 8.5% (Table 3).

Table 3

Distribution of main income sources of youth (15-34 years old), 2017, %

Main income sources	2017
Total income	**100.0**
including income from:	
Wage activity in the non-agricultural sector	32.1
Support	23.8
Transfers from abroad	10.8

Main income sources	2017
Social benefits	10.7
Self-employed agricultural activity	8.5
Entrepreneurial activity, craft and free professional activity	5.3
Scholarships	5.1
Wage activity in the agricultural sector	3.3
Other income source	0.4

Source: Calculated by the authors based on the data provided by the National Bureau of Statistics of the Republic of Moldova [4].

Business statistics in the Republic of Moldova do not provide enough data for analyzing entrepreneurs differentiated by the age groups. The most representative data concerning the involvement of young people in business activities in Moldova date back to 2009. In accordance with the existing indicators, the proportion of young people from the total number of entrepreneurs accounted for 22.7% from which 2.4% in the group of 15-24 years old and 20.3% in the group of 25-34 years old [1]. Recent data makes it possible to assess only the *involvement of young people in self-employment*: in 2017, the proportion of young people with the professional status "Self-employed workers" accounts for 24.4% in the total number of self-employed. This indicator is relatively lower than the proportion of young people in the total number of employed population – 31.6% (Table 4).

Table 4

Self-employed young workers by age group, 2017, %

Age groups, years old	Share in the total number of employed population	Share in the total number of self-employed workers
Total	100.0	100.0
15-24	6.6	5.2
25-34	25.0	19.2

Source: Calculated by the authors based on the data provided by the National Bureau of Statistics of the Republic of Moldova [3].

Given the relatively high unemployment rate among young people, the significant proportion of migrants among this group of the population, as well as their insufficient involvement in business/self-employment, we can conclude that the development of entrepreneurship may be an additional opportunity for the young people. This opportunity will provide them a certain level of income in order to feel more confident not only in the economy, but also in all spheres of activity, to participate more active in the public life and probably most important – to choose to live and to work in the home country.

Assessment of the state support policy for SMEs, with an emphasis on attracting young people in business in the Republic of Moldova

By signing the Moldova-EU Association Agreement, the Republic of Moldova is not only interested, but also obliged to take into account the main trends in implementing the policy of supporting entrepreneurship at the level of the European Union, including the successful experience of individual European countries. The analysis of the state policy of SMEs support in the Republic of Moldova demonstrates that a number of laws, strategies and action plans provide support for various groups of the population who want to establish or to develop their own business. This support is aimed to a large extent at involving youth in business.

The article 11 from the Law of the Republic of Moldova on Small and Medium-Sized Enterprises [12], which entered into force in 2016, is devoted to state programs for the development of SMEs. In particular, there are 6 main directions, and for some of them, state programs are envisaged, the first of which being the support of young entrepreneurs in launching a business in the country.

The main policy document adopted at the national level – Small and Medium Enterprise Sector Development Strategy for 2012-2020 [11] and the Action Plan for the implementation of the given strategy for 2018-2020 also includes a number of measures to support the youth intending to create their own small private business or those who already have it. First of all, there are proposed funding and training to young people as part of a targeted program (point 2.4.1. *Implementation*

of the National Pilot Program "START pentru TINERI" / "START for YOUTH"). Sometimes the focus of state support on young entrepreneurs is carried out only through indicators of progress. For example, measure 2.3.1. *Financing of business in accordance with the Program of attracting remittances to the economy "PARE 1+1"* provides the following data as an indicator of progress: 160 funded investment projects annually, for women and youth. In recent years, along with the Ministry of Economy and Infrastructure and the Organization for Small and Medium Enterprises Sector Development of the Republic of Moldova (ODIMM), the Ministry of Education, Culture and Research has been included in the implementation of measures aimed at engaging in business and supporting young entrepreneurs. In particular, the Ministry is obliged to support actions and initiatives to promote entrepreneurship among young people (p.3.2.3.).

In addition, targeted programs are implemented in the Republic of Moldova directly, aimed at supporting young entrepreneurs. The main ones are presented below.

The program "START for YOUTH: a sustainable business at home". The Ministry of Economy and Infrastructure in cooperation with ODIMM agency has recently launched the national program financed from the state budget. The program aims to integrate young people from the Republic of Moldova into the economic circuit by facilitating the launch and development of sustainable businesses. The program offers two forms of support: (1) financial support, which is implemented through a "business voucher" for access to training and consulting services, as well as financing an investment project, which will not exceed 80% of the required investment in the amount of up to 180 thousand MDL. The second form of support (2) consist in informational, advisory and mentoring assistance at the stages of the development and implementation of an investment project for the next 2 years.

The project "Joint Opportunities in Business for Youth", through which there were presented activities aimed at increasing the entrepreneurial and managerial abilities of young people by applying modern and innovative techniques, developing realistic business plans, promoting and stimulating team spirit, various ways of presentation. The project is funded by the European Union through the Moldova-Ukraine Cross Border Cooperation Program and it is implemented by ODIMM in partnership with Ukraine's "New Generation" Youth Public Organization.

The cross-border entrepreneurial training project *"Joint Opportunities in Business for Youth"* (JOBs4YOUTH). Its purpose is to initiate innovative businesses with a cross-border, social and economic impact, and to guide young entrepreneurs aged between 18 and 35 years. The "Joint Business Opportunities for Youth" project offers them the opportunity to train and also to meet new potential business partners in Ukraine. The project is implemented under the Moldova-Ukraine Cross-Border Cooperation Program and it is financed by the European Union.

"Create YOUiACT" project offers a chance for young people aged 14-25 years to participate in the pre-accelerating program of business ideas. "Create YOUiACT" will include several elements: exchange fields, international mentoring, project ideas contest, training, field trips, etc. The project will focus on seven cities: Chisinau, Soroca, Falesti, Ungheni, Cimislia, Palanca (Stefan Voda), Dubasarii Vechi (Criuleni), and other communities interested in participating. YOUiACT participants have multiple opportunities from which we mention: to benefit from the transfer of ideas and exchange experience; to discover entrepreneurship; to plan and to test a project that will bring a change to the community or the city they live in; to launch a business idea or a project of a social, cultural or economical nature; to take advantage of mentoring and international coaching; to test their creative, competitive and entrepreneurial spirit; to discover their own strengths; to identify patterns of income generation; to present a business idea and identify the audience, and so on.

Facilitating credits for youth. The launch of the Youth Credit Facility is initiated by the Ministry of Finance and it is fully based on the available funds of current investment credit lines funded by state external loans for the real sector development, which are granted by the World Bank and the International Fund for Agricultural Development. Implementation of YCF aims to reduce the constraints related to young people's limited access to favourable financial resources and to provide additional support by reducing interest rates on loans.

In addition, a few digital platforms are launched to help young entrepreneurs as the Platform for Cooperation and Business Support on "Promoting Innovation among Young Entrepreneurs"; UpFactory; FabLab Chisinau, etc.

Together with public institutions, business associations also get involved in the process of supporting young entrepreneurs in the field of business. For example, the National Association of Young Managers with the support of the ARGIDIUS Foundation, ODIMM and local partners, organizes the National Youth Business Plan Contest. The participants are involved in training courses and mentors' consultations, they present the developed business plans in front of a professional jury, and finally, the winners receive grants for business initiation or development [2].

Ensuring self-employment and involvement of graduates of vocational education and training institutions in business

In accordance with the Education Code, centres of excellence, colleges and VET schools are related to the vocational and technical education in the Republic of Moldova. Education in these institutions is offered for more than 80 professions and 100 specialties, which are adjusted annually considering the requirements of the labour market. Currently, 11 model centres, 32 colleges and 44 vocational schools are operating in the country. In the scholar year 2018-2019, 7.700 pupils were enrolled in secondary technical education and 29.000 pupils in post-secondary technical vocational education.

In recent years, many significant innovations have been made in the VET system in the Republic of Moldova: dual education has been introduced, the financial autonomy of VET institutions has been increased, and measures have been introduced to improve career guidance, etc. The most significant innovations include the implementation in 2012-2016 of a series of measures of teaching the basics of entrepreneurship to students from vocational education and training institutes. In this respect, the National Curriculum for the "Entrepreneurship Basics" discipline has been developed within the secondary vocational technical education institutions. The discipline is oriented towards the formation of competencies in pupils that will allow them to capitalize efficiently their own professional potential, and for the future – the effective initiation and management of some entrepreneurial activities. In a wider context, these skills must help young people to become more creative and active in any activity they will carry out in their personal and social lives. In addition to the Curriculum, a set of documents has been developed for teachers, aimed at increasing the quality of the teaching process and providing support for pupils in assimilating the new discipline. The set of documents include: The Methodological Guide for Teachers; Suggestions for designing lessons in the "Entrepreneurship Basics" discipline; Student specifications notebook. Further, taking into account that the role of the lecturer in the learning process is a priority, training programs have been organized for the teachers involved in teaching the "Entrepreneurship Basics" discipline. Also, there were organized trainings for those who were interested and prepared business plans for investors. The purpose of this action was to facilitate the establishment of the businesses by the graduates of the technical vocational education institutions. Some of the training participants received mini-grants to initiate their own business. Most of the above mentioned actions have been implemented by the Centre for Entrepreneurial Education and Business Support jointly with the Ministry of Education, Culture and Research with the support of the external donor.

In order to assess the implementation of the noted measures in 2016-2017, the Tracer study on the professional route of the graduates of technical professional education institutions in the Republic of Moldova was conducted, which was organized by the Centre for Entrepreneurial Education and Business Support (Executive Director – Sofia Shuleansky). The study has been carried out within the framework of MEEETA – Moldova project (IIIrd phase) “Employment and Entrepreneurship Education and Training Activity” implemented with the financial support of the Liechtenstein Development Service Foundation [5].

Tracer Study Results. During the study, 90 graduates of VET institutions have been surveyed. The average age of the surveyed graduates was 22.3 years old. Boys dominated (57.8%) in the sample. Relatively most of the respondents (55.6%) live in rural areas.

Almost half of the respondents (47.6%) indicated that they are employed. In the same time, a relatively high proportion of respondents – 39% initiated a business or were self-employed: 32.9% established a business where they were self-employed and another 6.1% – established business and employed people. Also, some of the graduates indicated that they were employed and established a business at the same time. 4.9% were unemployed during the survey (Table 5). Girls indicated that they were employed relatively more often than the boys; young men relatively often noted that they had established their own businesses.

Table 5

Labour status of graduates of VET institutions

Labour status	*% of respondents*
I am employed	47.6
I set up a business where I am a self-employed	32.9
I set up a business and I hire employees	6.1
I am unemployed	4.9
Others	8.5
Total	100.0

Source: Outcomes of the survey [5].

Graduates who created their business or were self-employed indicated that various people or events encouraged them to establish a business. Most often (42.0%) they reffered to family members and close relatives. Every fifth respondent (20.0% of the sample) noted that teachers from education institutions encouraged them to start a business. Examples of surrounding people who already have a business also served as a significant reason – 16.0% (Table 6).

Table 6

Sources of encouraging the establishment of the own business

Sources of encouraging the establishment of the own business	*% of respondents*
Family, close relatives	42.0
Teachers from the educational institution	20.0
Examples of surrounding people who already have a business	16.0
Friends, neighbours	8.0
Success stories read in literature, Internet	8.0
Others	6.0
Total	100,0

Source: Outcomes of the survey [5].

Among all the respondents, 90% of the surveyed graduates have studied the "Entrepreneurship Basics" discipline. 78.8% of the respondents indicated that the knowledge gained in the framework of this discipline influenced significantly the students to start a business. For 15.2%, the impact of the discipline was not significant (6.1%), or was absent – 9.1% (Figure 1).

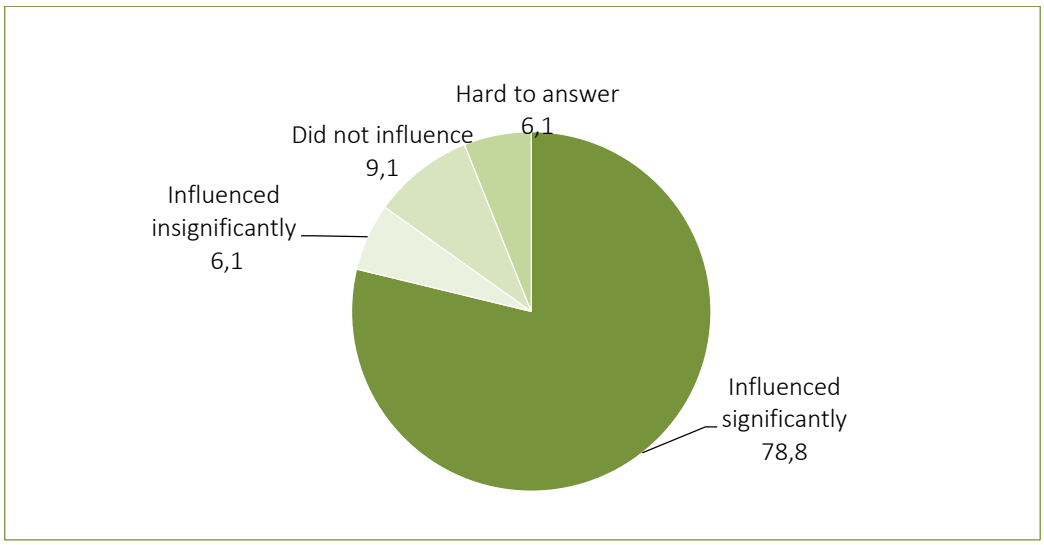

Figure 1. Influence of the "Entrepreneurship Basics" discipline on the decision to establish a business, %

Source: Outcomes of the survey [5].

82.2% of the respondents from graduates of VET institutions completed post-VET training on entrepreneurship. The graduates involved in the trainings, in general, highly appreciated their importance for their careers. When giving a general evaluation of the training, 80.8% indicated on it's high importance (32.9%) and very high importance (47.9%). In fact, all graduates of VET institutions, who subsequently participated in business training, have set up their own business.

2/3 of respondents (66.7%) mentioned that starting a business was not easy for them. The businesses created by the graduates, in most cases (77.4%) are not registered. Young entrepreneurs, while explaining the reasons why they did not register their businesses, indicated, first of all, on high tax rates or small turnover / income / profit, which makes official business registration unprofitable. Directly or indirectly, this was noted in most responses. Other reasons for informal business activity include lack of building and agricultural land (for registering a peasant farm), seasonal work. Only one answer indicated on the lack of financial resources to establish a business.

The graduates involved in entrepreneurship were asked what is the biggest obstacle for them to develop their business. The lack of financial resources was indicated most often (in every fifth response). Other obstacles were related to the lack of qualified personnel, the general economic situation in the country, the narrow internal market and high competition, as well as insufficient experience in the field. Half of the graduates pointed the business problems that are caused by limited access to resources (lack of equipment, premises, expensive raw materials), as well as unfavourable conditions of the business environment related to legislation, high tax rates and local administration activity.

Analyzing the perspectives of the business/personal career in 1 year and 5 years, a relatively large proportion of the respondents expressed the intention of developing/ expanding their business. 48.6% of the respondents indicated on this perspective in 1 year; in 5 years, even more respondents (60.6%) saw the prospect of growth for their business. Maintaining the business at the same level in 1 year is planned by 40.0% of graduates, while in 5 years this number will be much less 33.3%. Only 5.7% of the respondents see the prospect of closing their own business in 1 year. The same percentage of the respondents (5.7%) plan to go abroad to search a workplace or to emigrate (Table 7).

Table 7

Career perspectives of business / personal business in 1 year and 5 years, % of respondents

Career perspectives	*In 1 year*	*In 5 years*
Develop / expand the business	48.6	60.6
Maintain the business at the same level	40.0	33.3
Closing the business and looking for a job as an employee	5.7	-
Migration to work or emigration	5.7	6.1

Source: Outcomes of the survey [5].

The respondents have also indicated on the required support. Accordingly, the first place is occupied by the need for finance (37.5%). To a lesser extent, but also significant, there was a need for information (20.0%), consultations (15.8%) and training (13.3%) (Table 8).

Table 8

The need for support for successful development of the career

Types of support	*% of respondents*
Financial resources	37.5
Information	20.0
Consultancy	15.8
Training	13.3
Space	10.8
Others	2.6
Total	100.0

Source: Outcomes of the survey [5].

The majority of the respondents (66.7%) do not know about institutions that can offer such kind of support. The graduates that recognized the supporting organisations, indicated on the

following ones: CEDA (Centre for Entrepreneurial Education and Business Support); AFA (Business Women Association of Moldova); ODIMM (Organization for Small and Medium Enterprises Sector Development of the Republic of Moldova); IFAD (International Fund for Agricultural Development); financial institutions.

Main conclusions

The policy of the government of the Republic of Moldova aimed at supporting SMEs is focused on engaging various groups of population in business, first of all – the young people. This is reflected both, in the basic laws and policy documents related to the development of SMEs, and in the targeted programs, projects and other initiatives to promote entrepreneurship among young people. Opportunities for learning entrepreneurship, as well as financing of youths' businesses at the stages of initiating, establishing and developing their business, are mainly provided.

The analysis of the statistical indicators shows that in the Republic of Moldova the unemployment rate among the young people is relatively higher than the average for the economy. In the same time, young people amount for more than half of the total number of population of 15 years old and over, employed or searching for a job abroad; the share of young people involved in self-employment in the total number of self-employed is relatively lower than the proportion of young people in the total number of employed population. The data mentioned above suggests that the development of entrepreneurship/self-employment among young people is very important. It can serve as an additional opportunity for youth that could provide them a certain level of income, to feel more confident in all spheres of life, to actively participate in public life and to remain living and working in their country.

The experience of engaging young graduates of VET institutions in entrepreneurial activity was analyzed in the framework of the Tracer study on the professional route of the graduates of technical professional education institutions in the Republic of Moldova. Nearly half of the respondents indicated that they were employed. At the same time, a fairly high proportion of the respondents (39%) initiated a business or were self-employed. Some graduates indicated that they are employed and have their own business, which can be explained by the insufficient level of entrepreneurial income. Low income is largely due to the fact that the businesses created by the graduates of VET institutions, in most cases are not registered. It is also important to mention the fact that a relatively large part of the respondents indicated the intention to develop or to expand their business: almost half of the respondents indicated such a prospect for the following year and even more respondents saw this as an opportunity for the next 5 years.

The public administration body that develops and implements education policies (Ministry of Education, Culture and Research) acted as motivator and partner to involve the graduates of VET institutions in the business. Together with the non-governmental non-profit organization they actively supported reforms in the educational sphere, promoting entrepreneurship in the field of vocational education (CEDA – The Center for Entrepreneurial Education and Business Support). In this process were involved also the external donor interested in supporting the education system in Moldova (LED – Liechtenstein Development Service) which provided financial resources, and, of course, vocational institutions that are aware of the need for a change. This proves that the support of young people in ensuring self-employment and the establishment of enterprises becomes more successful due to the joint efforts and close cooperation of the interested organizations.

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MODERN METHODS OF VALUATION OF INVESTMENTS' ECONOMIC EFFICIENCY IN THE AGRICULTURAL BUSINESS

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The period of transition of the national economies from the socialist system to the market economy system is marked by a whole series of economic and social events, where investments represent a driving force for the country's economic development. The aim of this research is to provide scientific assistance on the widespread use of modern methods, recognized in developed industrialized countries, to elaborate and/or evaluate investment projects on the basis of which the indigenous agricultural sector will be able to survive in harsh conditions of often unfair competition from the part of Western agricultural producers. The main research methods are qualitative and quantitative analysis of economic events, comparative and statistical comparisons, dynamics and trend studies, economic and mathematical methods to justify the economic efficiency of investments, etc. The results obtained from the out carried research are the algorithms of calculation and performance indicators for assessing the level of economic efficiency of agrarian business investments, which are successfully used in the Western European countries for many years, but totally ignored within the national economy of the Republic of Moldova.

Keywords: *evaluation, investment projects, modern methods, agrarian business, economic efficiency.*

Perioada de trecere a economiei naţionale de la sistemul socialist spre sistemul economiei de piaţă este marcată de un şir de evenimente economice şi sociale, din care, în mod deosebit, evidenţiem investiţiile – forţă motrice pentru dezvoltarea economică a ţării. Scopul cercetării îl constituie asigurarea asistenţei ştiinţifice privind utilizarea largă a metodelor moderne, recunoscute în ţările industrial dezvoltate, de elaborare şi evaluare a proiectelor investiţionale în baza cărora sectorul agricol autohton va fi capabil de a supravieţui în condiţiile dure de competitivitate, deseori, neloială din partea producătorilor agricoli occidentali. Metodele principale de cercetare sunt: analiza calitativă şi cantitativă a evenimentelor economice, comparaţiile pare şi cele statistice, formarea rândurilor dinamice şi studiile trendurilor, metodele economico-matematice de argumentare a eficienţei economice a investiţiilor etc. În calitate de rezultate, obţinute în urma cercetărilor efectuate, pot fi numite algoritmele de calcul şi indicatorii de performanţă privind evaluarea nivelului de eficienţă economică a investiţiilor în businessul agrar, care, ani la rând, sunt utilizate cu succes în ţările vest-europene, însă, practic pe deplin, ignorate în cadrul economiei naţionale a Republicii Moldova.

Cuvinte-cheie*: evaluare, proiecte investiţionale, metode moderne, business agrar, eficienţă economică.*

Период перехода национальной экономики от социалистической системы к системе рыночной экономики отмечен целым рядом экономических и социальных событий, одним из которых следует признать инвестиции, являющиеся движущей силой экономического развития страны. Цель исследования – оказать научную помощь в широком распространении современных методов, применяемых в промышленно развитых странах, для разработки и оценки инвестиционных проектов, с помощью которых местный сельскохозяйственный сектор сможет выжить в непростых условиях зачастую нелояльной конкуренции со стороны западных сельхозпроизводителей. Основными методами исследования являются качественный и количественный анализ экономических событий, статистические сравнения, исследования динамических рядов и сформированных на их основе трендов, экономико-математические методы обоснования экономической эффективности инвестиций и др.

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В качестве результатов, полученных на основе проведенных исследований, можно назвать алгоритмы расчета и оценочные показатели уровня эффективности инвестиций в аграрный бизнес, которые годами успешно используются в странах Западной Европы, но практически полностью игнорируются в рамках национальной экономики Республики Молдова.

***Ключевые слова**: оценка, инвестиционные проекты, современные методы, агробизнес, экономическая эффективность.*

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Introduction. There are almost three decades since the declaration of independence of the Republic of Moldova (August 27, 1991). During this period, many sectors of the national economy have been successfully adapted to the new conditions of economic activity, based on the market mechanisms and management, primarily those with private ownership above the means of production, including agricultural land. As a result of the permanent reduction of the number of people employed in agriculture, at present only 32.3% of the total number of employees in the national economy are agricultural workers. One of the key factors, contributing to the low level of attractiveness of jobs in agriculture, is the lack of permanent (year-round) jobs, and most importantly, significantly lower wages, which do not exceed 2/3 of the average for the national economy, even in the most demanding period of the year (season of the most intensive agricultural works).

Investments in the agricultural sector are intended to increase and improve the production capacities of farms, to contribute to the increase of standards of living in rural areas, as well as poverty alleviation. Well-defined and well-thought investment projects in the agricultural sector could contribute to the development not only of the economic agent involved in the sector, but will have positive impact also on the population from a certain area where the project is implemented.

The aim of the paper is to offer a scientific approach to the investment projects in agriculture, which is also a novelty in this field, as previous research on this specific topic in the Republic of Moldova is not sufficient and has not been studied at a large extent.

Even if the study bears a theoretical character, providing methods of assessment of investment projects, its applied feature can not be denied, due to the fact that the calculations provided in the research can be further used is order to assess a specific investment object.

The degree of scientific approach to the topic and its presentation in the scientific literature. The detailed analysis of the degree of depiction of the problem in question, i.e. assessment of the investment projects in the agricultural sector, in the scientific literature of the Republic of Moldova serves as the basis of a univocal conclusion that fragmented analysis of the problems of efficiency of the investment activity have been adequately reflected in the researches of the local scientists. For example, Svetlana Albu [5] investigated the issues of the assessment and management of the national heritage; the problems of work organization and efficient agricultural management were studied in depth by the Moldovan scientists – Petru Turcanu, Alexandru Stratan, Dumitru Parmacli, Natalia Mocanu, Elena Timofti and others [6; 7; 8; 9; 10]. At the same time, the efficiency aspect of investments in the agrarian sector, approached as an initial stage of shaping the future agricultural potential, with the application of truly modern Western methods, was undertaken in one paper [11], which obviously is not sufficient and do not ensure adequate resolution of the issue of efficiency of investments in agriculture.

Data sources. The database of the initial information was composed by the monographs, articles, textbooks, etc. both of the scientific workers and university teachers, as well as the works of foreign scholars in the field of investment efficiency, evaluation of real estate objects, including agricultural land. Besides this, the data provided by the National Bureau of Statistics of the Republic of Moldova was consulted, which is properly reflected in the statistical yearbooks for the respective years. Nevertheless, the paper uses a personal scientific approach of the author, who provides a set of methods of evaluation of investment projects in the agricultural sector.

Results and discussions of scientific research. Unlike a number of ordinary purchases, which each of us makes, almost daily, without even thinking about their rationality or irrationality,

investment expenditures require a more deeply and comprehensively weighed preliminary justification.

Taking into account some specific existing features, there are many reasons for a detailed initial analysis of future investments, the main ones being as follows:

- investments are made, as a rule, for a long term and are often deprived of the possibility of a "reverse motion";
- all investment projects usually require essential financial expenses and, therefore, in addition to its own funds, the investor usually also requires borrowed financial resources;
- large relative and absolute costs, as well as long periods for the implementation of investment projects, determine their increased level of risk;
- due to limited financial resources and almost unlimited opportunities for investments, each investment proposal currently has, as a rule, not one, but several alternatives, making it difficult for the investor to take a final decision.

From the above list of main reasons for pre-investment analysis, we can conclude that there are many potential options for investment. It may seem strage, but this polyvariance of potentially existing directions of investment, in the end, hinders the process of making argumented final investment decisions.

In order to overcome the contradiction mentioned above, the present study assumes the use of a diversified system of indicators capable to identify clearly the most effective investment option for each particular case, from the many available alternatives.

As an initial stage of substantiation of future investment decisions, we consider the market of agri-food products, which includes a wide range of goods and services for the production, processing, storage, transportation and sale of both raw agricultural materials and ready-to-eat final products.

The market of agri-food products: current state and development prospects. The market of agricultural products is closely related to the market of food products, for which it delivers the main part of raw materials and serves as the natural basis for the formation of the latter, but does not duplicate it. The essence of the difference lies in the well-known diversity of both agricultural and food products, their wide diversification and constant renewal. At the same time, an increasing proportion of agricultural products find their final consumption outside the food market (for example, the production of biofuels). In turn, a very dynamic development is observed in areas of food production that are alternative to agriculture (hydroponic cultivation of vegetables, production of synthetic types of protein, suitable for nutrition, etc.).

Due to the differences mentioned above, retaining the property of a whole, the agri-food market is divided into (i) the market of agricultural goods and services, as well as (ii) the food market.

The next distinguishing feature is the fact that both of them: the national and the global level of agricultural market, in the quality of a specific fragment of the market economy (as a whole), steadily provides the largest number of jobs. Also, in the third world countries (including the Republic of Moldova), the agricultural market provides the largest volume of market turnover (in terms of money) compared with the other sectors of economic activity.

Thus, according to the latest statistics (as already noted), the agricultural sector of the national economy (agriculture, forestry and fish farming) provides jobs for 390 thousand people, which is 33.7% of the total employed population. Together with the workers in industry, transport and trade, the total number of workers engaged in the production, processing, transportation and sale of agri-food products exceeds 570.0 thousand people, which is approximately 46.7% of the total number of people from those employed in the national economy. At the same time, the volume of agricultural production in 2017 amounted to 33.0 billion lei, and the retail turnover of food products – 18.2 billion lei, or 37.4% of the total retail turnover. Particularly noteworthy is the steady increase in the share of food products in the total retail turnover in recent years.

Given the fundamental importance of this trend, primarily for those who will make the final decision on investments in agribusiness, it should be noted that it is based on:

- massive movement of rural residents to cities and municipalities of the Republic of Moldova after the completion of the privatization of agricultural land and other fixed assets of the agriculture, which took place in 2000;

- constant growth in the purchasing power of an ever-increasing number of citizens living in urban areas, due to both, a general increase in the standard of living and higher labor productivity (and, consequently, the wage for it) in non-agricultural sectors of the national economy.

Against the background of the all above mentioned, it should be noted also the dynamic and stable growth of the level of marketability of agricultural production, which reached (by the end of 2017) – 47.5%, which is a record for domestic agriculture.

In addition, according to the results for 2017, the profitability of sales of agricultural enterprises, noted by the statistical bodies, was with 2.2 percentage points higher than the average level of this indicator in the national economy and amounted to 21.1% in average annual terms [1, table 22.13.].

At the same time, there are substantial reserves for the growth of both agricultural productivity and the volume of retail turnover of food products, respectively, per average annual worker or per capita (Table 1).

Table 1

Labor productivity in agriculture and the volume of retail turnover of food products

Years	Gross domestic product (market prices) per capita, lei / year	Labor productivity per one average annual agricultural worker, lei / year	Retailing food products	
			per capita, lei / year	per one average annual agricultural worker, lei / year
2000	3741.6	10807.8	952.4	1886.2
2005	10457.7	23627.6	1004.5	6725.1
2010	20171.5	63088.9	2259.7	25553.0
2015	34503.4	71185.9	4354.7	40528.3
2016	38106.7	73873.5	5112.4	44196.8
2017	49783.7	87543.6	5115.6	50922.8

Source: Statistical Yearbook of the Republic of Moldova for relevant years.

The main estimates, made on the data of table 1 are:

- if at the beginning of the period (2000) the labor productivity in the agricultural sector was only 10.8 thousand per worker, per year, then at the end of this period (2017), the labor productivity level in the agricultural sector was already 87.5 thousand or 8.1 times higher;
- the growth in the productivity of agrarian labor was relatively high, but the retail turnover of food products per agricultural worker increased (for the period analyzed in Table 1) even more rapidly – by 27.0 times compared to the beginning of this period (2000). Correspondingly, if at the beginning of the period the productivity of one worker, achieved in domestic agriculture, allowed us to satisfy the needs of approximately 2 people, then at the end of the period (2017) this indicator was already nearly 10 people;
- it is quite obvious that substantial growth in both labor productivity in agriculture and the retail turnover of food products per one average annual worker in this sector, for the entire analyzed (post-privatization) period were achieved, first of all, due to a reduction in the number of employees (from 766 thousand people in 2000 to 390 thousand people in 2017).

Despite the positive dynamics of the main indicators of the development of the food products market in the Republic of Moldova, achieved as a result of relatively high growth rates of agricultural labor productivity, in turn, based on private ownership, these indicators are still significantly inferior to many similar indicators of industrialized countries from Western Europe and North America.

This circumstance serves as the starting point of the statement about the existence of substantial reserves for increasing both labor productivity and other quantitative and qualitative indicators of the development of the domestic agri-food sector, including crop yields, animal and poultry productivity, growth in the level of profitability of the agricultural business, etc. It has to be underlined that permanent relative and absolute reduction in the number of rural population, which leads to a stable decrease in the number of agricultural workers, irrefutably testify the need for a smaller number of workers to assure with high-quality and diverse food the increasing number of

urban population. Therefore, it is impossible to achieve such results without the help of investments aimed at:

- the acquisition and practical use of modern technologies for the cultivation of crops (raising animals and poultry), including new highly productive and resistant to stress factors plant varieties and breeds of animals and poultry;
- introduction of the most advanced organizational forms and methods of agricultural production, integrated into a single (cross-cutting) technological chain – "from the producer's field / farm to the consumer's table";
- selection, justification and practical application of optimal composition of production structure, levels of its specialization and/or concentration, allocation of capital in the most efficient for these specific conditions sub-sectors of agricultural production.

Even this small list of possible solutions to the problem of capital investments clearly indicates the need for a detailed, scientifically based and practically proven guide in the field of agribusiness investments. The presence of many options for investment decisions, as has already been stressed out, does not simplify but, on the contrary, complicates the management decision-making process, making it fragmentary, based, at best, on the experience of other investors, at worst – on intuition or simply by occasionally appearing information.

Nevertheless, the implementation of capital investments should be based on systemic, strictly reasonable and reliably verified calculations. Modern scientific concepts of financial and, above all, investment management really serve as the theoretical basis for making management decisions in the field of investment. The advantage of these concepts lies in the fact that regardless of their internal content, they are all deprived of an ideological background, contain no political preconditions and are capable of justifying the final results of various investment decisions with a high degree of probability.

In contrast to the overwhelming majority of previously published and practically applied methods for determining the effectiveness of investments, such practical guidance for making management decisions in the field of agribusiness involves evaluating the effectiveness of investments, based on actualized (discounted) cash flows, generated by one investment project or another.

Calculation of investment efficiency based on financial flows. It is considered that the accounting department of the enterprise (company) should answer all the questions regarding the existing and/or future investments. In fact, among the many types and forms of financial statements there is a report "On cash flow", which, in principle, should contain information about all investment projects of the company. Naturally, about all existing, for which the accounting department of the company has clearly established (fixed) costs and final (received) results.

If we are talking about newly emerging investment projects, accounting data on them, of course, does not exist. Therefore, the relevant information should be contained in the project itself. Moreover, reputable enterprises (mainly corporate structures) in order to make truly objective, well and comprehensively weighted investment decisions, as a rule, require the development of not one, but several, so-called alternative projects.

As a result, based on modern theoretical developments, the most progressive (corporate) practice of financial management regarding investment politics decisions is based on the expected provision (by relevant projects) of the cost-benefit ratio, measured by calculating former and future cash flows (CF).

From the above mentioned, it follows that the calculation of cash flows assumes coverage of all types of costs from previous periods (for example, years) and even more complex accounting of cash inflows from future periods. The difficulty lies in the fact that both of these periods (past and future) are very long. As a rule, they are measured in years, and in some cases – in decades of years. A significant part of investment projects (for example, the purchase of land) has no time limit at all. It is well known that, unlike many other types of fixed assets, used in agribusiness, a land plot (in case of its rational use) not only does not lose its biological (read – fertile) qualities but, on the contrary, multiplies them. For this reason, (in particular) land plots are not subject to depreciation, which makes them particularly attractive as an object of investment.

The method of measuring and comparing cash flows is not the only one decision-making method in the field of scientific argumentation of investments. Many investment projects (especially in the pre-reform period of development of the national economy) were developed and implemented in order to solve purely applied tasks, for example, to ensure the production of grain crops at least 1 ton per each citizen of the country per year.

Another widely known, but no less ideological, approach to making decisions in the field of investments is the method of comparison. As a rule, separate, previously achieved indicators of different countries (regions) are compared, which in itself is methodologically erroneous, given the huge number of existing factors, the differences between which make the comparison method practically unacceptable.

As will be shown later, the cash flow investment decision making method is also based on separate comparison fragments. However, in this case we are talking about comparing the cost streams with the revenue streams, provided by these costs. The integrity of the investment project, as an object of research, more precisely, the object of evaluation of the designed investment, is not violated here, which leads to the exclusion of the possible (positive or negative) influence of external factors.

Calculation of cash flows for the development of investment projects. As already noted, the theoretical basis for the development of modern investment projects are cash flows, consisting of:

- construction costs of the investment object;
- current operating costs occurring during the operation of the investee;
- revenue, and ultimately – the net income, received as a result of the operation of the investment project.

Taking into account the fact that between the start of project development and the receipt of future outcomes there is usually a significant (in time) period, it is important that the planning and pre-planning calculations take into account real-life needs of expenditure, as well as the most reasonable cash receipts, due to these costs (equally investment and current).

The main source of information for calculating investment costs is a cost estimate (technological maps) for laying a unit of an orchard, vineyard, greenhouse, farm, etc.

If the investment project provides for the production and sale only a single type of product (for example, production of plums for fresh sale), then planning cash flows at the beginning of the project can be simplified, considering the rise in the selling price in proportion to the expected rate of inflation for the entire period of the project.

However, in the overwhelming majority of cases, the quantity of produced products will be significantly more than one (due to the need to respect the crop rotations, the rational use of acquired technical means, the available labor, etc.). In this regard, it is recommended to calculate the average value of cash flows (monthly operating costs and net cash proceeds) for the first year of operation of the project according to Table 2. In subsequent years, the performance of the project is expected to be estimated by the average rate of increase in costs and an adequate increase in outputs (final results), based on the expected yield increase and the dynamics of changes in selling prices, taking into account the level of inflation.

The payback period and the coefficient of efficiency of investment in case of the "zero" level of inflation. As a commentary to the title of this section, it should be noted that for various reasons, which do not depend on the choice of investor, each investment project will be implemented either in the inflation or deflationary economic system.

"Inflation" means the depreciation of money, accompanied, as a rule, by an increase in prices for goods and/or services. The economic essence of inflationary phenomena is widely covered in the special literature, so we will not describe it. We only emphasize once again that, unlike deflation, which, on the contrary, represents an increase in the purchasing power of currency notes and, as a result, a decrease in prices for goods and/or services, the inflation scenario of the development of the national economy is more attractive for investors.

Taking into account the availability, magnitude and trends of a number of pricing factors, as well as factors of profit (loss), debt, economic growth, etc. the current financial and economic state of the Republic of Moldova can be characterized as stably inflationary with a gradual approach to the “zero” level of inflation and the subsequent transition to a deflationary scenario of economic development.

Considering all the above mentioned, and also taking into account the experience of other countries, primarily Japan, the period of attaining the state of "zero" inflation for the Republic of Moldova is measured for at least decades.

Table 2

Cash flow planning, based on operational costs and results, lei

Name of crops	Expenditure of previous periods	Month												Total for the year
		1	2	3	4	5	6	7	8	9	10	11	12	
Cash inflow														
Winter wheat. Other cultures ...									2820		328060			330880
Total receipts								103500	274280	776200	532400	976000		2662380
Cash costs														
Winter wheat. Other cultures ...	56748			5818	13516	15170	5850							97102
Total variable costs	193485			84731	78657	116576	106554	73981	44878	168413	19861			887136
Fixed costs, total		11499	11499	19269	11499	11499	19269	27139	11499	19269	11499	11499	182122	347461
Total costs	193485	11499	11499	104000	90156	128073	125823	101020	56377	187682	31360	11499	181122	1234597
Cash flow														
Availability of money at the beginning of the period		-193485	-204984	-216483	-320483	-410639	-538715	-664537	-662057	-444154	144364	645404	1609905	x
Arrival (+)		-	-	-	-	-	-	103510	274280	776200	532400	976000	-	2662380
Expenses (-)	-193485	-11499	-11499	-104000	-90156	-128073	-125823	-101020	-56377	-187682	-31360	-11499	-181122	-1234597
Availability of money at the end of the period	-193485	-204984	-216483	-320483	-410639	-538715	-664537	-662057	-444154	144364	645404	1609905	1427783	x

Source: Author`s calculations.

It is important to clarify that from the point of view of investors and the investment process as a whole, this period is the most favorable for acquiring or/and opening an "own business", obtaining the status of social and financial independence, characteristic for every successful entrepreneur. This clarification is necessary because the essence of the "deflationary economy" scenario, in scientific circles and among entrepreneurs, is consistently associated with the state of stagnation, a return to the administrative methods of economic management. These are quite familiar to older businessmen who laid the foundations of their business back in the 80's of the last century or in the early years of mass privatization in the Republic of Moldova (the end of last century).

As already noted, even theoretically, on the verge of a transition from an inflationary to a deflationary economy, a so-called "zero" inflation period should exist and indeed exists (albeit rather short). What does this period mean, what are its main parameters and characteristics?

The content of this question, as well as the answer to it, has its clear theoretical expression. However, for the purposes of this management (decision-making) oriented article, it is more important to identify the purely practical (applied) essence of the identified problem.

The essence of the state economy at the level of "zero" inflation, as well as (equally) – "zero" deflation, is that during this period both – the purchasing power of banknotes and the actual market prices for goods and services remain unchanged, absolutely stable.

Non-systemic (for example, local, sectoral, etc.) deviations from this stability, of course, can occur. But they will be nothing more than exceptions, which, as we know, only confirm the existence

of a rule. The rule remains itself – the purchasing power of banknotes in the period of "zero" inflation does not change in time, prices for goods and services also remain unchanged. The economy operates in conditions of stable purchasing power of banknotes.

From the point of view of the appraiser of the effectiveness of investments, this is the most simplified version. Since inflation (as well as deflation) is absent, all types of investment costs, regardless of the statute of limitations for their implementation, add up to a total amount (like children's blocks) without any adjustment and without any amendments to the preceding dimensions.

The same thing happens with the end results, obtained from the operation of certain investment projects. Since this is a "clean" end result, i.e. result, cleared of inevitable current costs, which boils down, in principle, to revenue (usually annual) minus all types of operating (i.e., associated with the operation of the name of this investment project) costs. These "clean" results in these conditions (i.e., "zero" inflation conditions) also add up to a single amount like a house of children's cubes – without a single adjustment for the length of the period, separating the capital investment in a particular project from the really obtained profit of its exploitation.

Then, by comparing the obtained "net" results with the previously implemented total investment costs, we determine the payback period of the invested funds, as well as the level of their economic efficiency. We remind you that such a calculation is justified and makes sense only if there is a "zero" inflation, that actually takes place (or simply assumed – in the case of preliminary or test calculations).

Exceptions to this limitation may be situations when the investment project being analyzed and/or estimated in short-term period (within 3 ÷ 5 years), or the inflation rate in this period is absolutely insignificant – within 2 ÷ 3% per annum.

The calculation of the payback period of investments (Payback Period – Tp.p.) is carried out separately for the depreciable components of the investment project and separately for non-depreciable. For non-depreciable components, the calculation of Tp.p. is conducted according to the formula:

$$T_{p.p.} = \frac{IC}{P_{av.an.}} \text{ (years)} \quad (1)$$

where:

IC – the initial cost of investment, lei;

$P_{av.an.}$ – average annual "net" cash flow due to the operation of this (non-depreciable) component of the investment project, lei / year.

If the average annual "net" cash flow is calculated for the depreciable part of the project, the size of the average annual "net" cash flow is increased by the amount of annual depreciation.

Example: An investment project with a cost (IC) of 110 thousand lei ensures profit (net income) in the amount of (thousand lei): 1 year - 50; 2 year - 46; 3 year - 40; 4 year - 30; 5 year - 26. It is required to determine the payback period of this project in the conditions of "zero" inflation.

1. Determine the net average annual income from the operation of above mentioned investment project:

$$P_{av.an.} = \frac{50 + 46 + 40 + 30 + 26}{5} = 38.4 \text{ thousand lei / year}$$

2. The payback period of investment project is:

$$T_{p.p.} = \frac{IC}{P_{av.an.}} = \frac{192}{38.4} = 5.0 \text{ years}$$

Calculation of the payback period of investment projects in the conditions of "zero" (really existing or simply assumed) inflation is an effective and most simplified part of any analysis (any assessment) of investment activity. Due to its simplicity and the absence of the need to use complex mathematical tools, this calculation must necessarily precede any form of investment calculation, regardless of its size (volume), industry sector, etc. It should also be emphasized that the calculation of the payback period is an important first step in choosing the most effective project among the many others – alternative ones.

At the same time, having a number of advantages and being widely used in the practice of developing and making investment decisions, the payback period of investments as an analytical and estimated indicator has significant drawbacks. Along with those mentioned above, another one should be noted, which is very important from the point of view of practical solutions.

The payback period does not give an answer to the question of how much this or that final result of investment activity is achieved. However, in reality, in addition to information about the size of invested capital (IC) and the payback period (Tp.p.), it is also very important for the investor to know which are the main parameters of the project's economic efficiency, in particular – what is its average annual (and final) efficiency. The essence of the problem lies in the fact that not a single investment project, as a rule, can do without attracting borrowed capital, for which, as we know, an investor has to regularly pay a certain percentage. Following this logic, it is reasonable to assume that even if the investor has sufficient capital to implement the project, this investment source is also not free of charge. The investor's own funds have been, deposited at a bank account, could bring him a certain income, which (in this case) is the cost of the investor's own capital.

In other words, any investment proposal may be acceptable provided that its efficiency (i.e. return on invested capital) will be higher than the cost of this capital.

Therefore, for non-depreciable components of investment projects, the efficiency of invested capital is calculated by the formula:

$$ARR = \frac{P_{av.an.}}{IC} \times 100 \quad (\%) \qquad (2)$$

where:

ARR –Accounting Rate of Return – ARR, %;

$P_{av.an.}$ and *IC* – the average annual net cash income and the initial investment cost, respectively [2].

For depreciable components of investment projects (or for depreciable projects subject to depreciation as a whole), formula (2) takes the following form:

$$ARR = \frac{P_{av.an.}}{0,5 \times IC} \times 100 \quad (\%) \qquad (3)$$

if at the end of operation of the project its residual value is zero, or:

$$ARR = \frac{P_{av.an.}}{0,5 \times (IC + RV)} \times 100 \quad (\%) \qquad (4)$$

if the residual value (RV) is greater than zero. In both of the above mentioned cases when calculating $P_{av.an.}$ along with the net operating income, the average annual amount of accrued depreciation has also to be taken into account.

In a market economy, there are no officially established lower and/or upper (minimum or maximum) limits of ARR. Despite this, the minimum level of the efficiency of capital investments, naturally, can not be lower than the average rate of credit, delivered for the national economy in the banking system, which in the Republic of Moldova currently stands at 8.6% per annum. Taking into account the fact that both of the above mentioned indicators (Tp.p and ARR) are significant only in the conditions of "zero" inflation and focusing on their reciprocal value, one would expect to make positive decisions on all investment projects whose payback period on average does not exceed 11.6 years ($\frac{100}{8,6} = 11,6$).

However, in conditions of even moderate inflation, these calculations can lead to erroneous results. As it is well known, under the influence of inflation the efficiency ratio of capital investments decreases, while their payback period, on the contrary, increases.

Methodical approaches to the calculation of the capitalized (future) value of investments in terms of inflation. In the conditions of a market, and even more than that – a market inflationary economy, the ultimate goal of any investment project is to increase the investor's capital. In turn, this multiplication is possible only in the case of successful project operation, meaning a constant and very significant (especially in the conditions of substantial inflation) excess of income over costs, both of which are measured in current prices of the respective years.

The next important feature of calculating the multiplied (capitalized, future, final, etc.) value of investment projects is the need to separate the cash flows caused by a particular project into at least two qualitatively (and quantitatively) different directions:

- the first direction (we will consider it the main one) is that part of the money received, which the investor does not intend to divert to other goals, leaving it to further strengthen and accelerate the development of the business (project);
- the second direction is the funds recovered (received) as a result of the successful operation of the project, which are constantly (or periodically) diverted by the investor to solve other problems that have nothing to do with the analyzed (estimated) investments.

The most of the net cash income (from the project) will be used in the second direction, the less will be the end result of its functioning.

Typical for successfully operating investment projects is the division of the resulting total net income of the investment project in half: 50% of the funds are used for further development (expansion, modernization, diversification, etc.) of the basic project; 50% – to solve other problems, including the payment of dividends to the owner (co-owners), encouraging managers of the enterprise and other goals.

It is quite obvious that the subsequent return of the newly invested (reinvested) in the investment project and/or the funds diverted from it for other needs will be completely different. The methods for calculating the capitalized value are also different for each of the listed ways to use the received net income.

In the case of reinvestment of funds in the development of the project, the calculation of the final results of investment activity is carried out on the basis of a compound interest formula (Compound Rate of Return – CRR).

If the funds received as a result of the effective (profitable) activity of the project are not reinvested in the development of the project, but are diverted to other goals and/or needs of the owner of the company (including to solve his personal problems), the calculation of the final (capitalized) project cost is effectuated on the base of simple interest formula (Simple Rate of Return – SRR).

Before proceeding directly to the essence of the above mentioned methodological approaches to the calculation of the final (capitalized) or future project value (Future Value – FV), let us take a closer look at some specific fragments of separate accounting of cash flows, generated by a successfully functioning investment project.

First of all, it should be noted that the distinction between the cash flows generated by the investment project is clearly reflected in the documents of the company's accounting statements. The amounts of money sent for the development of an enterprise are reflected in the balance sheet on the liabilities side under the name “Retained earnings”, which naturally increases from year to year. Also the report on retained earnings reflects the monies paid to the owners of the enterprise (project) in the form of dividends, which, in turn, will be used for personal purposes and the needs of investors (founders or simply co-owners of the enterprise).

As a separate note, it should be emphasized that “Dividends received” and “Retained earnings” are only the part of the existing forms of returning money to capital, invested in an investment project. The part of revenue returned to owners funds is also replenished due to depreciation deductions and, to a large extent, due to the remuneration of labor of both the investor(s) and their family members. Despite the fact that both of these sources belong to the category of costs of the enterprise, and their practical transformation into monetary form occurs only at the time of sale of manufactured products in the respective sales markets, for the vast majority of potentially existing investors in agribusiness they are an essential additional source of income.

Returning to the question of methodological approaches to the calculation of the future, or accumulated (capitalized) income, depending on the direction of use of the resulting return, we note the following:

a) The received cash income is completely reinvested in a valid investment project. In this case, as it was already mentioned, we will use the algorithm of Compound Rate of Return (CRR):

$$R_{nc}=P_o \times (1+r)^n, \text{ lei} \quad (5)$$

b) The received cash income is completely distracted from the existing investment project and is directed to other goals and needs.

In this case the algoritm of Simple Rate of Return – SRR, will be:

$$R_{ns}=P_o \times (1+rn), \text{ lei} \quad (6)$$

where:

Rnc (CRR) and Rns (SRR) are respectively the capitalized (future) value of the investment project, calculated (option "a", formula 5) using the compound interest rate of return formula and (option "b", formula 6) using the simple interest rate of return formula (lei);

Po = IC is the initial cost of the investment project, lei;

r is the established level of profitability of an investment project (specific units);

n is the number of operation periods of the project and, accordingly, the number of periods for calculating the capitalized value.

Analyzing the content of formulas (5) and (6), at first glance it becomes clear that if the number of calculation periods is one (only), then the results of the calculations in both cases will be the same. In all other cases, however, these results will be significantly different.

The difference between the above mentioned two methods of calculating the accumulated (capitalized or future) value will be considered on a specific example.

Example: It is required to calculate the final amount of capital accumulation obtained as a result of making an investment in the amount of 1000 lei, if used: a) compound interest rate formulas; b) simple interest rate formulas, taking into account the following conditions: $r_{an.}$ = 20%; settlement periods are: 90 days; 180 days; 1 year; 5 years; 10 years (a year has 360 days) [3]. The calculation results are summarized in table 3 (fig. 1).

Table 3

The results of the calculation of the capitalized (future) value of the investment, depending on the number of calculation periods and methods, thous. lei

Algorithm (method) of calculation	90 days *n*=1/4	180 days *n*=1/2	1 year *n*=1	5 years *n*=5	10 years *n*=10
a) compound interest rate formula;	1,0466	1,0954	1,20	2,4883	6,1917
b) simple interest rate formula	1,05	1,10	1,20	2,00	3,00

Source: Elaborated by the author.

Thus, as follows from the above reflected example, if the interest accrual period is less than one, then the calculation using the simple interest rate formula gives a larger final result, compared to the compound interest rate formula. If the number of charges is greater than one, then the result of the calculation of the accrued amount will (with time) significantly exceed the results of alternative calculations, in this case, calculations made according to the simple interest rate scheme.

With ten periods of calculation, as follows from above mentioned example, the accrued amount of an investment project (calculated according to the compound interest rate scheme) will more than double the same result, obtained using the simple interest rate scheme. In the economic literature, this phenomenon is characterized as "calculation of interest on interest", suggesting that, according to option "a", the investor does not withdraw money from his project, expecting them to increase more and more as a result of capitalization of the accrued amounts of money.

If we depict the situation graphically, then it is quite obvious that the simple interest rate method will reflect a steady increase of capitalization in an arithmetic progression. In other words, by the end of the ten-year period, the total amount of money will increase threefold and reach 3,000 lei (although on the project will still be the original amount of 1,000 lei).

As for accumulation under the compound interest rate scheme, it is also quite obvious that by the end of the 10-year period, the total amount of money will exceed the initial amount by almost 6.2 times (6191.7 lei), the total volume of money will increase exponentially. In both cases, however, the greater the growth rate will be, the larger the total amount of money, accumulated in the framework of investment project.

Another example of using simple interest rate to calculate the capitalized value is the lease of a land plot, as a result of which the land owner uses all received rental payments, for his own, let's say, purely personal purposes. If, suppose, the same amounts of cash payments are used by the lessor to make the necessary improvements (for example, irrigation of the plot), then we should expect a subsequent increase in the amount of rent, which should be regarded as a "interest on interest" payment phenomenon, in this case, the capitalized amount is calculated using the compound interest rate formula. Many agribusiness investment projects are burdened with a number of natural restrictions (land size, for example, can not be increased if neighbors do not intend to sell their land; there is not much possibilities for improvement, etc.). In this case, an increasing part of the cash flow due to one investment project, investors will divert and use to initiate other, as a rule, more advanced projects.

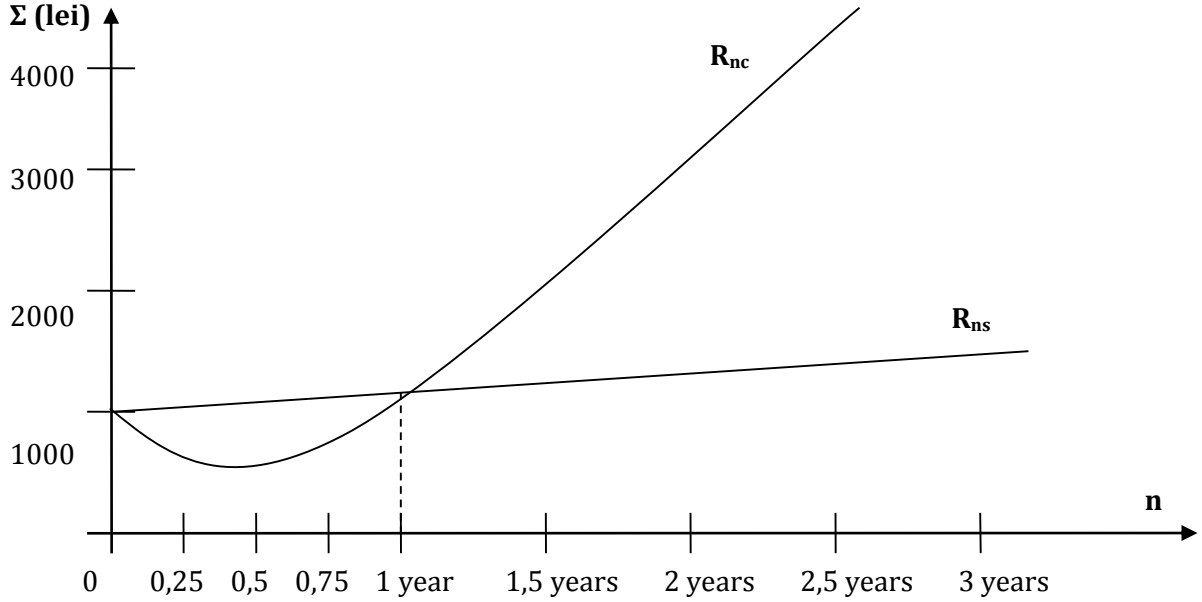

Figure 1. The difference of capitalized (future) value, depending on the number of calculation periods and methods

Source: Author`s calculations.

Depending on the specific intentions of the investor, the capitalized amount of the investment project will be calculated according to a specific algorithm, specially developed for this situation, the essence of which is reduced to the separation of financial flows, capitalized by the one or another method of calculation.

In order to simplify the algorithms, the future (capitalized), investment value of projects is calculated, as a rule, using the compound interest rate formula. At the same time, the current one, i.e. the original (initial) cost of project acts as a generator of future returnable cash flows, but is not equal to them. As a result, the future (capitalized) value of an investment project (FV) is solely a result of the capitalization of the cash flows generated by this project and is determined by the formula:

$$FV = \sum_{n=1}^{n} P_n \times (1 + r)^n, \text{ lei} \quad (7)$$

where:

P_1; P_2; P_3 ... P_n – net cash flows (net income + depreciation for depreciable components of investment projects), respectively, for the 1st, 2nd, 3rd, etc. years of project operation, lei;

r – capitalization rate, specific units;

n – the number of periods (for the agribusiness industries – the number of years of operation of the project).

As it was already emphasized, the calculation of the net cash flow for each year of the project's operation is carried out on the basis of technological charts, developed for each specific type of investment, based on the planned market prices and the actual (normative) cost of production. The calculation methodology, structure and current (actualized) cost of the overwhelming majority of the

agri-food products, produced in the Republic of Moldova, are set out in the practical guide "Tariffs of Costs in Agriculture" [4].

The concept of present Value (PV), net present value (NPV) and rentability index of investments in an inflationary economy. The future (capitalized) cost of an investment project is an important criterion for making investment decisions and serves as an indispensable guideline in the case of choosing the most appropriate investment option from several alternatives. At the same time, the investor, as a rule, is interested not so much in the future value (especially in the gross future value) of the investment, but in its present value, i.e. actualized (reduced) total (based on completion of the project operation) income for the entire period of its operation. In order to identify this indicator, referred to as – the present (current) value (PV), the projected cash flows are subject to the procedure of updating (discounting). The essence of the discounting process is that instead of calculating future value (FV), analysts estimate the same cash flows from the point of view of the present moment. The calculation is carried out according to the formula:

$$PV = \sum_{n=1}^{n} \frac{P_n}{(1+r)^n} \text{ (lei)} \quad (8)$$

The symbols used correspond to the formula (5).

The practical significance of the actualized (updated) value of the investment project is beyond doubt. Having determined the present value (PV), the investor practically finds out (which is very important) the market price of the project at the stage of its commissioning, calculated on the basis of updated cash flows (one of the three main methods for calculating the market price of real estate, legalized in the Republic of Moldova). It has to be mentioned that dimensions of PV is especially relevant for developers, i.e. investors whose main purpose is not so much the exploitation of investment projects, as their construction (for example, planting a garden or a vineyard plantation) with their subsequent sale.

It should be separately emphasized that from the point of view of the developer, it is important not only to know the current market value of the project, but the difference between this cost and the initial cost of its construction. In this case, along with the present value (PV), one should also calculate the net present value (NPV) using the formula:

$$NPV = PV - IC = \sum_{n=1}^{n} \frac{P_n}{(1+r)^n} - IC \text{ (lei)} \quad (9)$$

The objectivity and reliability of using this algorithm is based on the fact that, being reduced by the time of the start of operation (the time the investment project is put into operation), both the initial cost of its construction and all subsequent proceeds from operation will be measured by banknotes (lei, dollar, euro, etc.), having equal purchasing power.

Achieving purchasing power parity by applying formula (9) largely depends on the validity of the calculation of the update rate. In the most general approach, the value of the actualization rate or (which is the same) the discount rate (r_d), as well as the size of the capitalization rate (r_c), are predetermined by: (i) inflation rates; (ii) the degree of riskiness of investing money in this particular type of business; (iii) naturally, the level of profitability of the production of these agricultural products, etc.

All these indicators, even if they are completely objective, can often have nothing to do with an investment project. Moreover, the attempts of individual authors to calculate the discount rate for a project by simple (arithmetic) summation of all previously noted indicators are devoid of logic, since all of them are subject to the effect of mutual absorption. Taking into account the fact that with relatively small absolute amounts of discount rates (r_d) and capitalization rates (r_c), there are practically no differences between them [3, p. 338], given the presence of instability of these rates over the years of project operation. The indicated source of information recommends calculating the average annual discount rate on the basis of generally accepted indicators in the national economy (average business lending rate, current lending rate for investment projects in a given industry, a given locality, and so on).

As noted earlier, the higher the capitalization rate, the shorter the payback period of corresponding investments, and vice versa. The reduction (on average in the banking system) of the

lending rates of economic entities, currently taking place in the Republic of Moldova, means a general increase in the payback period of the invested funds. On the other hand, the same fact means that investments in the most profitable types of business (fuel filling stations, pharmacies, etc.) have already reached their maximum level, i.e. saturation level.

The time has come to invest in those sectors that were previously considered less attractive due to the longer payback periods of investment costs. The investment front is expanding. If at 10% of average annual efficiency all invested money could be returned to the investor within 10 years (under zero inflation conditions, naturally), then at 5% of average annual efficiency, the return period for invested funds increases to 20 years. With "other things being equal" – means that the area of application of investment projects is becoming wider, covering more and more new sectors of the national economy, new territories, etc. To a large extent, such an expansion in the sphere of investments means the flow of capital from more profitable to less profitable sectors of the national economy.

In any case, having calculated the NPV indicator, the investor gets a clear indication of which direction to go further:

- if NPV> 0, that is measured by a positive number, which means that investments are profitable and can be implemented in practice;
- if NPV <0, that it has a negative value, which means that investments are unprofitable and should be abandoned;
- in a situation when NPV = 0, this indicator receives a neutral status and must be supplemented (or replaced) with other decision-making indicators.

Along with a number of obvious and less obvious advantages, the calculation of indicators Present Value – PV and Net Present Value – NPV has some disadvantages. The main one is the fact that denoting, suppose, a positive effect from investing in such and such a project (NPV> 0), this indicator confirms the presence of a positive result, but does not open the investor's eyes regarding what kind of price this result will require to be achieved. This disadvantage of NPV is particularly relevant in the case of alternatives. It is not excluded that any of them will be able to provide the investor with the same result, but at a significantly lower price, at significantly lower costs.

In order to prevent possible errors in the process of making investment decisions, it is proposed, along with the calculation of PV and NPV, to also calculate the value of the investment project profitability index (Rentability Index – RI).

$$RI = \sum_{n=1}^{n} \frac{P_n}{(1+r)^n} : IC \quad \text{(specific units)} \qquad (10)$$

Taking into account that $PV = \sum_{n=1}^{n} \frac{P_n}{(1+r)^n}$ (see formula 8), we can convert formula (10) into:

$$RI = \frac{PV}{IC} \quad \text{(specific units)} \qquad (11)$$

Thus, if

- RI> 1 (PV> IC) – the market value (PV) of the investment project at the stage of its commissioning (equivalently at the stage of completion of the construction stage) is higher than the initial cost of its creation (whether it is building, planting a garden or a vineyard, irrigation system, etc.) – the investment project is accepted;
- RI <1 (PV <IC) – the investment project should be rejected;
- in a situation when RI = 1 (PV = IC) – the index of profitability becomes neutral and must be supplemented by other calculations [3, p. 447].

In contrast to indicators, based on the absolute size of expected cash returns, which are PV and NPV, the profitability index is relative, characterizes not the amount of income, but the level of profitability of the investment project and therefore is almost irreplaceable when choosing the most effective project from the many others. The higher the RI is, the greater, with other things being equal, will be the return on the practical implementation of the project.

Conclusion

1. In an economic system with "zero" or near to "zero" inflation, as well as for the evaluation of investment projects with short periods of operation (2-3 years), the main indicators for investment projects' evaluation must be the payback period (Tp.p.) and the accounting rate of return (ARR).

2. For conditions of inflationary economy it has to be recommended more sophisticated methods of investment projects' evaluation, based on a preliminary calculation of net cash flows, generated by these projects, the subsequent updating of these flows and the calculation of indicators such as present value (PV), net present value (NPV) and rentability index (RI) for one or another investment project.

3. For all (without exceptions) situations, final decisions about the practical implementation of investment projects are recommended to be made on the basis of a comparison of above mentioned performance indicators for 2-3 or even more alternative projects, elaborated for the same or related branches of economic activity.

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EXPERIENCE OF THE INPUT-OUTPUT MODELS APPLICATION TO THE MOLDOVAN ECONOMY

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The main goal of this article is to present an overview of the input-output models which have been applied to Moldovan economy development study. We examined: static input-output model, dynamic input-output model restricted by limited energy resources, and the Markov chain approach based on the input-output tables. All these models have been examined using statistic data referring to the input-output table, constructed on the base of 19 and 16 aggregated branches of the national economy. Static and dynamic optimization models were formulated, simulation calculation was done and analysed. Input-output table balancing problem was solved using RAS method. For dynamic model matrix of the investment coefficients was constructed. The emphasis was put on the problem of applying the theory of Markov chain for examination of the 19 and 16 branches in the framework of the input-output model for Republic of Moldova. A square exchange matrix of order $n \times n$ has been constructed. Every branch was considered as one state of the Markov chain with n states. We introduced a new $(n+1)$-th absorption state so that the examined matrix became of the order $(n+1) \times (n+1)$. The obtained transition matrix – probabilities matrix has been used for forecasting.

Keywords: *input-output models, static optimization model, dynamic optimization model, Markov chain, exchange matrix, investment matrix, transition matrix, forecasting.*

Obiectivul principal al acestui articol constă în prezentarea unei sinteze asupra modelelor interramurale utilizate în studierea dezvoltării economice a Moldovei. Au fost examinate modelul de optimizare static şi modelul de optimizare dinamic restricţionat de resurse energetic limitate, la fel şi abordarea stocastică bazată pe lanţurile Markov, obţinute în baza tabelelor intrări-ieşiri. Modelele menţionate au fost dotate cu date statistice în vederea construirii tabelelor intrări-ieşiri, având la bază 19 şi 16 ramuri agregate ale economiei naţionale. Modelul static şi modelul dinamic de optimizare au fost formulate, calculele de simulare în baza lor au fost efectuate şi analizate. Problema balansării tabelelor intrări-ieşiri a fost soluţionată prin aplicarea metodei RAS. Pentru modelul dinamic s-a construit matricea coeficienţilor investiţionali. Accentul a fost pus pe problema aplicării lanţurilor Marcov la examinarea a 19 şi 16 ramuri în cadrul modelului intrări-ieşiri pentru Republica Moldova. Matricea pătrată a cheltuielilor materiale directe de ordinul $n \times n$ a fost construită. Fiecare ramură fiind considerată ca o stare a unui lanţ Markov cu n stări. A fost adăugată o stare absorbantă încât matricea de tranziţie s-a transformat într-o matrice de ordinul $(n+1) \times (n+1)$. Matricea de tranziţie obţinută – matricea de probabilităţi, s-a folosit în scopuri de previziune.

Cuvinte-cheie: *modele intrări-ieşiri, model de optimizare static, model de optimizare dinamic, lanţuri Markov, matricea cheltuielilor materiale directe, matricea investiţională, matricea de tranziţie, previziune.*

Главная цель настоящей статьи заключается в предоставлении обзора межотраслевых моделей, используемых для изучения экономического развития Молдовы. Были рассмотрены оптимизационная статическая модель и динамическая модель с ограничениями на энергетические ресурсы, а также стохастическая модель, основывающаяся на цепях Маркова, построенных на основе таблиц затраты-выпуск. Рассмотренные модели были снабжены статистическими данными, необходимыми для построения таблиц затраты-выпуск по 19 и 16 агрегированным отраслям национальной экономики. Были сформулированы статическая и динамическая оптимизационные модели, по которым были проведены и проанализированы имитационные расчеты. Таблицы затраты-выпуск были сбалансированы с помощью метода RAS. Для динамической модели была построена матрица коэффициентов инвестиционных затрат. Основной акцент был поставлен на применение Марковских цепей для изучения

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19 и 16 агрегированных отраслей в рамках модели затраты-выпуск для Республики Молдова. Каждая отрасль ассоциировалась с одним из состояний цепи Маркова с n состояниями. К рассматриваемой цепи добавилось еще одно, абсорбированное состояние так, что переходная матрица приобрела порядок $(n+1)\times(n+1)$. Построенная переходная матрица – вероятностная матрица была использована в целях прогнозирования.

Ключевые слова: *модели затраты-выпуск, статическая оптимизационная модель, динамическая оптимизационная модель, цепи Маркова, технологическая матрица, инвестиционная матрица, переходная матрица, прогнозирование.*

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Introduction. For empirical applications, the input-output table has the same importance as a mathematical model. Most analyses start from tables in money units and devote a great deal of effort to making sure that the total money value of each row is equal to that of the corresponding column before deriving a coefficient matrix. By contrast, Leontief [1-4] stressed the technological interpretation of each column of coefficients and urged the collaboration of economists with engineers and other technological experts to project, column by column, coefficient matrices representing hypothetical changes in technologies in different industries based on the information in physical units.

Scientific approach is based on the modeling modern theory, relied on the input-output tables approach. Interbranch models are made up from matrices of direct material expenditure of one producing industry for other producing industries. Method for interbranch balances construction has been proposed and implemented by Russian scientist Vasilii Leontief [1-2]. In the year 1972 V. Leontief was awarded the Nobel Prize in economic science "for elaboration of the input-output method and its application for solving important economic problems". In time interbranch models passed through spectacular evolution, being studied both deterministic and stochastic models; static and dynamic models with lagged capital investment (one or more years), simulation and optimization models. Interbranch models are largely applied to economic development examination taking in account environmental medium. Such models have been used for world and regional economy evaluation, as a forecasting and indicative planning tool for medium and long term. Now these models are used in many industrial developed countries, but also in some less developed countries.

The purpose and scientific basis of the research

The present research deals with the overview of author`s research experience in the interbranch modeling and the last research related to the Markov chain applications relied on input-output table. They studied deterministic static [6-8] and dynamic [9-10] optimization models, general equilibrium models, stochastic models [11]. Empirical researches, simulation calculations and obtained results analysis have been effectuated. Father, general theory of the input-output models will be followed [18].

Scientific basis of the research is the input-output Leontief model [4], which consists of n industries $1,2,...,n$. The i- th industry requires an amount $0 \le a_{ij} \le 1$ of goods (in physical units) from industry j to produce 1 dollar's worth of goods. The external demand for the industries goods, in physical units, is given by the vector $y = (y_1, y_2, ..., y_n)$.

Let A be the (nxn) matrix of inter-industry coefficients a_{ij}, the industries produce total amounts given by the vector $x = (x_1, x_2, ..., x_n)$ and F is the matrix (kxn) of factor input per output (one row for each factor), and f is total factor use. Then the basic static input-output model looks as: $(I - A)x = y$, or

$$x = (I - A)^{-1} y \quad (1)$$

$$f = Fx. \quad (2)$$

The amounts of goods which the industries will need just to meet their internal demands, is given by the vector xA. In order to meet the external demand y and the internal demands the industries must produce total amounts given by a vector $x = (x_1, x_2, ..., x_n)$. which satisfies the equation $x = xA + y$.

The inverse matrix $(I - A)^{-1}$ has been called the Leontief inverse, also known as the multiplier matrix or matrix of multipliers.

Equations (1) and (2) are a quantity input-output model, and the coefficients in A and F matrices are ratios of physical units. If y is given, the solution vector x represents the quantities of sector`s outputs.

Assume that each industry's output is measured in a unit appropriate for that sector. A mixed-unit flow table accommodates variables measured in different units and can be constructed with no conceptual difficulty. In the coefficient matrix A derived from such a flow table, the $ij-th$ element is equal to the ij_{th} element of the flow table divided by the ij_{th} row total. So, mixed unit A matrix may be constructed as columns of coefficients.

Equations (1) and (2) represent an abbreviation of the basic input-output model. The full model involves two additional equations (where $(.)'$ indicates transposition):

$$p'(I-A) = v' = \pi'F \quad or$$

$$p' = v'(I-A)^{-1} = \pi'F(I-A)^{-1} \tag{3}$$

$$p'y = v'x = \pi'Fx \tag{4}$$

Here, p is the vector of goods unit prices, v is value-added, the total money value of factor inputs per unit of output, and π is the vector of factors prices.

Equation (4), called the income equation, is derived from Equations (1) and (3), the GDP identity assures that the value of final deliveries is equal to total value-added

The Leontief inverse is strictly positive, i.e., each element is positive. It follows from basic economic logic which requires that an increase $\Delta y > 0$ in final demand in Equation (1) should result in an increase $\Delta x > 0$ in total output. If the matrix $(I-A)^{-1}$ was not strictly positive, this logic could be violated. In consequence, Equation (1) always has a solution $x > 0$ for $y > 0$. There are a number of equivalent statements about A:

1. $(I-A)^{-1} > 0$.
2. $(I-A)^{-1} = I + A + +A^2 + A^3 + \ldots$ (The series $\sum A^k$ is convergent).
3. The successive principal minors of $(I-A)^{-1}$ are positive.
4. There exists a choice of units such that all row sums or all column sums of A are smaller than unity.
5. The matrix A has a dominant eigenvalue λ, $0 < \lambda < 1$.
6. A dominant eigenvalue λ of A is larger if one element of A is increased, and λ gets smaller if one element of A is decreased.

Statement 2 is important for distinguishing the industries contributing output in different phases of production. It says that output $x = y + Ay + A(Ay) + \ldots$ So the quantity y must be produced, plus Ay which is the vector of input to produce y, etc. Statement 3 is the well-known Hawkins-Simon condition, which assures that each subsystem is productive; that is, each subgroup of industries $i, j, k, \ldots$ requires less input from the economic system than it produces in terms of outputs. According to statement 4, the Brauer-Solow condition, value-added in each sector is positive in coefficient matrices derived from input-output tables in (nominal) money values. Assuming that the matrix describes a viable economy, this property assures that if output is measured in any chosen physical units, there exists a set of prices such that each industry has a positive value-added (i.e., revenue left to pay for factor inputs).

The dominant eigenvalue λ is a measure of the size of the intermediate outputs produced in the economy relative to total production. That is, λ indicates the net surplus of an economy in the sense that the larger λ (within the bounds described by statement 5), the smaller the net output. The surplus so defined can be consumed, invested for growth, devoted to environmental protection, etc. Statement 6 is useful for interpreting the role of technological change. For example, a technological innovation that reduces the need for certain intermediate inputs results in a lower dominant eigenvalue for the new coefficient matrix, leaving more surplus. Innovations that are not cost-reducing, on the other hand, will result in a larger λ. Input-output analysis can effectively identify those industries where increased technological efficiency would have a significant economy-wide impact. Thus, λ is a kind of efficiency indicator in that of two matrices describing two different economies, the one with a larger dominant eigenvalue represents the economy that is less efficient economically although it may have other desirable features. Eigenvalues also play an important role in dynamic models, where they have an interpretation

in terms of rates of growth or contraction and profit rates. If the economy does not produce a surplus (i.e., $y = 0$ in Equation (1)), we deal with a closed model of the following form $x = Ax$.

In this special case, A has a dominant eigenvalue equal to unity, and total output x is the Perron-Frobenius eigenvector of A. To solve this model for x means to solve it for this eigenvector. The solution provides only the production proportions; the scale has to be determined in other ways, such as external knowledge about the size of certain elements of x.

Above we interpreted the i_{th} column of the input coefficient matrices A and F as representing the technology to make good i and claimed that the coefficients represented an average technology. This interpretation allows for the existence of differences in technology among enterprises in the same industry. The use of an average avoids the complication of having to distinguish products and technologies where the distinction does not add much useful information for the purposes of the analysis. In terms of the model, it means that a one-to-one relation is established between the typical commodities and also average technology for producing it.

Suppose a new technology becomes available to produce the $i-th$ good. The i_{th} columns of A and F will also be balanced if the new technology is adopted by this industry. If two technologies are available for producing the i_{th} good, the model can determine which technology is the lower-cost choice in terms of the $overall$ use of factors. Equation (3) shows that the cost of factor use is equal to $v'x$ or $\pi' Fx$. If the new technology is cheaper in terms of overall factor inputs, it is more efficient than the old one and in principle will be installed. Because each price is the sum of the costs of the primary resources used directly and indirectly in its production, introducing the new technology will assure minimal cost.

These considerations enable to formalize the economically most efficient choice of technology as a minimization problem. The non-substitution theorem formulated and proved in [7, 9] identifies the choice among several alternative technologies that minimizes the use of priced resources for each product. It can be shown that for a particular final demand y, there is a unique, cost-minimizing set of technologies, provided that the possibility of factor constraints is ignored.

There are three types of impact, propagated through economy: direct, indirect, and induced that could be estimated by input-output models. Economy wide shocks deal with changing in the initial expenditure. Impact of the input changing between industries contributing to modifications in one or more specific technologies can be estimated.

Data sources and utilized methods

Direct material expenditure coefficients matrices were constructed on the National Accounts base in constant prices [8]. Direct investment expenditure coefficients matrix and limiting coefficients were constructed for the dynamic optimization model with one or more lags. Leontief inverse matrix was determined, Markov chain was constructed on the base of direct material expenditure coefficients matrix, transposing input-output matrices into transition one. Optimization methods, Solver application, RAS method software (proper elaboration) were utilized.

1. Own results and discussions

1.1. Static input-output model for the Republic of Moldova

Input-Output table elaboration in the Republic of Moldova has been started since USSR by the State Planning Institute. Our country at that time has occupied leading position at the diverse dimensions input-output table elaboration. After tearing of the USSR, this task was incumbent on the Institute of the Market Problems and to the National Bureau of Statistics. At present, principal elements of the input-output tables could be extracted from National Accounts. Regretfully, from the year 2015 this data for input-output table elaborating was ceased.

Researching of the interbranch models based on the input-output tables has been effectuated by the institutes of the Academy of Sciences of Moldova such as: Institute of Mathematics and Computer Science "Vladimir Andrunachievici", National Institute of Economic Research and the Institute of Energetic, which shows a major interest in the interbranch models examination.

Relying on the data in current prices for the 23 branches from the National Accounts of the Republic of Moldova, years 1996-2014, input-output table in constant prices in their classic form was constructed. Namely, for mentioned years, information was selected and processed. This data has formed I-III quadrant of the interbranch balances in constant prices.

Having input-output tables for year 2014 in the structure of the n (23) examined branches the model of the economic development will be formulated and solved. Four branches: Public administration and defense (L), Associate activities not included in other activities (O91), Recreation, culture and sport activities (O92) and Other activities and services (O93) are not productive branches. Having zero over the line, these branches consume only, so do not affect the matrix of direct material expenditure, thus may be excluded from the interbranch balance. The interbranch static and dynamic models have been studied in [6-11], based on it, much simulation was done. Further static optimization problem based on the input-output table for the year 2014 will be formulated.

An input-output table (year 2014) for the 19 productive aggregate industries of the Moldovan economy is principalelement when static optimization problem is formulated. Our country being in profound scarcity of the proper sources of energy, is imposed to import it in sufficient large proportions for covering own necessities. As a result, both growing of the world prices of energy resources and internal tariffs growing, contribute to the domestic prices of the energy resources changing. This in its turn affects both production sector in total and households dramatically influencing country energy security and wellbeing of the population, being on the limit of poverty. So, the problem of energy tariffs growth studying, in this context has major importance.

Interbranch balances can be very useful in the structure of 19 productive aggregate industries, from which aggregate industry of Electric energy, gase and water being one on the whole based on import. So, we will research the influence of the energy tariffs growing on the economy as a whole and on the population in special using interbranch static optimization models.

Suppose that energy tariffs grow 1.5 times, then components of technology vector will grow at the same rate. In such circumstances, what will be the impact on Gross Domestic Product? Knowing output volume X in the one specified year$_t$ having modified electric industry technology vector (E), mentioned problem will be formulated as a problem of final consumption optimization. It can be mentioned that both elements of the input-output tables, output vector, and final consumption vector are measured in constant prices. So, the following static optimization problem needs to be solved: maximize final consumption when energy resources tariffs are increasing (changing vector-column (E) and fixing output volume vector value). Then formalized model is written as:

$$\max \sum_{i=1}^{19} y_i , \tag{5}$$

subject to the following restriction $(I - A)^{-1} Y = X$, (6)

here X is the output vector volume which is known and Y is the final demand vector, that must be maximized or

$$\max \sum_{i=1}^{19} x_i \tag{7}$$

subject to the following restriction $X - AX = Y$. (8)

Let`s examined matrices of the direct material expenditure A in money values. Elements of these matrices are less than one and its sum along the column and line is strictly smaller than one. Matrix A , constructed from statistical data [8] for year 2014 satisfied partly the earlier exposed particularities, namely, the sum along the column is less than one, but the sum along the line for some industries for example (Processing industry) is greater than one. In such circumstances inverse matrix existence do not done. Such phenomena implies problem in satisfying restriction (6). This imposed to done simulations based on the problem (7), changing prices following restriction (8).

1.2. Simulation`s calculations

Table 1

Expenditure changes in respect to price modification

Expenditure E	28500717	2843392	31307171	30698998	30359116	29846954	29211061	28548610	29411015	28962435
Resources X	221303904	4298115	1836452	192390282	201135294	218661243	221303904	227370333	236115346	244860358
Prices	1	1,05	1,1	1,15	1,2	1,25	1,3	1,4	1,45	1,5
Iterations	1	2	3	4	5	6	7	8	9	10

Source: Author`s calculations.

Simulation calculations effectuated in concordance with price modifications demonstrate that price growing can be only applied till 1,3 limit, after that some components of the Gross Domestic Product become negative, challenging economy collapse.

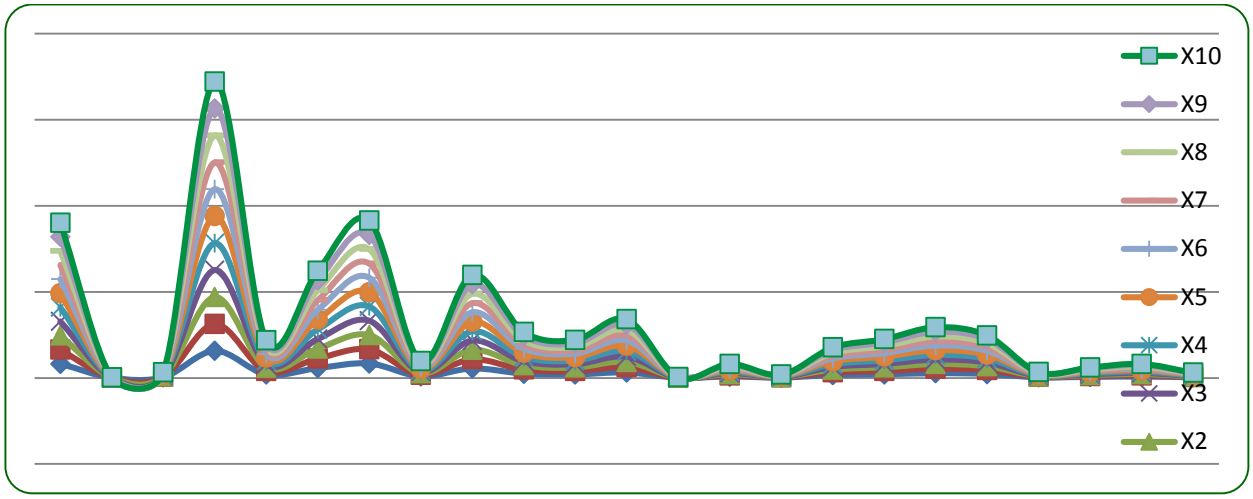

Figure 1. Resource modification relative to price changing
Source: Author`s calculations.

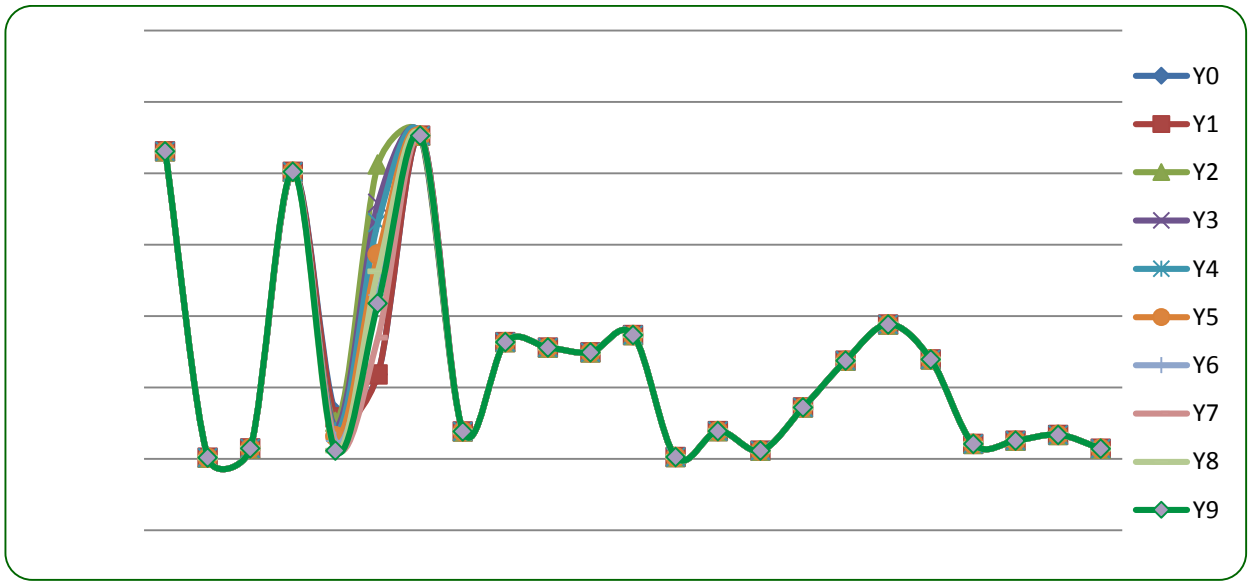

Figure 2. Modifications in Gross Domestic Product relative to price changing
Source: Author`s calculations.

1.3. Conclusions

It must be mentioned that through this study, the utility of the proposed tool, based on the input-output tables constructed on the money flows in constant prices [8] for years 1996-2014, was demonstrated. Two static optimization models (1)-(2) based on the data from year 2014 have been solved. The first model, given satisfied interbranch balance restrictions, starts with known volume of production in order to maximize final consumption. The second model deals with production volume maximizing, given known final consumption and interbranch restrictions satisfied. Calculations results have demonstrated that upper limits of the price increasing is equal to 30%, after that some components of the final demand become negative, which ascertained that final demand can not be satisfied. Using interbranch balance for 2014 year, it could be possible to demonstrate that energy resources tariffs growth, have negative impact on the Gross Domestic Product, which influences both economy as a hole and population especially. Such analysis can be effectuated for every industry from

those 19 examined in accordance with proposed objective. It is very unfortunate to know that beginning from year 2015 interbranch tables elaboration in the classical manner was ceased.

Another examined aspect is referred to the input-output tables unbalance namely that sum over line may be greater than one, as result it is not equal to the column sum, which is less than one. This industries utilized resources exceeding more production volume, using in plenty import resources (especially energy resources) surpassing domestic production. Input-output table balancing problem is possible to be solved by using RAS method. Next, RAS method description and application follows.

1.4. Input-output matrices balancing

Table 2

Sum of the direct material expenditure matrices coefficients along the columns and *lines*

Aggregate branches	$\sum_i a_{ij}$	$\sum_j a_{ij}$	x_i	$x_i - \sum_i a_{ij} x_i$	$x_i - \sum_j a_{ij} x_j$
A Agriculture, hunting economy and forestry	0.65	0.47	8194443	4307985	3617782
B Fishing	0.01	0.45	27364.6	14925	26046
C Mining	0.44	0.52	303098.6	145482	1449980
D Processing industry	**5.94**	**0.74**	15657828	4022168	20667046
E Water distribution; waste administration	0.72	0.67	1985815	650721	1498246
F Construction	0.39	0.79	5660514	1185158	822897
G Wholesale and retail trading	0.07	0.46	8310259	4528646	237941
H Hotels and restaurants	0.16	0.57	892875.4	384848	287496
160-63 Transport and storing	0.63	0.70	5439666	1636009	2207758
164 Communications	0.45	0.36	2427941	1560084	862180
J Financial activity	0.35	0.26	2011364	1492015	934737
K70 Estate transactions	0.65	0.44	3103366	1735042	1474654
K71 Cars and equipments rent	0.02	0.39	38119.96	23372	16664
K72 Computers and adjoint activity	0.13	0.48	743423.5	387512	141666
K73 Investigations - elaborations	0.05	0.34	173374.3	113617	66855
K74 Other commercial activities	0.31	0.55	1611441	719303	862941
L Public administration and defense	0	0.33	2049550	1376683	73720
M Education	0.03	0.29	2680886	1884680	47213
N Health and social assistance	0.02	0.38	2241138	1391747	121516
O90 Recovering and waste removing	0.08	0.32	306535.1	208836	0
O91 Activities not included in other categories	0	0.55	558130.2	253929	0
O92 Recreation, cultural and sport activities	0	0.55	744108.9	336151	0
O93 Other activities and services	0	0.49	277459.9	141804	3617782

Source: Author`s calculations.

Table 2 offers calculations of the sum direct material expenditure matrices coefficients along the columns and lines, effectuated in accordance with model data. Showed noticed from this table that column sum over the column is less than one for all examined branches but sum over line of the Processing industry exceeds much more one unit, in such a manner encroach upon productivity property of the direct material expenditure coefficients matrices. Second observation certified that double accounting rule don`t have to stand. To surpass this phenomena one will e appeal to the RAS [13] method, well known and wide utilized automation tool for balancing input-output matrices. Main objective of the RAS method consists in column and line balancing of the input-output matrices, in other words balancing demand and use through modification and revising of initial input-output table. Main equation which is cyclic dependent on the existing discrepancy can be written as:

$X_C^{new}(t_n) \cdot X_C^{new}(t_{n-1}) \cdot \ldots \cdot X_C^{new}(t_1) \cdot A \cdot X_R^{new}(t_1) \cdot \ldots \cdot X_R^{new}(t_{n-1}) \cdot X_R^{new}(t_n) = A^{new}$.

Here

$X_C^{new}(t_1)$ is the new volume production vector over column at the time t_1,

A is the direct material expenditure matrix,

$X_R^{new}(t_1)$ is the new volume production vector over line at the time t_1.

These equations have been easy solved with special soft or by utilizing Excel applications.

Being known precise sums over columns and lines in practice this method is reduced to revising existent totals over columns and lines so as it coincides with that precise. The RAS adjustments can be seen as one iterative process in which columns and lines (lines and columns) have been modified successively in order to obtain correct balanced totals over columns and lines so as differences among two consecutive lines be equal to zero.

At the first step (t_1) (first iteration), matrix A will be replaced by the line sum in concordance with the formula: $A_R^{new}(t_1) = \cdot X_R^{new}(t_1) \cdot A$

Procedure is applied to all matrix A lines. At the second step (first iteration) all column sums are recalculated in concordance with formula: $A_C^{new}(t_1) = \cdot X_C^{new}(t_1) \cdot A$.

First iteration is finalized with the matrix A recalculated over columns and lines as follow $A^{new}(t_1) = X_C^{new}(t_1) \cdot A \cdot X_R^{new}(t_1)$.

Table 3

Input-output table initial data before applying RAS procedure mil lei

Data in mil lei, constant prices	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**160-63**	**164**	**J**
A Agriculture, hunting economy and forestry	1452154	4436	0	2000419	0	28031	29847	81591	0	0	0
B Fishing	0	1	0	20161	0	0	1890	1219	0	0	0
C Mining	57053	33	59	393858	322219	421803	53898	14088	17250	3304	1193
D Processing industry	2225370	6147	109014	7755851	542075	3567832	1315381	251983	2141284	325315	101408
E Electric energy, gase, water	41203	653	9484	320939	242408	26013	197846	47139	94006	146554	15007
F Construction	0	0	4076	194858	33087	103635	51275	15649	82651	53258	51162
G Wholesale and retail trading	0	0	0	66789	11179	6319	38772	2985	48556	8163	11803
H Hotels and restaurants	1564	38	521	24229	2951	35096	82510	762	71752	4154	2861
160-63Transport and storing	48850	166	30891	322883	34823	63718	564646	4542	889936	78445	16272
164 Communications	12232	165	511	88005	36106	39813	113264	22217	114752	153710	33824
J Financial activities	7177	92	701	71932	56425	27614	345550	8845	93080	13043	221442
K70 Estate transactions	13681	258	1657	167510	12464	128751	617018	23065	169002	19204	16641
K71 Cars and equipments rent	0	0	0	312	0	0	0	218	1089	65	41
K72 Computers and adjoint activity	4749	35	0	10232	5757	5489	0	4026	6928	8372	6614
K73 Investigations - elaborations	7879	0	0	30759	1819	636	0	520	2072	1408	698
K74 Other commercial activities	13756	398	545	132954	24649	6646	332874	16425	57195	40887	33512
M Education	0	6	129	8726	2396	1178	10600	1687	7788	8630	2332
N *Health and social assistance*	793	14	0	0	0	0	1643	0	0	0	0
O90 Recovering and waste removing	0	0	28	25243	6735	12782	24595	11066	6316	3346	4540
A Agriculture, hunting economy and forestry	3886462	12440	157617	11635660	1335093	4475356	3781612	508028	3803658	867859	519349
B Fishing	3886462	12440	157617	11635660	1335093	4475356	3781612	508028	3803658	867859	519349
C Mining	0	0	0	0	0	0	0	0	0	0	0

Data in mil lei, constant prices	K70	K71	K72	K73	K74	M	N	O90	Line`s sum	Correct sum
A	0	0	0	3762	0	7245	10298	0	3617782	3886462
B	0	0	0	0	0	626	2149	0	26046	12440
C	52932	50	1994	962	2208	57387	46117	3571	1449980	157617
D	666487	5071	153753	20905	494036	399234	538800	47098	20667046	11635660
E	171257	733	6897	3456	10361	105962	53869	4458	1498246	1335093
F	72239	345	795	11799	27980	70995	45663	3428	822897	4475356
G	14161	0	329	531	22631	1603	3974	147	237941	3781612
H	7707	44	3939	1084	20080	15227	4929	8050	287496	508028
160-63	25519	390	18008	3826	71576	15163	15754	2348	2207758	3803658
164	74832	157	57778	1416	79611	13721	13184	6883	862180	867859
J	28956	535	17736	893	12878	6272	13377	8188	934737	519349
K70	163450	6353	29377	1916	69923	23517	7954	2914	1474654	1368324
K71	127	0	0	62	77	4966	9600	108	16664	14748
K72	10639	299	51233	1032	4290	7479	12509	1984	141666	355942
K73	0	0	3078	5777	2730	4189	5291	0	66855	59757
K74	70470	483	8518	1799	60164	49925	8903	2839	862941	892138
M	1290	12	1240	107	9560	8896	7825	1317	73720	796206
N Health	0	0	0	0	0	0	44763	0	47213	849392
O90	8259	273	1267	429	4034	3799	4434	4368	121516	97699
Coloan`s sum	1368324	14748	355942	59757	892138	796206	849392	97699		
Correct sum	1368324	14748	355942	59757	892138	796206	849392	97699		
Balansing	0	0	0	0	0	0	0	0		

Source: Author`s calculations.

Then equality of the new sums over columns and lines is verified. If the equality of the new sums over columns or lines doesn't exist, then matrix $A^{new}(t_1)$ is copied and replaced instead of the matrix A. Iterations are repeated till both column sums and line sums coincide with that correct one, and namely with differences along the sum between last two iterations being equal to zero.

In conclusion, for RAS procedure application it is necessary to indicate data for direct material expenditure coefficients matrix A (with n lines and n columns) and correct sums over respective columns and lines. Then the balancing procedure realized in Excel application can be applied.

Table 4

Input-output table initial data after applying RAS procedure (mil lei)

Iteration 63. Line transformations	A	B	C	D	E	F	G	H	160-63	164	J
A	1785404	4510	0	1972238	0	33450	18718	64735	0	0	0
B	0	0	0	10872	0	0	648	529	0	0	0
C	7926	4	6	43874	33193	56872	3819	1263	1196	195	61
D	1680428	3838	54992	4696367	303547	2614945	506628	122790	807227	104328	28268
E	59883	785	9208	374035	261259	36695	146663	44211	68208	90459	8051
F	0	0	24377	1398725	219636	900423	234114	90401	369360	202468	169062
G	0	0	0	1441519	223125	165072	532281	51853	652450	93314	117271
H	4785	96	1064	59454	6697	104238	128782	1505	109614	5398	3232
160-63	147949	416	62501	784174	78210	187309	872266	8878	1345598	100901	18192
164	22464	251	627	129601	49171	70965	106096	26330	105208	119885	22931
J	7609	80	496	61149	44358	28414	186846	6051	49262	5873	86660

Iteration 63. Line transformations	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**160-63**	**164**	**J**
K70	21687	338	1755	212928	14652	198093	498878	23594	133744	12928	9738
K71	0	0	0	771	0	0	0	433	1675	85	46
K72	22177	134	0	38315	19935	24879	0	12132	16151	16603	11402
K73	10685	0	0	33451	1829	837	0	455	1403	811	350
K74	25595	612	677	198367	34010	12002	315903	19722	53127	32309	23017
M	0	102	1891	153604	39001	25095	118695	23898	85350	80461	18897
N	89869	1275	0	0	0	0	95028	0	0	0	0
O90	0	0	24	26217	6469	16069	16248	9250	4084	1841	2171
Coloan`s sum	3886462	12440	157617	11635660	1335093	4475356	3781612	508028	3803658	867859	519349
Correct sum	3886462	12440	157617	11635660	1335093	4475356	3781612	508028	3803658	867859	519349
Balansing	0	0	0	0	0	0	0	0	0	0	0

Iteration 63. Line transformations	**K70**	**K71**	**K72**	**K73**	**K74**	**M**	**N**	**O90**	**Line`s sum**	**Correct sum**
A	0	0	0	1485	0	4267	1655	0	3886462	3886462
B	0	0	0	0	0	202	189	0	12440	12440
C	3968	4	147	43	127	3819	837	263	157617	157617
D	271589	2439	61812	5070	154948	144417	53176	18852	11635660	11635660
E	134315	679	5337	1613	6254	73773	10233	3434	1335093	1335093
F	348957	1969	3791	33920	104029	304437	53423	16264	4475356	4475356
G	205682	0	4712	4590	252999	20668	13981	2097	3781612	3781612
H	12726	86	6417	1065	25521	22321	1971	13057	508028	508028
160-63	41708	753	29037	3722	90039	21999	6236	3770	3803658	3803658
164	74160	184	56491	835	60725	12071	3165	6700	867859	867859
J	16565	361	10010	304	5670	3185	1853	4601	519349	519349
K70	139818	6413	24792	975	46037	17858	1648	2448	1368324	1368324
K71	211	0	0	61	98	7327	3865	176	14748	14748
K72	26810	889	127371	1548	8320	16731	7634	4910	355942	355942
K73	0	0	2223	2516	1538	2721	938	0	59757	59757
K74	70756	573	8437	1075	46494	44498	2165	2800	892138	892138
M	15287	174	14491	757	87169	93553	22452	15329	796206	796206
N Health	0	0	0	0	0	0	663220	0	849392	849392
O90	5773	225	874	179	2170	2357	751	2999	97699	97699
Coloan`s sum	1368324	14748	355942	59757	892138	796206	849392	97699		
Correct sum	1368324	14748	355942	59757	892138	796206	849392	97699		
Balansing	0	0	0	0	0	0	0	0		

Source: Author`s calculations.

2. Dynamic input-output model for the Republic of Moldova

2.1. Model structure

Optimization models present special interest in its application for economic problems solving. Peculiarity of the optimization models consists in the possibility to elaborate methods for efficient using of the limited resources for maintaining sustainable economic development. Further, dynamic optimization model for Republic of Moldova will be presented. Input-output table`s statistic data for Republic of Moldova have been collected from National Accounts (years 2000-2014) in the structure of 19 industrial branches) in concordance with European Union Standards. Objective function deals with maximizing the Gross Domestic Product restricted by limited energy consumption for the period of [1,T]:

$$\max \quad f(x_t) = \sum_{t=1}^{T} e'(x_t - A_t x_t)$$

Here, x_t is the vector of the production volume, A_t is the matrix of the direct material expenditures and e is the unity vector.

Objective maximization function is followed to meet following restrictions:

$$C_t \geq c_t' x_t$$
$$x_t = A_t x_t + B_t(x_{t+1} - x_t) + y_{1t} + y_{2t},$$
$$(s_t + s_{ft}) e'(x_t - A_t x_t) \geq e' B_t (x_{t+1} - x_t),$$
$$(1 - s_t) e'(x_t - A_t x_t) \geq e' y_{1t},$$
$$s_{ft} e'(x_t - A_t x_t) \geq -e' y_{2t},$$
$$q_1 x_{t-1} \geq x_t \geq q_2 x_{t-1},$$
$$x_t, y_{1t} \geq 0.$$

In previous relationships c_t is the vector of energy consumption needed for production of the one unit of output in industries examined at the moment t; B_t is the matrix of the investment coefficients; y_{1t} is the final consumption vector; y_{2t} is the vector of net export; s_t is the rate of internal savings, equal to (0.62), s_{ft} is the weight of the foreign capital in GDP, equal to 0.67; q_1 is the fast growth limited coefficient, equal to 1.127; q_2 is the coefficient of economic recession limit, equal to 0.873. The investment coefficients of the matrix B_t were calculated according to the following formula:

$$b_{ijt} = \frac{\Delta s_{it} a_{ijt}}{\Delta x_{j(t+1)} \sum_{j=1}^{n} a_{ijt}}.$$

Optimization model formulated earlier, endowed with determined b_{ijt} coefficients, have been solved using Solver application and the following conclusions were done.

2.2. Calculating model parameters and forecasting

Table 6

Macroeconomic indicators values for st and stf

Indices	*Year 2010*	*Year 2011*	*Year 2012*	*Year 2013*	*Year 2014*	*Mean*
st	**-0.6714**	**-0.6961**	**-0.6818**	**-0.4089**	**-0.6243**	**-0.6165**
sft	**0.6714**	**0.6961**	**0.6818**	**0.6478**	**0.6243**	**0.6643**

Source: Author`s calculations.

Table 7

Energy`s Industry intermediate consumption

Years	*Year 2010*	*Year 2011*	*Year 2012*	*Year 2013*	*Year 2014*	*Max C_t*
C_t	3664845.609	4152344	4421277	4867877	5373075	5373075

Source: Author`s calculations.

Table 8

GDP forecasted values in (mil lei)

Objective function	*Year 2015*	*Year 2016*	*Year 2017*	*Year 2018*
GDP	104512319.9	110708443.8	117496102.2	127693108.6

Source: Author`s calculations.

2.3. Conclusions

Economic development scenario restricted by energy saving polices have been elaborated dealing with small changes, in the limits of existing possibilities. So, following results presented in Table 9, small diminishing of the energy industry volume in the Gross Domestic Product structure and increasing weight in the services industries were confirmed. In conclusion, to reach energy saving it is necessary to develop such services industries which consume a small volume of energy resources: only human resources and energy preserving technologies.

Table 9

Forecasting results (year2018)

Aggregate branches	Year 2015	Year 2016	Year 2017	Year 2018
A Agriculture, forestry and fishing	12,9178	14,0059	15,9075	15,9075
B Mining	0,4762	0,5163	0,5562	0,5864
C Processing industry	24,6010	20,6616	17,2410	14,0811
D Production and supplying of electric energy	***3,1200***	***2,6404***	***2,1866***	***1,7858***
E Water distribution; waste administration	1,,3585	1,4730	1,5867	1,6729
F Construction	8,8936	9,6427	10,3874	10,9519
G Wholesale and retail trading	12,7075	13,7779	14,8419	15,6485
H Transport and storing	8,5466	9,6427	9,9821	10,5246
1 Accommodation and public feed	1,4029	1,5210	1,6385	1,7275
J Information and communications	3,8597	2,5360	0,7761	0,8183
K Financial activity and insurance	2,4480	2,6541	2,8591	3,0145
L Estate transactions	4,8759	5,2866	5,6949	5,2798
M Professional, research and technical activities	0,2724	0,2953	0,3182	0,3354
N Professional services offer and support activities	1,9612	2,1264	2,2906	2,4151
O Public administration and defense	3,2202	3,4914	3,7611	3,9655
P Education	4,2121	4,5669	4,9196	5,1870
Q Health and social assistance	3,5212	3,8178	4,1126	4,3361
R Art, research and pleasure activity	1,1691	1,2676	1,3655	1,4397
S Other activities and services	0,4359	0,4727	0,3944	0,3221
N Professional services offer and support activities	1,9612	2,1264	2,2906	2,4151
M Professional, research and technical activities	0,2724	0,2953	0,3182	0,3354
O Public administration and defense	3,2202	3,4914	3,7611	3,9655
P Education	4,2121	4,5669	4,9196	5,1870
Q Health and social assistance	3,5212	3,8178	4,1126	4,3361
R Art, research and pleasure activity	1,1691	1,2676	1,3655	1,4397
S Other activities and services	0,4359	0,4727	0,3944	0,3221

Source: Author`s calculations.

Table 10

Direct investment expenditure coefficients matrix

Investment matrix Bt	A	B	C	D	E	F	G	H	I
A Agriculture, hunting economy and forestry	0,00015	0	2E-05	0	0	2E-06	9,2E-07	0	0,000168
B Mining	5,4E-10	2E-09	3E-10	2,56E-08	7,8E-09	2,8E-09	1,5E-10	7E-11	2,69E-09
C IProcessing industry	5,4E-05	0,008	2E-05	0,000109	0,00044	6E-05	9,2E-06	2E-05	0,000122
D Electric energy, thermic energy, gas, hot water, and conditional air production and supplying	1,3E-06	8E-04	9E-07	6,22E-05	7,6E-05	5,6E-07	1,8E-06	1E-06	2,91E-05
E Water distribution; sanitation, waste administration, decontamination activities	0	1E-05	3E-07	8,24E-06	5,9E-05	1,3E-06	1E-06	4E-07	3,25E-05
F Construction	0	0,005	7E-06	0,000111	0,00023	2,9E-05	6E-06	1E-05	0,000126

Investment matrix Bt	A	B	C	D	E	F	G	H	I
G Wholesale and retail trading; îkeeping and repairing of cars and motocars	0	0	8E-06	0,000121	3,3E-05	5,7E-06	1,4E-05	3E-05	8,33E-05
H Transport and storing	5,2E-06	0,01	3E-06	3,09E-05	5,8E-05	4,7E-06	1,7E-05	4E-05	9,69E-06
I Accomodation and public nourisment activities	1,9E-08	2E-05	2E-08	2,87E-07	1,2E-05	2,9E-07	2,8E-07	4E-07	1,78E-07
J Information and communication	4E-07	3E-05	2E-07	8,22E-06	2,3E-05	7,5E-07	7,7E-07	1E-06	1,24E-05
K Financial and asurance activities	7,2E-08	2E-05	6E-08	4,65E-06	7,5E-06	1,9E-07	9,8E-07	4E-07	1,75E-06
L Estate tranzactions	1,5E-06	5E-04	2E-06	1,13E-05	6,9E-05	9,8E-06	2E-05	8E-06	5,02E-05
M Professional, scientific and technical activities	1,6E-07	0	6E-08	3,17E-07	0	9,3E-09	0	2E-08	2,17E-07
N Activităţi de servicii Administration servivies and support servicies	2,1E-07	2E-05	2E-07	3,05E-06	8,5E-06	6,9E-08	1,4E-06	4E-07	4,88E-06
P Education	6,2E-09	4E-04	8E-07	2,22E-05	0,00011	9,1E-07	3,4E-06	4E-06	3,75E-05
Q Health and social assistance	6,4E-06	0	0	0	0	0	3,7E-06	0	0

Investment matrix Bt	J		K	L	M	N	P	Q
A Agriculture, hunting economy and forestry	0		0	0	2E-05	0	3,5E-06	1,6E-06
B Mining	9,09E-11		1,3E-11	2E-09	4E-10	1,05E-10	2,4E-09	5,5E-10
C IProcessing industry	2,083E-05		2,7E-06	6E-05	2E-05	5,96E-05	4,2E-05	1,6E-05
D Electric energy, thermic energy, gas, hot water, and conditional air production and supplying	8,512E-06		5,1E-07	2E-05	5E-06	1,6E-06	1,4E-05	2,1E-06
E Water distribution; sanitation, waste administration, decontamination activities	1,219E-06		7,3E-07	4E-06	3E-06	2,96E-06	2,4E-06	8,2E-07
F Construction	3,929E-05		2,3E-05	1E-04	0,0002	5,65E-05	0,00013	2,3E-05
G Wholesale and retail trading; keeping and repairing of cars and motocars	2,002E-05		1,7E-05	7E-05	4E-05	0,000148	3,7E-05	2,2E-05
H Transport and storing	1,852E-05		1,9E-06	1E-05	2E-05	3,82E-05	7,1E-06	2,1E-06
I Accomodation and public nourisment activities	1,7E-07		3,7E-08	3E-07	6E-07	1,17E-06	7,8E-07	7,2E-08
J Information and communication	1,151E-05		1E-06	7E-06	3E-06	9,89E-06	2,2E-06	7,6E-07
K Financial and asurance activities	5,477E-07		2,4E-06	1E-06	4E-07	6,36E-07	2,7E-07	1,7E-07
L Estate tranzactions	9,518E-06		2E-06	6E-05	1E-05	3,8E-05	1,1E-05	1,1E-06
M Professional, scientific and technical activities	1,69E-07		1,6E-08	0	6E-06	2,85E-07	3,8E-07	1,4E-07
N Activităţi de servicii Administration servivies and support servicies	1,32E-06		5,5E-07	4E-06	1E-06	4,46E-06	3,2E-06	1,7E-07
P Education	1,972E-05		2,8E-06	5E-06	6E-06	5,3E-05	4,3E-05	1,1E-05
Q Health and social assistance	0		0	0	0	0	0	0,00045

Source: Author`s calculations.

Calculations results, depicted in the considered table, also demonstrate considerable GDP growth during the examined years under sufficient decreasing of the energy resources weight of the energy industry.

For the dynamic model as well as for the static model, necessary data were gathered and processed. So the data from Statistic Yearbooks for the years 2000-2015 were selected, and were completed by specific features for dynamic model. Because since year 2015, Moldovan statistics has been changed in accordance with industrial structure of the European Union, the 19 industries structure instead of 23 was adopted. The new industry structure also looks like in table 9.

Examined model offered many opportunities for diverse scenario elaboration and solving both in order to modify rates of growth of the industries produce volumes, and to modify technology matrix structure, and also to increase profitability of the productive industries. Simulations calculations results obtained can be useful for decision making person's in formulating development polices in

particular at economy as a whole level and at the sector level in special.

3. Markov chains and exchange matrix for the Republic of Moldova

Let come back to the input-output model with 16 aggregate industries which described economy of the Republic of Moldova. Industry i necessitates the quantity $0 \le a_{ij} \le 1$ of goods (in money value) from the industry j in one lei value. Let A **be** the direct material expenditure coefficients matrix with its elements a_{ij}, $16 \le i, j \le 16$. Let the demand for final consumption be vector $y = (y_1, y_2, ..., y_n)$. We will make up Markov chain taking as the states technology vectors in correspondence with examined industries, and as a transition probabilities a_{ij} elements. It is well known that the direct expenditure coefficients matrix (technology coefficients matrix) has satisfied conditions $0 \le a_{ij} \le 1, \ 1 \le i, j \le n$ and line sum is equal to $\sum_{j=1}^{n} a_{ij} < 1, \ 1 \le i \le n$ and is strictly less than one.

Further transition – probabilities matrix will be constructed for the exchange matrix in the input-output model. For this purposes 16x16 exchange matrixes for Republic of Moldova (year 2014) were considered.

We examine stochastic matrix, which has nonnegative elements, each column of it sums to one. Economically, the system can be interpreted either as one in which there is no demand or one in which demand is considered as an industry which consumes all its own output.

Such matrices also arise in the analysis of finite Markov chains: stochastic processes in which the probability of being in a particular state at any step depends only on the state occupied at the previous step. More exactly, consider repetitive trials of an experiment with a finite number of possible outcomes $S_1, S_2, ..., S_n$. The sequence of outcomes is a Markov chain if there is a set of n^2 numbers p_{ij} such that the conditional probability of outcome S_j on any trial, given outcome S_i on the previous trial, is p_{ij}; that is $p_{ij} = \Pr(S_j \ on \ trial \ \ k+1 \,|\, S_i \ on \ trial \ \ k), \quad 1 \le i, j \le n, \ k = 1,2,\ldots$

The transition probabilities p_{ij} can be arranged in a stochastic matrix as follows:

$$P = \begin{bmatrix} p_{11} & p_{21} & \cdots & p_{n1} \\ p_{12} & p_{22} & \cdots & p_{n2} \\ & & \cdots & \\ p_{1n} & p_{2n} & \cdots & p_{nn} \end{bmatrix}.$$

Let $p_i^{(k)}$ be the probability that the outcome on the $k\,th$ trial S_i and $p^{(k)} = (p_1^{(k)}, p_2^{(k)}, \ldots p_n^{(k)})^T$ be the associated probability distribution vector. Then, for Markov processes, it is true that $p^{(k+1)} = Pp^{(k)}, \ k = 1,2,\ldots$ Thus a Markov chain is completely characterized by its transition matrix P and an initial probability distribution $p^{(0)}$ in the sense that $p^{(k)} = P^k p^{(0)}, \ k = 1,2,\ldots$

In many applications of Markov processes, one is interested in the existence of equilibrium probability distributions; that is, vector p such that $p = Pp$. For example, if some positive power of P is strictly positive then it can shown that there is a unique strictly positive distribution p so that $\lim_{k \to \infty} P^k p^{(0)} = p$ for any initial distribution $p^{(0)}$.

The existence of equilibrium distribution vectors can be proven using the Brower Fixed Point Theorem.

If S is the set of all probability distributions, then S forms the standard $(n-1)$ simplex in R^n and for p in S, we have:

$$\sum_i (Pp)_i = \sum_i \sum_j (p_{ij} p_i) = \sum_i \sum_j p_{ji} p_i = \sum_j p_j \sum_i p_{ji} = \sum_j p_j = 1,$$

so that Pp also lies in S. Thus, we can view P as a linear transformation from S to itself. Since P is continuous.

We can consider exchange matrix A as the transition matrix of a Markov chain provided only *normalized* price vector s productive whose components sum to one.

In the open model for an economy some output is accounted for by consumer demand. Every closed model may be considered as an open model too. In terms of matrix A, this means that some columns may sum to less then 1. The system, or the matrix A, is productive if there is a nonnegative vector X (output)such that $X \geq AX$. The vector X is a *production* vector.

Theorem. A substochastic matrix A is productive if and only if $I - A$ is nonsingular.

Corollary If A is substochastic matrix, then the equation $(I - A)X = D$ has a nonnegative solution if $D \geq 0$; a positive solution if $D > 0$; a strictly positive solution if $D >> 0$. In the transition matrix of the Markov chain, sum over its columns is equal to one. In order to satisfy this condition by the exchange matrix A, we proceed in the following manner. An absorbent state 0, denoted as $a_{i0} = 1 - \sum a_{ij}$ is added to exchange matrix A, obtaining the new matrix A', line sum over every line be equal to 1.

$$A' = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} & 1 - \sum_j a_{1j} \\ a_{21} & a_{22} & \cdots & a_{2n} & 1 - \sum_j a_{2j} \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ a_{n1} & an_{12} & \cdots & a_{nn} & 1 - \sum_j a_{nj} \\ 0 & 0 & \cdots & 0 & 1 \end{bmatrix}.$$

For columns sum to be equal to 1, it is needed to transpose the matrix A' and so transition matrix P, is obtained, in which column sum is equal to one.

$$P = \begin{bmatrix} a_{11} & a_{21} & \cdots & a_{1n} & 0 \\ a_{12} & a_{22} & \cdots & a_{2n} & 0 \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ a_{1n} & a_{2n} & \cdots & a_{nn} & 0 \\ 1 - \sum_j a_{1j} & 1 - \sum_j a_{2j} & \ldots & 1 - \sum_j a_{nj} & 1 \end{bmatrix}$$

Principal cofactor of the matrix P is equal to $P_{nn} = (-1)^{(n+n)} \left|A(n,n)\right|$, and $\left|P\right| = 1 * Pnn = \left|A\right|$. Suppose that X is the production volume vector in the year 2015, and Y is the final demand vector in the same year (both normalized to one), then expression for the Gross Domestic Product is $X - AX = Y$,while vector t is absorbtion expectation time, $t = Nc$, where $N = (I - A)^{-1}$ and $c = (1,1,..., 1)$ is the n – dimensional vector $t = (3, 1, 1, 9, 2, 4, 4, 3, 1, 4, 2, 1, 2, 1, 1, 1, 2, 2, 2, 1)$. $\det (I - A) = 0,097185947$, then inverse matrix $(I - A)^{-1}$ exists, and matrix A is productive.

There is not any positive power of P which is strictly positive for the matrix A. Right now we calculated a power of the matrix A equal to 15, for which $p^{(15)} = P^{15} p^{(0)} \cong 0$, then there is a unique strictly positive distribution $p = 0$ so that

$\lim_{k \to \infty} P^k p^{(0)} = p$ for the initial distribution $p^{(0)} = X$, *normalised to one* . So, beginning from the initial state X_{2015} and technology matrix A_{2015} examined economy has been tendedto collapse.

3.1. Conclusions

Markov chain approach to the input-output models study was examined. Input-output table for year 2015 in 16 structure has been transformed into transition matrix by adding one additional column and then transposing it. After transposing transformed matrix became transition one with columns sum equal to 1. Applying known theory about Markov chain to the considered matrix, it was possible to study stability problem and time of transition from one state to another. So, effectuated calculations demonstrates that, it is strictly necessary to modernize the economy by implementing new contemporary technologies, the faster the better, because economy collapse can be happened in the following ten years.

General conclusions

Presented overview of the input-output models application to the concrete economy in transition like Moldovan economy, has demonstrated usefulness of this tool for empirical study. RAS method for input-output table balancing has been applied and realized as software program. Both static and dynamic optimization models can be implicated to elaboration of the diverse scenarios and their analysis. New technology proposed for implementation could be tested before it. Direct expenditure coefficients investment matrix has been constructed starting with settled down industries growth rate investment figures and then based on it, dynamic optimization model was solved using Solver procedure. The same procedure was also used for solving static and dynamic optimization models. Assumption about constancy of both technological and investment matrixes was made in order to effectuate calculation in time. This assumption was justified actually by small changes in time of technological and investment coefficients. Markov chain application to the input-output model treatment, appear to be very useful from the stability problem point of view. All together, examined methods are recommended for policy makers in order to consult alternative opinion when decisions are taking.

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MOLDOVAN EXTERNAL TRADE WITH EU, CIS AND OTHER COUNTRIES: ACHIEVEMENTS AND CHALLENGES

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The foreign trade of a state represents a determinant factor in assessing its economic statute among the neighbours and in the whole world. The actuality of the studied topic is determined by the changing trade relations that the Republic of Moldova is passing through in the last years. Republic of Moldova holds the necessary criteria for becoming a competitive country in the region in terms of the manufactured and marketed goods. The aim of the study is to evaluate the foreign trade of the Republic of Moldova, by emphasizing the main traded groups of products, trade partners as well as to analyze the average price index and physical volume index of imports and exports. The paper also comes with an analysis of re-export and re-import, which represents a peculiarity for our country's trade pattern. Research methods that have been used within the paper are the following: analogy, systemic approach, statistical and scientific analysis, Laspeyres index method. The obtained results focus on the recovery of the foreign trade between 2015 and 2017 with higher revival rates of exports, and a growing reorientation of exports towards the European Union and other countries' markets.

Keywords: *import, export, foreign trade, economy, Republic of Moldova, average price index, physical volume index.*

Comerțul exterior al unui stat reprezintă un factor determinant în evaluarea statutului său economic între vecini și celelalte state. Actualitatea temei studiate este determinată de schimbarea relațiilor comerciale pe care Republica Moldova le parcurge în ultimii ani. Republica Moldova posedă toate premisele necesare pentru a deveni o țară competitivă în regiune, prin prisma produselor fabricate și comercializate. Scopul studiului este de a evalua comerțul exterior al Republicii Moldova, accentuând principalele grupuri de produse tranzacționate, partenerii comerciali, precum și analiza indicelui mediu al prețurilor și indicelui volumului fizic al importurilor și exporturilor. În lucrare se regăsește, de asemenea, o analiză a reexportului și a reimportului, care reprezintă o particularitate pentru modelul comercial al țării noastre. Metodele de cercetare utilizate în cadrul lucrării sunt următoarele: analogie, abordare sistemică, analiză statistică și științifică, metoda indicelui Laspeyres. Rezultatele obținute se concentrează pe redresarea comerțului exterior între 2015 și 2017, cu rate mai mari de recuperare a exporturilor și o reorientare tot mai mare a exporturilor spre pieţele Uniunii Europene și ale altor țări.

Cuvinte-cheie: *import, export, comerț exterior, economie, Republica Moldova, indicatori Laspeyres.*

Внешняя торговля государства является определяющим фактором при оценке его экономического статуса среди соседей и других государств. Актуальность изучаемой темы определяется изменением торговых отношений, которое сложилось в Молдове за последние годы. Республика Молдова имеет все необходимые предпосылки для того, чтобы стать конкурентоспособной страной в регионе с точки зрения выпускаемой и продаваемой продукции. Целью исследования является оценка внешней торговли Республики Молдова, выделение основных групп реализуемой продукции, торговых партнеров, а также анализ индекса средних цен и индекса физического объема импорта и экспорта. В данной роботе также содержится обзор реэкспорта и реимпорта, который является особенностью коммерческой модели нашей страны. Методы исследования, используемые в статье: аналогия, системный подход, статистический и научный анализ, метод индекса Ласпейреса. Результаты сфокусированы на восстановлении внешней торговли между 2015 и 2017 годами, с более высокими темпами восстановления экспорта и растущей переориентацией экспорта на ЕС и другие рынки.

Ключевые слова: *импорт, экспорт, внешняя торговля, экономика, Республика Молдова, показатели Ласпейреса.*

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Introduction. The foreign trade of the Republic of Moldova has undergone some significant changes in the last seven years. Changing relations with CIS countries and signing of the DCFTA with EU represented the determinant factors for changing the vector of the external trade of the country. The trade pattern in terms of both, exports and imports, has changed during the recent years, showing a smaller degree of dependence on the "old" trade partners. Based on the applied research methods, this paper aims to present an analysis of the current situation of the Moldovan foreign trade, thus highlighting the groups of products mostly intended for export and import. The use of the Laspeyres index method allows us to evaluate the price index and physical volume index, thus determining the real physical volumes and the real price difference for certain products from the commodity groups. The issue of external trade and its impact on the economic development of a country, including the in depth analysis of the trade in term of Laspeyres index, has been studied by various foreign scholars, such as Pomfret R. (Pomfret, R. 2005), Lipsey R. (Lipsey, R., 1991), Helpman and Krugman (Helpman, E., Krugman, P. 1985), etc. Moldovan scientists that analyzed the external trade of the Republic of Moldova in a broad sense are the following: Stratan A. and Clipa V., (Stratan, A., Clipa V., 2011), Galben I., (Galben, I., 2012), Ganciucov V. and Ceban A. (Ganciucov, V., Ceban A. 2015), Ceban A. (Ceban, A. 2017) and others.

The given study is based primarily on analysis of statistical data on foreign trade provided by the National Bureau of Statistics and WITS database.

Applied research methods

For a better assessment of the current situation related to the external trade of the Republic of Moldova, the following research methods have been used: analogy, systemic approach, statistical analysis of the databases and scientific analysis of the used literature and methodology. At the same time, the author has used the Laspeyres index to measure the changes between two periods of time in the total cost of purchasing the basket of goods and services that is representative comparative to the base period.

The methodology has at least three practical advantages: it is easily explained to the public; it can make repeated use of the same data on consumer purchases; and it doesn't need to be revised, assuming that users are satisfied with the Laspeyres concept. Another notable advantage is that the Laspeyres is consistent in aggregation down to the lowest level of aggregation. (Consumer..., 2004, Ceban, A. 2017).

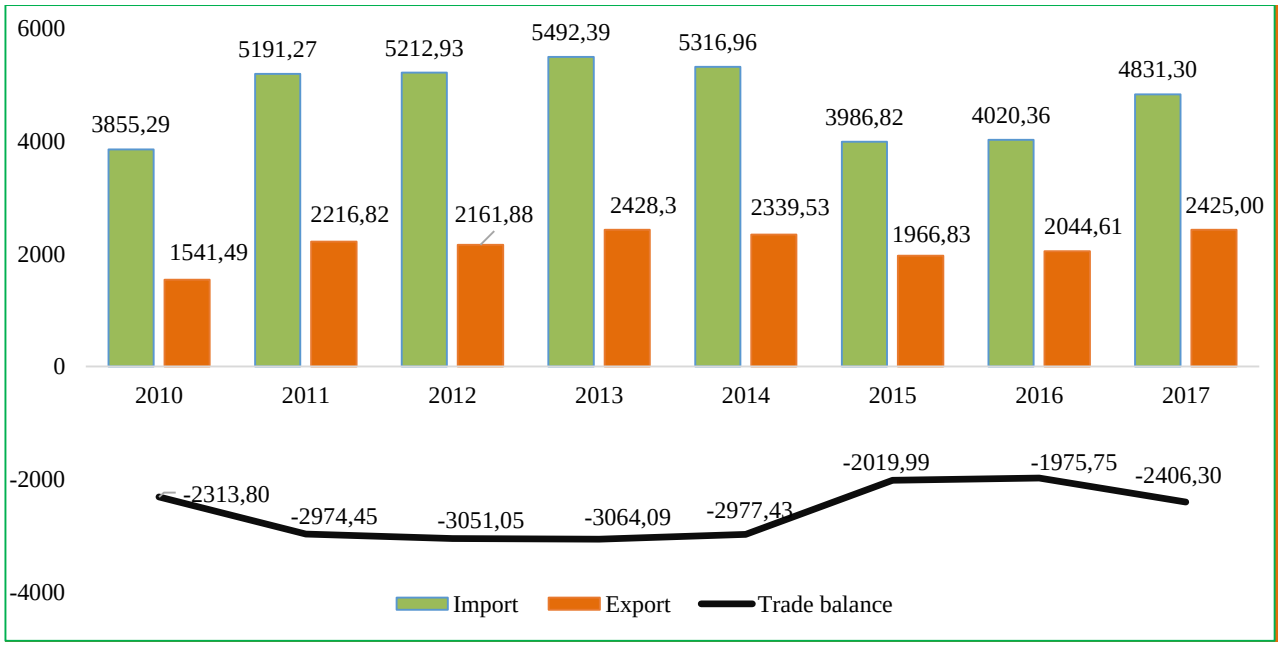

Figure 1. Trade balance of the Republic of Moldova, 2010 – 2017, mil. USD

Source: Elaborated by the author based on the data of the National Bureau of Statistics.

Results obtained

During the period of 2010-2017 the balance of the foreign trade had experienced increasing as well as decreasing trends (Figure 1). This result is due both, to imports, which increased in 2011-2014 with maximum values in 2013, but which has diminished its value in the years 2015 and 2016 with a tendency to recover in 2017. The exports are following the import's trends, but in a slower way.

Although the export of manufactured goods in 2017 did not reach yet the value of 2013, it increased compared to 2010 by 25.3%. Nevertheless, compared with the previous years of decline (2015 and 2016) the year of 2017 brought a growth of 18.6% compared to 2016, mainly due to the recovery of the banking sector after a crisis period of 2015-2016, increase in production of most of the commodities, as well as to the strengthening of the national currency. Cooperation with the EU countries, which accounted for 65.9% of total exports (Table 1), represented one of the main drivers of the above-mentioned increase. The import in 2017 reached a value of 4831.3 mil. USD, which accounted for a 20.2% increase compared to 2016 and 57.3% compared to 2010. This result is largely due to imports from the European Union countries, which reached 49.5% of the total import in 2017.

Table 1

Foreign trade of the Republic of Moldova in 2017

Indicators	2017		Structure %		The degree of influence on the increase (+), decrease (-) of the indicators	
	mil. USD	% to previous year	2016	2017	2016	2017
Total export, of which:	2425	118.6	100	100	3.9	18.6
CIS countries	462.8	111.8	20.3	19.1	-3.9	2.3
EU countries	1596.9	119.9	65.1	65.9	5.8	12.9
Other countries	365.3	122.4	14.6	15.1	2.1	3.2
Total import, of which:	4831.3	120.2	100	100	0.8	20.1
CIS countries	1206	122.4	25.6	24.9	0.2	4.4
EU countries	2389.2	121.1	49.1	49.5	0.4	10.3
Other countries	1236.1	121.3	25.4	25.6	0.1	5.4
Deficit of the trade balance, of which:	-2406.3	121.8	100	100	-2.1	21.7
CIS countries	-743.2	121.2	31.04	30.9	4.3	6.5
EU countries	-792.3	123.4	32.5	32.9	-4.7	7.6
Other countries	-870.8	120.8	36.5	36.2	-1.8	7.6

Source: Elaborated by the author based on the data of the National Bureau of Statistics.

Import

After analyzing the imports during the period 2011-2017, one can note a stability over the period 2011-2014, which was followed by a significant reduction in 2015 and a slight increase in 2016, with signs of marked revival in 2017. This reduction was conditioned by several factors, including the reduction of remittances, the reduction of foreign direct investment and the massive elimination of capital by individuals and businesses as a result of the banking problems that took place during the recent years. However, structurally examining the import over the years, one can observe a reorientation from the CIS to the EU market. Thus, at the beginning of the analyzed period, imports from CIS countries had a share of 33% of the total imports, and in 2017 they fell to a level similar to imports from other countries, accounting for about 25%. EU imports in 2011 registered a 43.5% share, and over the years they strengthened their positions and in 2017 reached a 49.5% share of the total imports.

In 2017, the European Union, being the main trade economic partner, exported in the Republic of Moldova commodities valued at 2389.2 mil. USD, marking an increase of 21.1% compared to the previous year. The main import partners of the Republic of Moldova in the European Union are Romania, Germany, Italy, Poland and France. Altogether these five counties accounted for 68.2% of total imports in 2011 and 70.9% in 2017 registering an increase of 2.7%.

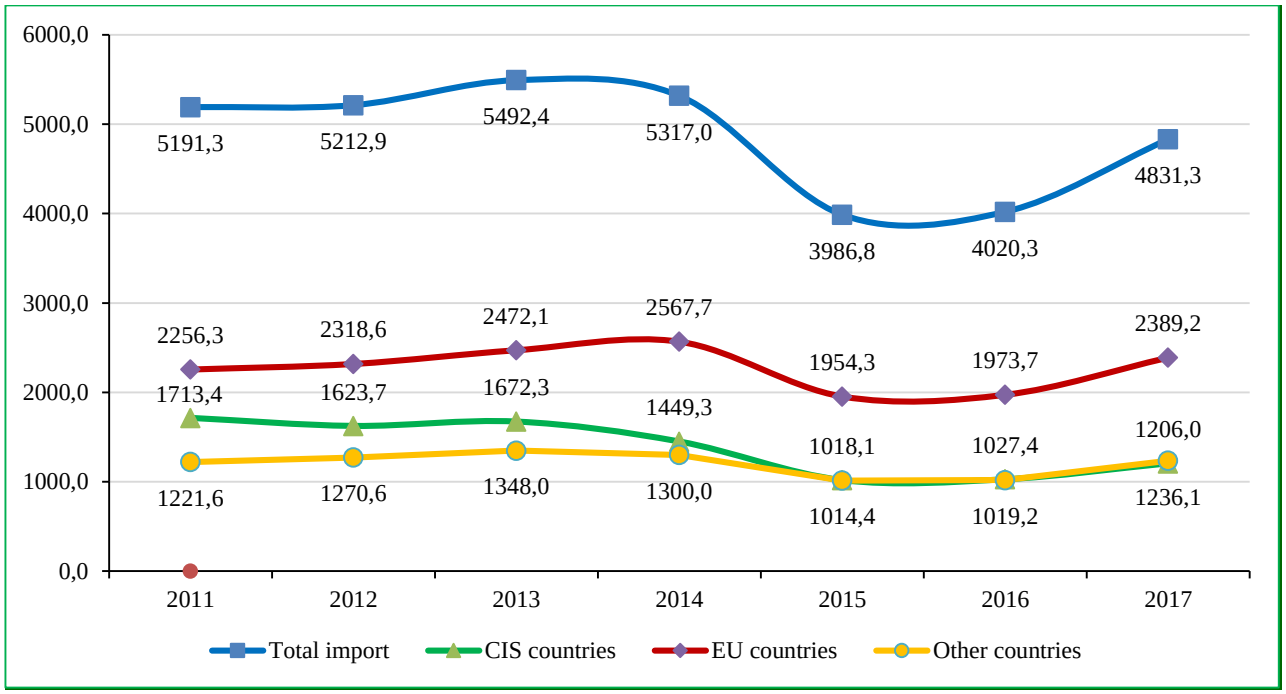

Figure 2. Dynamics of imported goods, 2010-2017, mil. USD

Source: Elaborated by the author based on the National Bureau of Statistics data.

Imports from CIS countries also registered an increase in 2017, accounting for 22.4% compared to the previous year. Among the CIS countries, the main import partners for the Republic of Moldova between 2011 and 2017 were the Russian Federation, Ukraine, Belarus, Uzbekistan and Kazakhstan, which covered virtually all imports from CIS countries over the analysed period or 99.2 % in 2011 and 99.9% in 2017.

In terms of the import from the category of "Other countries", which marked an increase of 21.3% compared to 2016 (1236.1 mil. USD), the main import partners are China, Turkey, USA, Vietnam and Japan. Their share in 2011 accounted for 74.3%, and in 2017 they strengthened their positions to a share of 77.3% of the total imports from other countries.

Overall, the first 15 countries that export goods to the Republic of Moldova hold a share of 84.7% of the total import.

The main 5 groups of commodities, which according to the Commodity Nomenclature for 2017 accounted for 60% of the total imported goods are the following: "Machinery and mechanical appliances; electrical equipment; parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles", "Mineral products", "Products of the chemical or allied industries", "Textiles and textile articles", "Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes".

Table 2

The most important 15 import countries

Country name	Import 2017		Structure %		The degree of influence on the increase (+), decrease (-) of exports	
	Total, mil. USD	% to previous year	2016	2017	2016	2017
Total	4831.4	120.2	100	100	0.8	20.17
Romania	694.51	125.9	13.7	14.4	-0.1	3.5
Russian Federation	571.7	106.8	13.3	11.8	-0.01	0.9
Ukraine	511.1	133.1	9.6	10.6	0.3	3.1
China	505.4	128.4	9.8	10.5	0.6	2.7
Germany	390.6	123.4	7.9	8.1	-0.1	1.8

Country name	Import 2017		Structure %		The degree of influence on the increase (+), decrease (-) of exports	
	Total, mil. USD	% to previous year	2016	2017	2016	2017
Italy	331.3	118.0	7.0	6.9	0.04	1.2
Turkey	304.3	111.9	6.8	6.3	-0.3	0.8
Poland	165.7	125.4	3.3	3.4	0.2	0.8
Belarus	114.6	113.1	2.5	2.4	0.4	0.3
France	112.7	125.3	2.2	2.3	0.2	0.5
Hungary	99.6	124.4	2.0	2.1	0.2	0.4
Austria	80.3	108.9	1.8	1.7	-0.4	0.1
Bulgaria	74.1	128.6	1.4	1.5	-0.2	0.4
USA	70.2	131.8	1.3	1.5	0.06	0.4
Czech Republic	68.2	121.5	1.4	1.4	0.1	0.3

Source: Elaborated by the author based on the data of the National Bureau of Statistics.

The explanation of the high import values for the first three groups of products mentioned above comes from the very moderate level of production registered in the Republic of Moldova, as well as from the population and market oriented towards "consumption" of the commodities from these groups.

Textiles are imported as a raw material and due to investments made by foreign entrepreneurs in the textile industry are processed and further exported under the form of clothes and articles of thereof.

As for the group of "Prepared foodstuff" tobacco, spirits and prepared food products have the greatest values of total imports in this group.

Table 3

Import by group of goods structured by value, mil. USD

Code	Name of the commodity group	2017		Structure %		Structural changes, p.p.
		mil. USD	% to previous year	2016	2017	2017
	Total import	4831.3	120.1	100.0	100.0	X
XVI.	Machinery and mechanical appliances; electrical equipment; parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles	801.2	124.5	16.0	16.5	0.5
V.	Mineral products	774.2	122.8	15.6	16.0	0.3
VI.	Products of the chemical or allied industries	572.9	113.9	12.5	11.8	-0.6
XI.	Textiles and textile articles	398.3	115.2	8.6	8.2	-0.3
IV.	Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes	352.8	115.6	7.5	7.3	-0.2
XV.	Base metals and articles of base metal	343.9	125.5	6.8	7.1	0.3
XVII.	Vehicles, aircraft, vessels and associated transport equipment	294.6	126.8	5.7	6.1	0.3
VII.	Plastics and articles thereof; rubber and articles thereof	292.2	113.3	6.4	6.0	-0.3
II.	Vegetable products	195.3.	113.7	4.2	4.0	-0.2
XX.	Miscellaneous manufactured articles	138.0	119.7	2.8	2.8	-0.01
I.	Live animals; animal products	131.5	122.9	2.6	2.7	0.06

XIII.	Articles of stone, plaster, cement, asbestos, mica or similar materials; ceramic products; glass and glassware	122.5	118.1	2.5	2.5	-0.04
IX.	Wood and articles of wood; wood charcoal; cork and articles of cork; manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork	105.8	124.1	2.1	2.1	0.07
X.	Pulp of wood or of other fibrous cellulosic material; waste and scrap of paper or paperboard; paper and paperboard and articles thereof	88.0	112.1	1.9	1.8	-0.1
XVIII.	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; clocks and watches; musical instruments; parts and accessories thereof	76.0	133.8	1.4	1.5	0.2
VIII.	Raw hides and skins, leather, furskins and articles thereof; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silkworm gut)	64.6	133.4	1.2	1.3	0.1
XII.	Footwear, headgear, umbrellas, sun umbrellas, walking-sticks, seat-sticks, whips, riding-crops and parts thereof; prepared feathers and articles made therewith; artificial flowers; articles of human hair	43.9	160.8	0.6	0.9	0.2
III.	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	25.7	105.4	0.6	0.5	-0.07
XIV.	Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal and articles thereof; imitation jewellery; coin	8.8	120.0	0.1	0.1	0.00
XXI.	Works of art, collectors pieces and antiques	1.1	27.9	0.1	0.0	-0.08

Source: Elaborated by the author based on the National Bureau of Statistics data.

During the period of 2011-2013, the most important group of products was "Mineral Products". Since 2013 it has been in a continuous decline, with little attempts to restore the situation. In 2017 it decreased by 38.39% compared to 2013, being overtaken by the group "Machinery and mechanical appliances; electrical equipment; parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles". This significant reduction of the Mineral products group is largely due to reductions occurred in its subgroup, namely the "Mineral fuels, mineral oils and products from distillation; bituminous materials; mineral wax", which has a share of about 98% of the given group over the last years and which also decreased in 2017 by 38.42% compared to 2013.

The most significant increases in 2017 compared to the previous year were recorded within the groups "Footwear, headgear, umbrellas, sun umbrellas, walking-sticks, seat-sticks, whips, riding-crops and parts thereof; prepared feathers and articles made therewith; artificial flowers; articles of human hair", "Optical, photographic, cinematographic, measuring, checking, precision, medical or

surgical instruments and apparatus; clocks and watches; musical instruments; parts and accessories thereof", "Raw hides and skins, natural fur and articles thereof", "Vehicles, aircraft, vessels and associated transport equipment" and "Base metals and articles of base metal".

Re-import

During 2011-2017, there were no significant changes in the re-imported products. Thus, the share of re-importations in the total imports in this period is insignificant, varying between 0.1 and 0.3%. In 2017 this indicator registered the value of 0.1%.

Export

Analyzing the evolution of exports during the years 2011-2017 (Figure 3), we observe that although the total export has an oscillatory value with a maximum value in 2013 and tendencies of return in 2017, during the given period there is noted the reorientation of the export direction from the market of CIS countries to the EU market. Thus, if the export to the CIS countries in 2011 had a share of 41.5%, it decreased to a share of 19.1% in 2017. On the other hand, exports to the EU countries in 2011 recorded 48.9%, marking an increase in the following years in percentage terms, reaching 65.9% of the total exports in 2017. It is also worth noting the increase in exports to other countries of the world from 9.7% in 2011 to 15.1% in 2017.

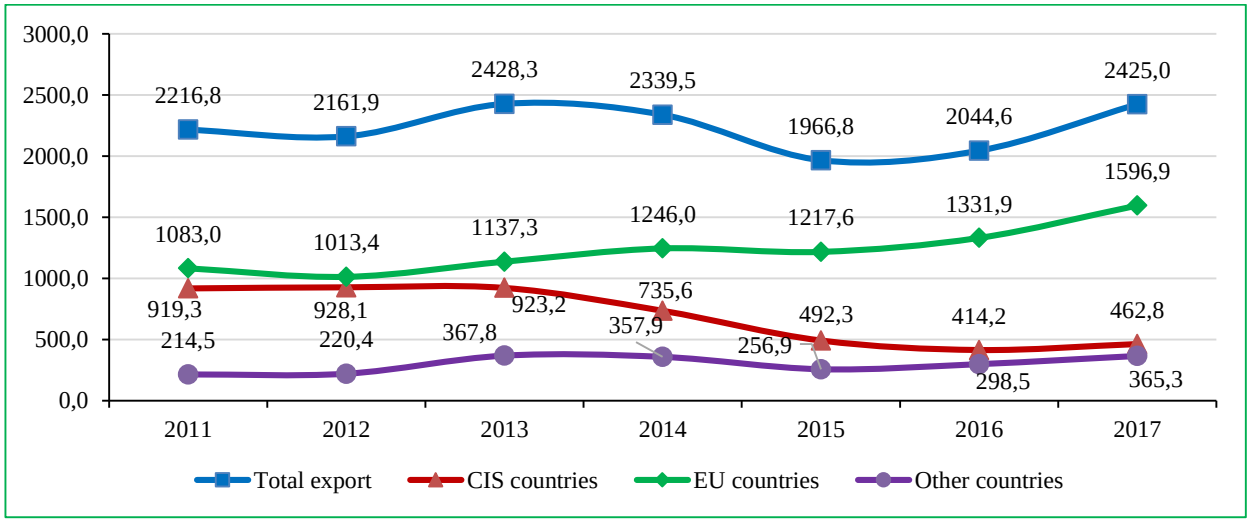

Figure 3. Total export of goods in 2011-2017, mil. USD

Source: Elaborated by the author based on the National Bureau of Statistics data.

The first 15 countries that import goods from the Republic of Moldova account for a share of 84.5% of the total Moldovan exports (Table 4).

Although the exports from the EU countries increased in 2017 by 19.9% compared to the previous year (1596.9 mil. USD), the trade balance still remains negative, as for the other groups of countries. On the European market, the main importing countries of the local products are Romania, which in the last years intensified its cooperation with the domestic producers, thus reaching 37.6% of the total exports to the EU countries in 2017, followed by Italy, Germany, the Great Britain and Poland, which together make up about 77.7% of all consumers of Moldovan products.

Exports in CIS countries also recorded increased values, by 11.8% in 2017 compared to 2016 (462.8 mil. USD), the main consumer of domestic products being the Russian Federation, which, however, over the years 2011-2017 is gradually losing its positions. Thus, if in 2011 Russian Federation held a share of 68%, then in 2017 this figure accounted for 54.9% of the total exports oriented towards the CIS market, being followed by Belarus, Ukraine, Georgia and Kazakhstan.

Exports to other countries (besides EU and CIS) has recorded the biggest increase (22.4%) compared to 2016. In terms of exports, the leader to other countries over the years 2011-2017 remained Turkey. Although the share of exports in these directions has increased significantly, Turkey has substantially lost its position – from 34.2% in 2011 to 8.54% in 2017, followed by China, United States, Georgia and Iraq, which together account for 27.44% of total exports to other countries.

Carrying out an analysis of exports by countries without taking into consideration the destination market, one can notice that over the years the leader in this ranking, until 2014 was the Russian Federation, which due to the embargo imposed for Moldova, was overtaken by Romania, which is strengthening its position in the standings during the last years (Ceban, A., 2017). Italy, Germany, the United Kingdom and Belarus are the next countries in this ranking, which throughout the 2011-2017 period remained almost unchanged. These countries in 2017 hold a share of 62% of the total exports of the Republic of Moldova.

Table 4

The most important 15 export countries

Country name		Export in 2017		Structure %		The degree of influence on the increase (+), decrease (-) of exports	
		Total, mil. USD	% to previous year	2016	2017	2016	2017
Total export		2425.0	118.6	100	100	4.0	18.6
1	Romania	600.6	117.1	25.1	24.7	3.4	4.3
2	Russian Federation	254.5	109.1	11.4	10.5	-0.4	1.0
3	Italy	236.0	119.3	9.7	9.7	0.0	1.9
4	Germany	166.1	131.2	6.2	6.8	0.5	1.9
5	Great Britain	136.1	119.1	5.6	5.6	-1.2	1.1
6	Belarus	110.0	106.3	5.1	4.5	-1.4	0.3
7	Turkey	104.0	169.2	3.0	4.2	-0.1	2.1
8	Poland	102.9	140.2	3.6	4.2	0.3	1.4
9	Bulgaria	78.1	102.7	3.7	3.2	2.4	0.1
10	Ukraine	65.5	131.8	2.4	2.7	0.2	0.8
11	France	50.8	113.6	2.2	2.1	0.1	0.3
12	Switzerland	44.0	99.0	2.2	1.8	0.5	0.0
13	Austria	40.8	150.0	1.3	1.6	0.3	0.7
14	Czech Republic	29.8	105.6	1.3	1.2	0.0	0.1
15	Greece	29.4	100	1.4	1.2	0.2	0.0

Source: Elaborated by the author based on the data of the National Bureau of Statistics.

The most exported commodity groups according to the Combined Nomenclature of Goods are the following: "Vegetable products", which hold 27.31% of the total exported goods, followed by "Machines and apparatus, electrical equipment and parts thereof; sound recorders and reproducers, television image and sound recorders or reproducers, and parts and accessories of such apparatus", "Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes", "Textiles and textile articles" and "Miscellaneous manufactured articles". The monetary value and weight of these products in the total exported goods as compared to 2016 increased, reaching a share of 79.2% in 2017.

Table 5

Export of the Republic of Moldova divided by groups of goods, 2016-2017

Code	Name of the commodity group	2017		Structure %		Structural changes, p.p.
		mil. USD	% to previous year	2016	2017	2017
I	Live animals; animal products	47.1	117.2	1.9	1.9	-0.02
II	Vegetable products	662.5	125.1	25.9	27.3	1.4
III	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	53.7	98.9	2.6	2.2	-0.4

Code	Name of the commodity group	2017		Structure %		Structural changes, p.p.
		mil. USD	% to previous year	2016	2017	2017
IV	Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes	367.7	114.3	15.7	15.1	-0.5
V	Mineral products	28.7	201.3	0.7	1.1	0.5
VI	Products of the chemical or allied industries	98.7	109.1	4.4	4.0	-0.34
VII	Plastics and articles thereof; rubber and articles thereof	33.4	93.6	1.7	1.3	-0.4
VIII	Raw hides and skins, leather, furskins and articles thereof; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silkworm gut)	20.8	87.1	1.2	0.8	-0.3
IX	Wood and articles of wood; wood charcoal; cork and articles of cork; manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork	10.5	108.8	0.4	0.4	-0.04
X	Pulp of wood or of other fibrous cellulosic material; waste and scrap of paper or paperboard; paper and paperboard and articles thereof	13.2	107.9	0.6	0.5	-0.05
XI	Textiles and textile articles	346.7	112.8	15.0	14.3	-0.7
XII	Footwear, headgear, umbrellas, sun umbrellas, walking-sticks, seat-sticks, whips, riding-crops and parts thereof; prepared feathers and articles made therewith; artificial flowers; articles of human hair	34.0	115.8	1.4	1.4	-0.03
XIII	Articles of stone, plaster, cement, asbestos, mica or similar materials; ceramic products; glass and glassware	42.1	94.9	2.2	1.7	-0.4
XIV	Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal and articles thereof; imitation jewellery; coin	1.2	160.1	0.04	0.05	0.01
XV	Base metals and articles of base metal	48.3	111.0	2.1	1.9	-0.1
XVI	Machinery and mechanical appliances; electrical equipment; parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles	389.6	130.9	14.5	16.0	1.5
XVII	Vehicles, aircraft, vessels and associated transport equipment	41.4	150.6	1.3	1.7	0.4
XVIII	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; clocks and watches; musical instruments; parts and accessories thereof	30.8	106.7	1.4	1.3	-0.1
XX	Miscellaneous manufactured articles	154.6	115.4	6.5	6.4	-0.2
XXI	Works of art, collectors pieces and antiques	0.0	28.9	0.0	0.0	0.0

Source: Elaborated by the author based on the data of the National Bureau of Statistics.

Analyzing the exports between 2010 and 2017, we can observe the considerable weight of the agri-food products. Thus, in 2010, the share of these products accounted for 47.5% of the total exported goods. Although the percentage share in 2011-2014 is decreasing, in the following period 2014-2015 it increases significantly in monetary values compared to the previous period. In the same time, it increased on average for the years 2015-2017, keeping the same share in the total exported goods.

The agricultural sector of the Republic of Moldova holds a significant importance in the country's economy. With a share of about 12% in GDP in the last years, it has a high degree of influence over the exports of the country. Exports of vegetable products record high values mainly due to the export of low added value cultures such as cereals (wheat, sunflower and maize), and vegetables and fruits. Therefore, in order to increase the sector's competitiveness on the foreign markets, it is necessary to make investments along the most important value chain for each sector, so that the processed products would bring added value to the sector.

Table 6

Dynamics of export of agri-food goods, 2010-2017, mil. USD

Code	Name of section / chapter	2010	2011	2012	2013	2014	2015	2016	2017
	Total export	1541.5	2216.8	2161.9	2428.3	2339.5	1966.8	2044.6	2425.0
I	Live animals; animal products	27.0	38.0	37.8	37.2	59.7	37.5	40.2	47.1
II	Vegetable products	340.7	471.0	360.5	507.0	549.7	501.7	529.5	662.5
III	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	47.6	77.5	89.7	44.0	77.5	72.0	54.3	53.7
IV	Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes	316.9	330.6	390.9	427.3	378.4	303.3	321.5	367.7
Agri-food products		732.2	917.1	878.9	1015.5	1065.4	914.5	945.5	1131.0
Share in export, %		47.50	41.37	40.65	41.82	45.54	46.50	46.24	46.64

Source: Elaborated by the author based on the data of the National Bureau of Statistics.

Re-export

Re-export accounts for a significant share of the total value of goods exported by the Republic of Moldova. If in 2011 the re-export share in the total export constituted 45.18%, this indicator gradually decreased over the years, thus constituting 32.35% in 2017.

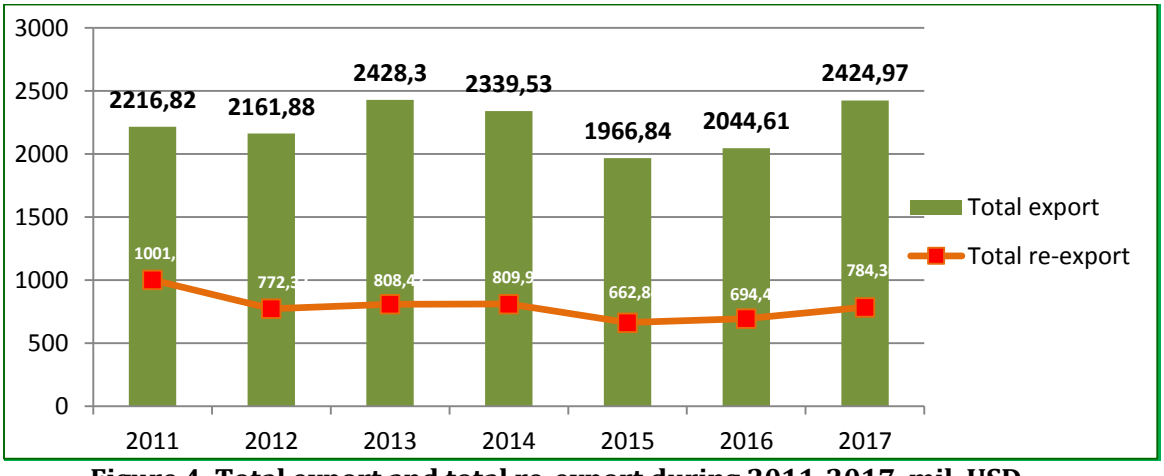

Figure 4. Total export and total re-export during 2011-2017, mil. USD

Source: World Bank, Wits database, www.wits.worldbank.org

The most significant groups of goods with a larger share of total re-exports are the following ones:

- "Textiles and textile articles", which over the years 2011-2017 had a share of approximately 31%, with an increase of up to 38.3% in 2017. Within this group, the largest re-exports are registered under the headings "Articles of apparel and clothing accessories, knitted or crocheted", "Articles of apparel and clothing accessories, not knitted or crocheted" and "Knitted or crocheted fabrics", which in turn have a coverage of 89.12% of the total group for the year 2017. The main partner countries in the re-export chapter are Italy, the United Kingdom, Romania and Turkey.
- "Machinery and mechanical appliances; electrical equipment; parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles", which in 2012 accounting for 10.65% of total re-exports had a steady increase in 2017 with a share of 23.14%. Within the group, the most significant re-exports are carried out within the chapters: "Machinery and mechanical appliances; electrical equipment; parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles" and "Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof" which hold the total number of re-exports in the total for the given group for the year 2017. The main re-export countries are: Romania, Bulgaria, Germany, Russia and Italy.
- "Products of the chemical or allied industries" in the period 2012-2015 held a share of about 16%, with a reduction to 8.9% in 2017. This share is due to the re-export of "Pharmaceutical products", "Soap, organic surface-active agents, washing preparations, lubricating preparations, artificial waxes, prepared waxes, polishing or scouring preparations, candles and similar articles, modelling pastes, 'dental waxes' and dental preparations with a basis of plaster" and "Essential oils and resinoids; perfumery, cosmetic or toilet preparations", which account for 95.3% of the total value of the re-exported products in the given group for the year 2017. The main re-export partners of the given group are: Russian Federation, Ukraine, Kazakhstan, Poland and Georgia.
- "Miscellaneous manufactured articles" has a floating quota during 2011-2017, with 8% in 2011 and 5.6% in 2017 of all re-exported products. In 2017, the re-export of this group is entirely due to the categories of goods "Toys, games, and sports requisites; parts and accessories thereof" and "Miscellaneous articles", the main partners being the Netherlands, Germany, Romania, the Russian Federation and the Czech Republic.
- "Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes". This group had a share of only 0.42% in 2011, then with different growth rates recorded a 4.4% share in 2017. Maintaining this quota is due to the categories of goods "Beverages, liquids alcohol and vinegar" and "Tobacco and manufactured tobacco substitutes", which together constitute 91.55% of the total re-export of the given group for the year 2017.

Table 7

Re-export of the Republic of Moldova divided by groups of goods, 2016-2017

Code	Group name	2017		Structure %		Structural changes, p.p.
		mil. USD	% to previous year	2016	2017	
I	Live animals; animal products	0.002	56.5	0.0005	0.0003	-0.0003
II	Vegetable products	21.8	99.7	3.1	2.7	-0.3
III	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	1.3	137.8	0.1	0.2	0.03
IV	Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes	35.2	130.1	3.8	4.5	0.5
V	Mineral products	17.3	291.5	0.8	2.2	1.3
VI	Products of the chemical or allied industries	70.1	103.8	9.7	8.9	-0.7

Code	Group name	2017		Structure %		Structural changes, p.p.
		mil. USD	% to previous year	2016	2017	
VII	Plastics and articles thereof; rubber and articles thereof	13.1	58.5	3.2	1.6	-1.5
VIII	Raw hides and skins, leather, furskins and articles thereof; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silkworm gut)	16.7	83.8	2.8	2.1	-0.7
IX	Wood and articles of wood; wood charcoal; cork and articles of cork; manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork	2.1	96.1	0.3	0.3	-0.04
X	Pulp of wood or of other fibrous cellulosic material; waste and scrap of paper or paperboard; paper and paperboard and articles thereof	4.3	107.9	0.5	0.5	-0.02
XI	Textiles and textile articles	300.6	111.6	38.8	38.3	-0.4
XII	Footwear, headgear, umbrellas, sun umbrellas, walking-sticks, seat-sticks, whips, riding-crops and parts thereof; prepared feathers and articles made therewith; artificial flowers; articles of human hair	25.6	111.8	3.3	3.2	-0.03
XIII	Articles of stone, plaster, cement, asbestos, mica or similar materials; ceramic products; glass and glassware	0.9	108.8	0.1	0.1	-0.004
XIV	Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal and articles thereof; imitation jewellery; coin	0.3	159.7	0.02	0.03	0.01
XV	Base metals and articles of base metal	19.4	89.7	3.1	2.4	-0.6
XVI	Machinery and mechanical appliances; electrical equipment; parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles	181.5	132.1	19.8	23.1	3.3
XVII	Vehicles, aircraft, vessels and associated transport equipment	21.0	91.5	3.3	2.6	-0.6
XVII	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; clocks and watches;	9.1	168.7	0.7	1.2	0.4

Code	Group name	2017		Structure %		Structural changes, p.p.
		mil. USD	% to previous year	2016	2017	
	musical instruments; parts and accessories thereof					
XX	Miscellaneous manufactured articles	44.1	106.7	5.9	5.6	-0.3
XXI	Works of art, collectors pieces and antiques	0.01	1.6	0.1	0.001	-0.1
Total		**784.4**	**112.9**	**100**	**100**	**X**

Source: World Bank, Wits database, www.wits.worldbank.org

Evaluation of physical volumes and average prices of import and export

In order to analyze average prices and physical volumes, the price index and the physical volume index, which are calculated using Laspeyres formulas, are used. For the calculation of the indices using Laspeyres formulas, the monetary value of the goods and their physical volumes are required both, in the reference year and in the base year (Ceban, A. 2017). In the current analysis, the base year will be considered the year 2016.

$$I_P = \frac{\sum p_1 q_0}{\sum p_0 q_0}$$

$$I_q = \frac{\sum p_0 q_1}{\sum p_0 q_0}$$

where:

I_P – price index

I_q – physical volume index

As a result of the analysis of the physical volume and the average export prices, in 2017 it is noted an increase of the physical volume by 11.9% and a decrease of the average price indices by 11.7%.

Table 8

Average price index and physical volume index of export by commodity groups in 2017

No.Gr.	Main groups	2016	2017	Sum ration %	Average price index %	Physical volume index %
		Sum, thous. USD	Sum, thous. USD			
I	Live animals; animal products	40066.8	47047.6	117.4	111.6	108.6
II	Vegetable products	529467.3	662470.9	125.1	105.8	118.9
III	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	54289.7	53713.4	98.9	89.3	111.2
IV	Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes	321527.2	367728.2	114.3	115.7	100.6
V	Mineral products	14118.8	28691.4	203.2	107.7	188.0
VI	Products of the chemical or allied industries	90032.2	98672.6	109.6	107.7	112.5
VII	Plastics and articles thereof; rubber and articles thereof	35613.4	33414.8	93.8	95.8	101.6
VIII	Raw hides and skins, leather, furskins and articles thereof; saddlery and harness; travel goods, handbags and similar containers;	23929.3	20850.4	87.1	110.8	98.9

No.Gr.	Main groups	2016 Sum, thous. USD	2017 Sum, thous. USD	Sum ration %	Average price index %	Physical volume index %
	articles of animal gut (other than silkworm gut)					
IX	Wood and articles of wood; wood charcoal; cork and articles of cork; manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork	8988.4	10519.7	117.0	102.9	131.2
X	Pulp of wood or of other fibrous cellulosic material; waste and scrap of paper or paperboard; paper and paperboard and articles thereof	12192.2	13166.5	107.9	100.6	107.3
XI	Textiles and textile articles	306897.9	346733.1	112.9	105.2	111.9
XII	Footwear, headgear, umbrellas, sun umbrellas, walking-sticks, seat-sticks, whips, riding-crops and parts thereof; prepared feathers and articles made therewith; artificial flowers; articles of human hair	29345.9	33983.9	115.8	106.0	111.2
XIII	Articles of stone, plaster, cement, asbestos, mica or similar materials; ceramic products; glass and glassware	44214.6	42059.5	95.1	110.4	88.4
XIV	Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal and articles thereof; imitation jewellery; coin	758.1	1214.0	160.1	120.6	384.7
XV	Base metals and articles of base metal	43193.4	48302.5	111.8	117.9	228.1
XVI	Machinery and mechanical appliances; electrical equipment; parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles	296507.4	389635.9	131.4	106.0	222.3
XVII	Vehicles, aircraft, vessels and associated transport equipment	27473.9	41392.6	150.6	136.9	95.5
XVIII	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; clocks and watches; musical instruments; parts and accessories thereof	28787.8	30808.8	107.0	97.9	168.9
XX	Miscellaneous manufactured articles	133804.0	154134.4	115.1	102.2	145.2
XXI	Works of art, collectors pieces and antiques	12.1	3.5	28.9	100.0	345.2
Total		2041220.3	2424543.2	118.7	88.3	111.9

Source: Elaborated by the author based on the National Bureau of Statistics data.

The most significant increases that influenced exports favourably in 2017 compared to 2016 were recorded in the following groups: "Vegetable products" with an increase in the physical volume index by 18.9%, "Machinery and mechanical appliances; electrical equipment; parts thereof; sound

recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles" with an increase in the physical volume index of 2.2 times, "Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes" with an increase in the physical volume index (+0.6%) had a significant increase in the average prices index (+15.7%) which eventually brought a significant monetary value to the growth in exports, "Textiles and textile articles" contributed to the increase of exports by the combination of growth of the physical volume index by 11.9% and the increase of the average price index by 5.2% and "Miscellaneous manufactured articles" with a significant increase of the physical volume index by 45.2%.

One can note that there are groups that have even higher physical volume indexes, such as "Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal and articles thereof; imitation jewellery; coin" with an increase of 3.8 times or "Works of art, collectors pieces and antiques" – with an increase of 3.4 times, but their contribution to the share of exports is not so great in order to be taken into account (Table 7).

A negative contribution to exports had the groups "Raw hides and skins, leather, furskins and articles thereof; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silkworm gut)" – with a reduction in physical volume by 1.1%, "Plastics and articles thereof; rubber and articles thereof" – which even with a certain stability of the physical volume index (+1.6%) had a 4.2% reduction in the average price index that eventually contributed negatively to the value of exports, "Articles of stone, plaster, cement, asbestos, mica or similar materials; ceramic products; glass and glassware" – with a reduction of the physical volume index by 11.6%.

After analyzing the average price indices and the physical volume indices of imported products, we observe that both are growing, so the average price index recorded an increase of 9.6% and the physical volume index by 21.4% compared to the previous year.

Table 9

Average price index and physical volume index of imported goods by group of goods in 2017

No.Gr.	Main groups	2016	2017	Sum ration %	Average price index %	Physical volume index %
		Sum, thous. USD	Sum, thous. USD			
I	Live animals; animal products	106834.9	131353.2	122.9	108.2	303.6
II	Vegetable products	171622.5	195270.5	113.7	118.5	99.7
III	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	24407.9	25735.1	105.4	103.2	102.5
IV	Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes	305176.1	352835.2	115.6	102.9	112.7
V	Mineral products	630155.4	774172.7	122.8	109.0	115.8
VI	Products of the chemical or allied industries	502630.1	573036.2	114.0	101.9	116.8
VII	Plastics and articles thereof; rubber and articles thereof	257765.7	292148.4	113.3	105.4	107.6
VIII	Raw hides and skins, leather, furskins and articles thereof; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silkworm gut)	48294.8	64555.6	133.6	199.9	93.3
IX	Wood and articles of wood; wood charcoal; cork and articles of cork; manufactures of straw, of esparto or	85227.2	105797.8	124.1	107.4	116.2

No.Gr.	Main groups	2016	2017	Sum ration %	Average price index %	Physical volume index %
		Sum, thous. USD	Sum, thous. USD			
	of other plaiting materials; basketware and wickerwork					
X	Pulp of wood or of other fibrous cellulosic material; waste and scrap of paper or paperboard; paper and paperboard and articles thereof	78484.4	87973.3	112.1	99.2	113.9
XI	Textiles and textile articles	345624.9	398272.4	115.2	108.7	108.1
XII	Footwear, headgear, umbrellas, sun umbrellas, walking-sticks, seat-sticks, whips, riding-crops and parts thereof; prepared feathers and articles made therewith; artificial flowers; articles of human hair	27319.8	43942.5	160.8	126.6	129.8
XIII	Articles of stone, plaster, cement, asbestos, mica or similar materials; ceramic products; glass and glassware	103715.5	122547.0	118.2	112.4	108.6
XIV	Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal and articles thereof; imitation jewellery; coin	7360.2	8842.8	120.1	107.4	117.3
XV	Base metals and articles of base metal	273872.1	343900.7	125.5	118.9	106.7
XVI	Machinery and mechanical appliances; electrical equipment; parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles	643164.2	801208.0	124.5	113.6	117.5
XVII	Vehicles, aircraft, vessels and associated transport equipment	232179.2	291810.7	125.6	104.3	122.9
XVIII	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; clocks and watches; musical instruments; parts and accessories thereof	56743.2	76000.8	133.9	109.7	130.3
XX	Miscellaneous manufactured articles	113813.0	135816.3	119.3	98.9	219.7
XXI	Works of art, collectors pieces and antiques	4091.4	1143.0	27.9	117.7	31.3
TOTAL		4018 482,8	4826 362.7	120.1	109.6	121.4

Source: Elaborated by the author based on the National Bureau of Statistics data.

Almost all product groups had a positive contribution to the increase in imports, the only exception is the group "Works of art, collectors pieces and antiques", which recorded a 68.7% decrease in the physical volume index and the group “Miscellaneous manufactured articles" that marked a decrease in the price index by 1.1% compared to 2016.

The most significant increase was influenced by imports from the following groups: "Machinery and mechanical appliances; electrical equipment; parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles" which had both an increase in the average price index of 13.6% and the increase of the physical volume index by 17.5%, "Mineral products" with an increase of the average price index by 9.0% and an increase of the physical volume index by 15.8%, "Products of the chemical or allied industries" having an insignificant increase of the average price index by 1.9%, however, with an increase in the physical volume index by 16.8%, "Base metals and articles of base metal" with an increase of the average price index by 18.9% and of the physical volume index by 6.7% and "Vehicles, aircraft, vessels and associated transport equipment" with a small increase of the average price index by 4.3% and an increase of 22.9% of the physical volume index.

Conclusions

Together with the recovery of the foreign trade between 2015 and 2017 in terms of the volume of the years 2013-2014, exports have had higher revival rates than imports, thus keeping the influence degree at the same positions around the value 50%.

At the same time, there is noted a growing reorientation of exports towards the European Union market, which is becoming more attractive for local producers, thus contributing to the systematic increase of the share of this market in the total exports. The quality issue is an important aspect that hinders the exports of goods of the country, due to the high standards established especially by EU countries, but this could represent a further motivation for Moldovan producers in order to manufacture quality goods with high added value. Nevertheless, there is considerably favourable the fact that export to "Other countries" is increasing, which has a positive impact on the diversification of new markets.

The most imported groups of commodities like "machinery and mechanical appliances, mineral products, products of the chemical industry, textiles and prepared foodstuffs; beverages, tobacco remain quite the same over the last years, due to the increase in consumption on the local market and the re-export of some categories of these products. On the other hand the export of vegetable products, electrical equipment, prepared foodstuffs, spirits and tobacco, as well as textiles are increasing due to the high values of investments, re-export, and oversupply of these goods on the domestic market.

The analysis carried out with the help of Laspeyres index allowed us to observe that even if the prices for goods from the imported commodity groups increased, the physical volume index also increased, thus showing the high dependence of the Republic of Moldova on the external market and lack of local products that could replace the imported ones.

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THE CURRENT STATE AND THE PERSPECTIVES OF FRUIT-GROWING ENTREPRENEURSHIP IN THE NORTHERN DEVELOPMENT REGION OF THE REPUBLIC OF MOLDOVA

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Currently, the role and importance of SMEs in the development of the national economy are characterized by such features as: the direct contribution to the formation of the GDP in every country is, as a rule, between 55-95%; new jobs creation; boosting competition; increasing exports; innovations and technologies fostering. The effectiveness of entrepreneurial activity in fruit growing is characterized by the application of new fruit production technologies, such as intensive and super intensive system. The purpose of the research was to analyze fruit growing entrepreneurship in the Northern Development Region of the Republic of Moldova based on the data of „Domultera" LLC in Floresti district. The objective of the research was to analyze fruit-growing entrepreneurship in the Northern Development Region of the Republic of Moldova by describing the realities and perspectives in the field. It has been found out that applying superintensive and intensive technology to fruit growing is efficient. This fact can be explained by the reduction in production costs and the increase in global fruit production, sales revenue from the obtained production and gain profit, which have influenced the increased profitability level of up to 127.76% in 2017 and 86.15% in 2018 in the case of apple cultivation by applying the superintensive system. Apples and plums cultivation by applying intensive technology also increases the economic efficiency when trees begin to bear fruits.

Keywords: *entrepreneurship, efficiency, intensive technology, profitability, tree planting, seed fruits, stone fruits.*

În prezent, rolul și importanța IMM-lor în dezvoltarea economiei naționale se caracterizează prin unele trăsături, precum: contribuția nemijlocită la formarea Produsului Intern Brut din orice țară, de regulă, între 55-95%; crearea noilor locuri de muncă; stimularea concurenței; creșterea exporturilor; favorizarea inovațiilor și tehnologiilor. Eficacitatea activității de antreprenoriat în pomicultură este caracterizată de aplicarea noilor tehnologii de producere a fructelor, precum este sitemul intensiv și super intensiv. Scopul cercetării rezidă în analiza antreprenoriatului pomicol în Regiunea de Dezvoltare Nord a Republicii Moldova în baza datelor SRL „Domultera" din raionul Florești. S-a constatat că aplicarea tehnologiei super intensive cât și intensive în pomicultură poate asigura întreprinderilor un profit sporit de la 567 lei la o tonă, în anul 2016, până la 1835 lei la o tonă, în anul 2018. Aceasta se explică prin reducerea costurilor de producere și sporirea producției globale de fructe, veniturilor din vânzări de la realizarea producției și a profitului obținut, care au influențat nivelul sporit al rentabilității de până la 127,76%, în anul 2017, și 86,15%, în anul 2018, în cazul cultivării merelor prin sistemul super intensiv. La cultivarea merelor și prunelor prin aplicarea tehnologiei intensive, la fel, se înregistrează o sporire a eficienței economice, care se demonstrează prin rata rentabilității sporite de 48,32% și profitul obținut în calcul la o tonă în mărime de 1225,39 lei, odată cu intrarea deplină în rod a plantațiilor.

Cuvinte-cheie: *antreprenoriat, eficiență, tehnologie intensivă, rentabilitate, plantații pomicole, fructe sământoase, fructe sâmburoase.*

В настоящее время роль и значение МСП в развитии национальной экономики характеризуется некоторыми особенностями, такими как: прямой вклад в формирование валового внутреннего продукта в каждой стране от 55% до 95%; создание новых рабочих мест; стимулирование конкуренции, увеличение экспорта; содействие инновациям и технологиям. Эффективность предпринимательской деятельности в выращивании фруктов характеризуется применением новых технологий производства фруктов, таких как интенсивная и интенсивная

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система. Цель исследования: анализ предпринимательской деятельности в области плодоводства в Северном регионе Республики Молдова на основе данных „Domultera" ООО, Флорештского района. Было установлено, что применение суперинтенсивного и интенсивного садоводства является эффективным. Это объясняется за счет снижения себестоимости и увеличения объемов производства фруктов, доходов от реализации продукции и полученной прибыли, которые увеличили рентабельность до 127,76% в 2017 году и 86,15% в 2018, при выращивании яблок с применением суперинтенсивного метода. Выращивание яблок и слив с применением интенсивных технологий, также повышает экономическую эффективность, при полном входе деревьев в плодоношении.

Ключевые слова: *предпринимательство, эффективность, интенсивные технологии, рентабельность, плодоводство, семечковые и косточковые фрукты.*

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Introduction. Under market economy conditions, the entrepreneurial activity raises a steadily increasing interest. The entrepreneurial activity has a strong impact on the world, because even if the entrepreneurs don't invent new things, they are ultimately the ones that make things move and the world progress. They are the ones who introduce new technologies, promote new products, stimulate the discovery of new resources and mobilize capital. One of the entrepreneurial activities developed in the Republic of Moldova is the cultivation of fruit plantations, the branch that has been and will be one of the priority branches of agriculture with a considerable share in the country's economy and export. The global production of fruits and berries constituted about 47% of the total national production in 2017, the main growers being Soroca, Briceni, Ocnita, Donduseni, Edinet. We can also say that global fruit production constitutes about 5% of the country's GDP.

Degree of scientific approach to the topic and its presentation in the scientific literature

The problem of fruit-growing entrepreneurship and sustainable development is studied to a certain extent in the scientists' works in the Republic of Moldova. Among the local authors, who have dedicated scientific papers to entrepreneurship, the following can be mentioned: Litvin A. in her book *„Rural entrepreneurship"*defines the notion of rural entrepreneurship and describes its peculiarities in rural areas. Solcan A. in her book *„Small business management"*defines the concept of small business and presents the functions, general principles and features of small business management. Pesteanu A. in his article „*The effect of manual apple trees pruning on fruit productivity and quality"*presents the results of manual apple trees pruning and demonstrates its effect on fruit productivity. Grinciuc L., Litvin A. in the article „*Entrepreneurship – a major factor in the development of Moldovan economy"*, describe entrepreneurship as an important factor in the development of the Moldovan economy, present the main criteria for classifying SMEs in the Republic of Moldova and analyze in dynamics some indicators that characterize the current state of SMEs. Also Grinciuc L., Bujor T. in their article *„The role of entrepreneurship in the development of the economy of the Republic of Moldova*", state the role of entrepreneurship in the country's economy, describe the main organizational-legal forms of entrepreneurial activity in the Republic of Moldova and present the principles of its further development.

The article is also of particular interest in the analysis of the current state of the fruit growing entrepreneurial activity in the Northern Development Region by using the data of "Domultera" LLC agricultural enterprise. On the basis of these data we can demonstrate that the application of modern technologies for cultivation of multiannual plantations contributes to the increase in fruit productivity and directly to the increase in economic efficiency.

Results of own research and discussions

Focusing on the agricultural enterprises from the Northern Development Region (NDR), it is necessary to make its brief characteristic: NDR includes Balti municipality and 11 districts: Briceni, Edinet, Donduseni, Drochia, Falesti, Floresti, Glodeni ,Ocniţa, Rascani, Singerei, Soroca, with an area of about 10,014 km^2, which represents about 32.9% of the total area of the Republic of Moldova. The population is 1025 thousand people (28.6% of the country's population), including urban population - 357 thousand people or about 34.8% of the total region. The region includes 571 localities, of which

20 cities and 551 localities, out of a total of 1679 localities in the Republic of Moldova. Agriculture is an important sector in the region's economy [1; 6, p.106-111].

Due to favorable climatic conditions, NDR has a significant agricultural potential in crops and yields production in particular. Of the total NDR area, 70% is agricultural land. The region contributes with about 41% to total agricultural output of the country. The main agricultural products are cereals, technical crops and fruits. Thanks to fertile soils and favorable climate, NDR also has significant advantages in cultivating fruits and vegetables. Total production of fruits and berries in 2017 constituted 47% of the global production at the national level, the main cultivators being Soroca, Briceni, Ocnita, Donduseni, Edinet [1; 6, p.106-111].

Table 1

The surface of fruit-growing plantations, medium and global fruit harvest in the territorial regions of the Republic of Moldova

Indicators	Year				
	2013	2014	2015	2016	2017
Northern Region					
Surface of plantations, thousands ha	25,24	24, 82	24, 04	21,46	22,65
of which fructifying plantations	18, 82	20, 16	18, 36	16,70	9,25
Average harvest per 1 ha, t	5,81	7,59	5,89	6,26	9,07
Global harvest, thousands tons	109,34	153,01	108,14	104,54	83,89
Central Region					
Surface of plantations, thousands ha	13,45	13,65	13,10	12,98	13,46
of which fructifying plantations	9,72	9,95	9,86	9,69	9,82
Average harvest per1 ha, t	6,45	5,93	5,02	7,21	7,39
Global harvest, thousands tons	62,70	59,00	49,50	69,86	72,57
Southern Region					
Surface of plantations, thousands ha	7,96	7,96	7,62	6,84	6,85
of which fructifying plantations	5,36	4,06	5,80	5,26	4,83
Average harvest per 1 ha, t	5,45	5,03	5,08	8,13	7,73
Global harvest, thousands tons	29,24	20,42	29,46	42,76	37,34

Source: Elaborated by the author on the basis [1; 6, p.108].

Analyzing the data of Table 1, we can say that generally the largest areas of orchards are grown in the Central and Northern regions. In 2017 of the total of 46.14 thousand hectares of orchards in the Northern region, 22.65 thousand hectares are cultivated, out of which 9.25 thousand hectares are fructifying. It is obvious that both the total area and the fruitful surface area have been decreasing as compared to the previous years. This fact has influenced the volume of global fruit production which is decreasing compared to 2013-2016. In the Central region the situation is different: the surfaces of fruit plantations are maintained at the same level, recording an increase of the average yield per hectare, which influences the increased global fruit harvest. The same situation is recorded in the Southern region, where the surfaces are maintained at the same level, but the average harvest per hectare and the global harvest are increasing.

The production of high value crops is one of the profitable businesses that offer the best potential for revenue growth. It is also a way to escape poverty for the rural population. The European countries have had modern agriculture for decades and enormous amounts of money have been invested in agricultural business. One of the agricultural wonders in Moldova is „Domultera" LLC, which is located near Domulgeni village, Floresti district. It can be seen from a distance of several kilometers and consists of an apple orchard, which is 50 percent assured with anti-hail net, and the premises where fruits are sorted and stored. The owners invested several hundred thousand euros and it is a perfect example for those who plan to start a business in the field. The owners started the business in 2004 when they understood that only big companies would succeed in the field of acquisitions and exports.

Three years later, when they found out that the earnings did not exceed 10% of the investment; they decided to plant an apple orchard, a business that would ensure not only income, but also maximum satisfaction. So „Domultera" LLC was born, an enterprise specialized in the production of fruits and cereals. In the structure of gross profit in 2012 cereal crops had a share of 70% and fruits 30%. In the coming years, they plan to modernize their technologies and change the production structure in which the fruit will have a share of 61% and the cereals will have a share of 39%. The company leased 1160 hectares of agricultural land in the village of Domulgeni, Floresti district: of which 1060 hectares were planted with field crops and 100 hectares were fruit-growing plantations. The lease contracts were concluded for a period of 10 years, except for the orchards that were leased for a period of 25 years.

The variety composition was selected by „Domultera" LLC according to the current trends in apple plantations in the EU countries.

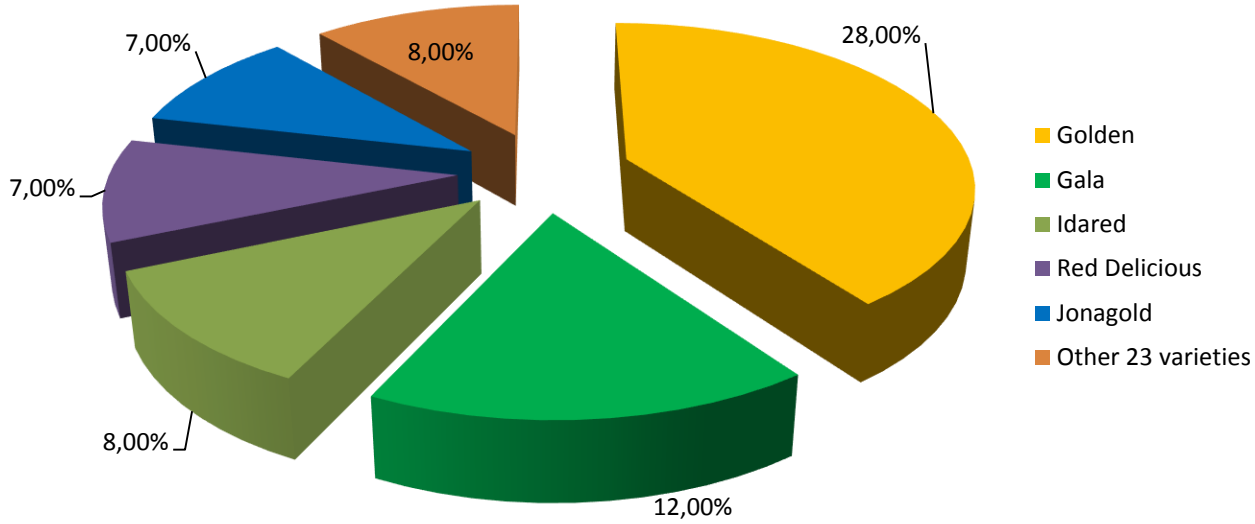

Figure 1. Top 5 varieties of apples after 2017 in the EU

Source: Elaborated by the author on the basis [8].

The data presented in Figure 1 show that consumers prefer red apple varieties. These preferences can be seen in the markets of the countries neighboring the Republic of Moldova, such as the Russian Federation or Romania, but also in the Middle East markets, where Moldovan apples have been exported recently. So among the favorite red varieties are Gala, Jonagold, Fuji Kiku, Idared, Red Delicious, etc. Red Delicious, Granny Smith, Idired and Golden Delicious are still required.

It is worth mentioning that the management of "Domultera" LLC pays great attention to its business and cultivates such high-potential varieties for exports Gala Delicious, Fuji Kiku, Golden Delicious, Granny Chalinger, Idared, Jonagold and Renette Simirenco.

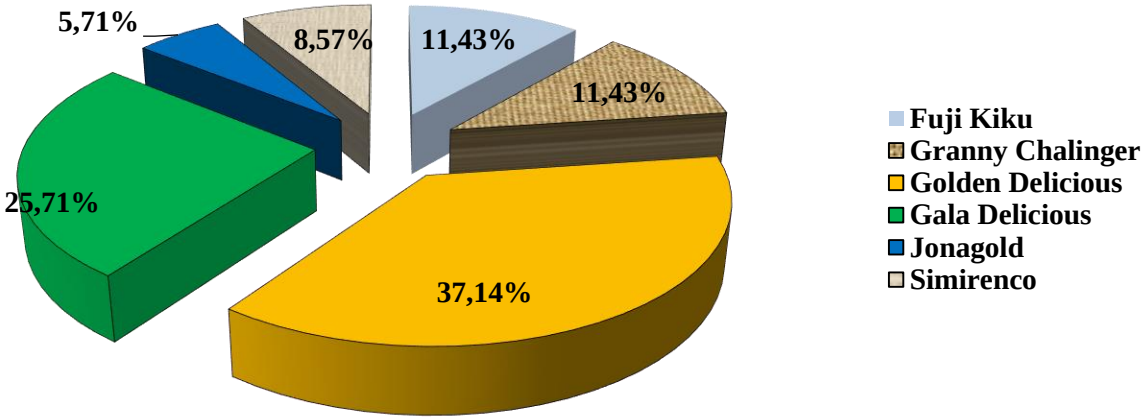

Figure 2. Apple varieties grown in „Domultera"LLC

Source: Elaborated by the author on the basis of the data „Domultera" LLC.

The planting material was procured from the certified producers in Italy with 7 EUR for each rootstock and the setting up of the orchard was carried out by SC „Vitalitifruct" LLC of Moldova, which is a specialized company with many years of experience in agricultural services.

The superintensive orchard was set up on the M-9 rootstock with a density of 3750 trees per hectare on support from concrete pillars. The concrete pillars are intended to provide support:

1) for trees in the row in order to form the fruit wall;
2) for the drip irrigation and fertilization system;
3) to install hail and sun protection accessories.

The irrigation complex was built by the company during 2013 and consists of the water supply pipe from the river Raut to the fields of the enterprise and of a geomembrane accumulation basin.

The enterprise is able to market fruits for long period of time, including extra-season, using the storage capabilities of its business partner „KA-Grup" LLC, which has a modern refrigerator for fruit storage. „Domultera"LLC and „KA-Grup" LLC are related parties, mainly dealing with the marketing of apples.

Today, „Domultera" LLC owns only 70 hectares planted with orchards in the following composition: 40 hectares of apple orchards, of which 35 hectares are superintensive and 5 hectares are intensive; 15 hectares of cherries, of which: 5 hectares on the Mahaleb rootstock with 670 trees per hectare, superintensive 6 hectares on the Gizela 6 rootstock with 1667 trees per hectare and intensive 4 hectares with 1250 trees per hectare on Maxima 14 rootstock; 15 hectares of Stenley common plums with a total of 670 trees per hectare. The entire surface is irrigated, it has supporting system and 35 hectares of apple orchard are equipped with anti-hail net.

Taking into consideration the hard work and the efforts made by the owner of „Domultera" LLC, it is rational to determine the economic efficiency of the fruit production obtained by applying modern cultivation technologies.

Table 2

The economic efficiency of apples production cultivated super intensively in „Domultera" LLC during the period 2015-2018

Indicators	Year				Year 2018 in % compared to		
	2015	2016	2017	2018	2015	2016	2017
Harvest per1 ha, t	43,71	44,40	46,90	71,43	163,4	160,9	152,3
Direct labor consumption per t, man -hours	55,67	62,97	64,51	49,76	89,38	79,02	77,14
The cost of 1 t, lei	2490,00	2800,00	2356,00	2950,00	118,47	105,36	125,21
Selling price of 1 t, lei	3567,00	3810,00	5446,00	5492,00	153,97	144,18	100,8
Profit earned per 1 t, lei	1038,99	1010,00	3055,00	2542,00	2,44 times	2,51 times	83,2
Rate of profitability, %	41,10	36,07	127,76	86,15	45,0	50,1	-41,6

Source: Elaborated by the author on the basis of the data „Domultera" LLC.

The study of economic efficiency essentially involves a causal analysis of the factors that determine decision taking in the corresponding risk environment.

Thus, by analyzing the indicators of Table 2, we can notice that the cultivation of apples by using the superintensive system on the area of 35 hectares records annually an increase of the harvest obtained per hectare. If in 2015 the harvest constituted 43.71 tons per hectare, then in the years 2016-2018 it increased to 71.43 tons, which in relative size increased respectively by 63.4%; 60.9% and 52.3% in 2018 compared to the previous years.

It is good that the selling price of one tonne exceeds the cost of one tonne, which results in a profit per one tonne.

The profit per 1 tonne increased in 2018 compared to 2015 and 2016, respectively by 2.44 times and 2.51 times, which is explained by the increase of the income obtained from the production.

All these results influenced the rate of profitability that increased in 2018 compared to 2015 and 2016 by 45.0 p.p. and 50.1 p.p respectively, and compared with 2017 it decreased by 41.6 p.p, the

cause being the increase in production costs and the non-marketing of total fruit production.

This data demonstrates that in „Domultera"LLC it is efficient to produce apples using superintensive cultivation technology.

Table 3

The economic efficiency of apples production intensively cultivated in „Domultera" LLC during 2016-2018

Indicators	Years			Year 2018 in % comparison to	
	2016	2017	2018	2016	2017
Harvest per 1 ha, t	17,40	8,20	27,40	157,47	3,3times
Direct labor consumption per t, man –hours	51,49	52,29	53,00	102,93	101,36
The cost of one t, lei	3000,00	3243,90	3165,00	105,50	97,57
Selling price of 1 t, lei	3567,01	3809,02	5000	140,2	131,26
Profit earned per1 t, lei	567,00	565,12	1835,00	3,23times	3,25times
Rate of profitability, %	18,90	17,42	52,96	34	35,5

Source: Elaborated by the author on the basis of the data „Domultera" LLC.

Another statistical situation is reflected in Table 3 which presents the data on apples cultivation on the area of 5 hectares by using the intensive system during three years. This situation is explained by the fact that the intensively cultivated apple orchard has born fruits since 2016. It is well known that the achievemnt of an investment goal has the purpose to achieve a certain effect, but the effects have a complementary character, influencing each other, and the determination of efficiency is done by aggregating all the effects.

Therefore, in the process of growing apples by using the intensive system, which consists of the application of the dripping system only, the same good results are obtained. If a harvest of 17.4 tonnes per hectare was obtained in the first year of harvest, then in the third year there were 27.4 tonnes per hectare or 57.47% more than in 2016.

The cost of one tonne of apples decreased by 2,41% in 2018 compared to 2017 due to the effect of the "economy of scale" principle, i.e. by increasing global apple production.

The increase in the price of production in 2018 compared to the previous years was by 40.06% and 31.23%, respectively, it directly influenced the obtained profit increase per one tonne of apples.

The profitability rate is increasing by 34 p.p in 2018 compared to 2016 and by 35.5 p.p compared to 2017, which is, in fact, the expected goal of all economic agents as a result of investment works for development, modernization and refurbishment of the production process.

Table 4

The economic efficiency of the production of plums grown in „Domultera" LLC during 2016-2018

Indicators	Years			Year 2018 in % comparison to	
	2016	2017	2018	2016	2017
Harvest per 1 ha, t	2,42	6,22	14,96	6,2 times	2,4 times
Direct labor consumption per t, man -hours	55,67	51,49	48,66	87,4	94,50
The cost of one t, lei	2875,00	2057,00	2535,00	88,17	123,2
Selling price of 1 t, lei	3338,80	3169,45	3761,13	112,65	118,67
Profit earned per 1 t, lei	463,61	1111,86	1225,39	2,6 times	110,2
Rate of profitability, %	16,12	54,04	48,32	32,2	-5,7

Source: Elaborated by the author on the basis of the data „Domultera" LLC.

The level of economic efficiency is higher when the useful effect per unit of made effort is greater or when the consumed effort per unit of useful effect is lower.

Thus, analyzing the indicators of the economic efficiency of plum production grown in „Domultera" LLC during the period 2016-2018, we've found out that the made effort generated the expected effects.

In the dynamics of the analyzed period there was a considerable increase of the plum harvest per hectare, as well as the increase in labor productivity as a result of the promotion of new technologies through refurbishment and re-engineering works.

Although the rate of profitability in 2018 decreased by 5.7p.p. compared to 2017, the plum production is effective.

So, through its activity and its results, „Domultera"LLC has proved to be an important actor of the agricultural business in the Northern region of the republic with regard to the production and marketing of fruits. And the positive dynamics of market development and business relationships have prompted the company to modernize its fruit production sectors in order to maximize profit.

The analysis of the situation in this domain allows us to recommend some directions, levers and tools that would support the sustainable development of the fruit-growing business:

- local producers should orient towards the establishment of spring-frost-resistant seedlings of stone fruit trees, which enjoy an increased demand on the market and the weather conditions of the country in recent years;
- domestic producers should start competing with the fruit growers from Peru, South Africa, etc. by using advanced technologies and competitive varieties, by developping post-harvest infrastructure and having the desire to be better;
- organization of conferences and seminars with the participation of a number of foreign experts who have rich experience in advanced technologies, which would allow local fruit growers to learn more about new production and processing technologies, fruit preservation, to become familiar with the branch development strategy in the context of the EU integration and the evolution of business forecasts and strategies;
- another way of the sustainable development of fruit growing business would be to join a target group of beneficiaries belonging to projects and programs, supporting people who wish to invest in the launching and/or developing of their own business.

In this context, I would like to mention that the majority of fruit growers who cultivate intensive and superintensive orchards are pioneers in this field and must also be competitive on the local market. The local consumer must have a choice and should be treated with respect and the fruits grown in the orchard of Moldova must promote the consumption of tasty and healthy apples as a source of vitamins and a symbol of national agriculture.

Conclusions

Under the conditions of market economy the role of entrepreneurial activity is very important in the Republic of Moldova. One of the priorities of the development of fruit-growing entrepreneurship in the Republic of Moldova is the cultivation of fruit plantations with the application of modern technologies, which ensure the competitiveness of domestic production on the foreign agricultural markets.

„Domultera"LLC is a well-known agricultural enterprise both in the Republic of Moldova and abroad as it applies modern technologies for the production of seed fruits and stone fruits. From the company's primary information and the calculations we've made, we've found out that in „Domultera" LLC the cultivation of fruit plantations by applying super intensive and intensive technology is efficient. This fact is explained by the reduction in production costs and the increase in overall fruit production, sales revenue from production and profit, which have affected the increased profitability level of up to 127.76% in 2017 and 86.15% in 2018 in the case of apple cultivation by using the super intensive system. In the cultivation of apples and plums by applying intensive technology there is also an increase in economic efficiency when the trees bear fruits, which resulted in the increase of profitability rate from 16.12% in the first year of bearing to 54,04% in the second year of bearing.

It can be stated with certainty that the practice of today's modern technologies in fruit growing creates conditions for sustainable development, which represents a long-term activity, i.e. ensuring the future in order to avoid insolvent problems in the business and in the life of the "actors" of the given domain.

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PERFORMANCE MANAGEMENT – A BASIC INSTRUMENT FOR SUSTAINABLE DEVELOPMENT OF POMICULTURE

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Fruit growing has become an area of great interest for economic agents. Recently, it has been more difficult for the businesses to enter the market, which requires differentiation in management activity. In this sense, formulating the role of performance management in terms of consumer behaviour becomes a trampoline for effective management actions. In the scientific literature, it is given a minor attention, as evidenced by the low degree of research in the field of efficient management and of the sustainable development of fruit growing. Under these circumstances, the need to study the performance management as a basic tool in the sustainable development of fruit growing of the Republic of Moldova is more than adequate. Thus, the main objective of this article is the conceptual approach of advanced management – as a basic tool in the sustainable development of fruit growing. The informative basis of the investigation consisted of the consulted bibliographic sources, on the basis of which the author presented his own visions. The main research methods used were: monographic method, analysis, scientific observation, comparison, induction, deduction, explanation and interpretation. The obtained results highlighted: defining the notion of performance management, identifying its characteristics, specific functions and basic levers; value chain determination methodology and the impact of the developed value chain on the process of identifying export markets for Moldovan fruit.

Keywords: *management, performance management, performance, sustainable development, horticulture, enterprise, market, efficiency, effectiveness, competitiveness, functions, value chain, investments.*

Pomicultura a devenit un domeniu de activitate de mare interes pentru agenții economici. În ultimul timp, întreprinderilor le este mai dificil să abordeze piața, fapt care impune diferențierea activității de management. În acest sens, formularea rolului managementului performant în funcție de comportamentul consumatorilor devine drept trambulină pentru acțiunile eficiente de management. În literatura științifică, managementului performant îi este acordată o atenție minoră, ceea ce este demonstrat de gradul redus al cercetărilor din domeniul managementului performant – dezvoltării durabile a pomiculturii. În aceste condiții, necesitatea studierii managementului performant, ca instrument de bază în dezvoltarea durabilă a pomiculturii Republicii Moldova, este mai mult decât oportună. Astfel, obiectivul principal al prezentului articol constă în abordarea conceptuală a managementului performant ca instrument de bază în dezvoltarea durabilă a pomiculturii. Baza informativă a investigației sunt sursele bibliografice consultate, conform cărora autorul și-a expus viziunile proprii. Principalele metode de cercetare utilizate au fost: metoda monografică, analiza, observarea științifică, comparația, inducția, deducția, explicarea și interpretarea. Rezultatele obținute evidențiază: definirea noțiunii de management performant, identificarea caracteristicilor, funcțiilor specifice și pârghiilor de bază ale acestuia; metodologia de determinare a lanțului valoric prin prisma costurilor și impactul lanțului valoric dezvoltat asupra procesului de identificare a pieței de export pentru fructele moldovenești.

Cuvinte-cheie: *management, management performant, performanță, dezvoltare durabilă, pomicultură, întreprindere, piață, eficiență, eficacitate, competitivitate, funcții, risc, lanț valoric, investiții.*

Плодоводство стало областью большого интереса для экономических агентов, в то же время предприятия испытывают определенные сложнности при выходе на рынок, что требует дифференциации в управленческой деятельности. В этом смысле формулирование роли управления эффективностью с точки зрения поведения потребителей становится трамплином для эффективных управленческих действий. В научной литературе этой проблеме уделяется незначительное внимание, о чем свидетельствует низкая степень исследований в области эффективного управления, устойчивого развития плодоводства. В этих условиях необходимость

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изучения управления эффективностью как основного инструмента устойчивого развития плодоводства в Республике Молдова являетсяпредставляет особую актуальность. Основной целью данной статьи является концептуальный анализ передового менеджмента как основного инструмента устойчивого развития плодоводства. Информационную основу исследования составили библиографические источники, на основании которых автор представил свои собственные взгляды. Основные методы исследования: монографический метод, анализ, научное наблюдение, сравнение, индукция, дедукция, объяснение и интерпретация. Основныерезультаты исследования: определение понятия управления эффективностью, определение характеристик, конкретных функций и основных рычагов; методология цепочки создания стоимости и её влияния на процесс определения экспортных рынков для молдавских фруктов.

Ключевые слова: *управление, управление эффективностью, производительность, устойчивое развитие, садоводство, предприятия, рынок, эффективность, эффективность, конкурентоспособность, функции, риск, цепочка создания стоимости, инвестиции.*

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Introduction. In the conditions of increasing complexity and dynamics of the socio-economic phenomena, management acquires new valences and has a major role in achieving efficiency, in the development and modernization of the economy, for the material and spiritual progress of the individual and society. This means that the major problems faced today and in the foreseeable future by the Moldovan enterprises (the necessity of ensuring and accelerating the economic growth, the economic crisis, the pollution, the reduction of the poverty level in the society, etc.) are likely to be solved only in case the management at the level of the organizations proves to be effective and efficient in capitalizing on the used resources and maximizing the contribution of these organizations to the development of the society as a whole.

Managerial concerns have intensified and amplified with the development of human society, leading to a leadership and organization activity with superior structural and functional characteristics [12, p.14].

In the Republic of Moldova in the last decades the fruit growing branch has been one of the main pillars of the national agriculture, determining to a large extent the efficiency of the agricultural sector as a whole. The fruit growing branch generates a considerable share of income in horticultural production, being at the same time the essential source of income for a great part of the country's population and the core activity of the majority of the 323,000 people employed in agriculture.

The Republic of Moldova is in the immediate neighbourhood with two of the largest markets for fruit products – the European Union and the Commonwealth of Independent States (CIS). Despite this, the potential of this branch is being exploited inefficiently due to the limited absorption capacity of the local market, the reduced competitiveness of the products on the markets, as well as the barriers imposed by the Russian Federation on the import of fruit products.

Under these circumstances, the sustainable development of fruit growing essentially depends on the quality of management at the branch level, which would focus on researching all the possibilities that can be applied to make the most of the trading capacity of these markets and beyond.

The pertinent approach to the issue of high performance management as a basic tool for the sustainable development of the Republic of Moldova implies the increase of the efficiency at branch level, which will increase the competitiveness of the domestic fruit products, having a positive impact on the increase of the sale degree and facilitating the efficient utilization of their potential.

As there exist the opportunities of Moldova's association with the European Union and the changes in the trade regime of key partners, the sustainable and competitive development of the fruit-growing branch based on a high-performance management would be of interest to science and practice.

Data sources and methods used. The scientific research methods applied in the present paper have served to deepen the study and knowledge of the field of performance management in the sustainable development of fruit growing. The main research methods were: monographic method, analysis, synthesis, scientific observation, comparison, induction, deduction, explanation and interpretation, table method. Qualitative and quantitative research has been used to collect primary

data about the real state of fruit growing using direct research tools such as focus group, survey, in-depth interviews, brainstorming, and discussion.

The primary data collected in the research project "Sustainable development of the horticultural sector in the context of the economic security of the Republic of Moldova", no. 65P, cipher 15.858.06.02A served as the data sources necessary for the fruit value chain formation.

Results of own research. Recently, in the specialty literature a new vision of management has emerged, namely "performance management", which, according to the author, implies an evolutionary-superior phase of management. The author has not identified any definition of performance management, but there are enough approaches to the concept of "performance management," which is a new concept in the human resources management (HRD).

In this context, the author defines the performance management as follows: "performance management represents all the actions undertaken by managers in order to ensure lasting success in the activity of the organizations, based on the application of modern methods, managerial techniques and information technologies, in order to improve the managerial performance and economic performance of the organization".

The main features of the performance management identified by the author (survival, results and effectiveness, productivity, efficiency, practical decision-making, competitiveness) allow us to conclude that these characteristics are interdependent, complementing each other and all of them form the conceptual framework of performance management.

In order to make the management more efficient, managers should apply the general management functions in practice, and these are supplemented, in the author's view, with four other important functions.

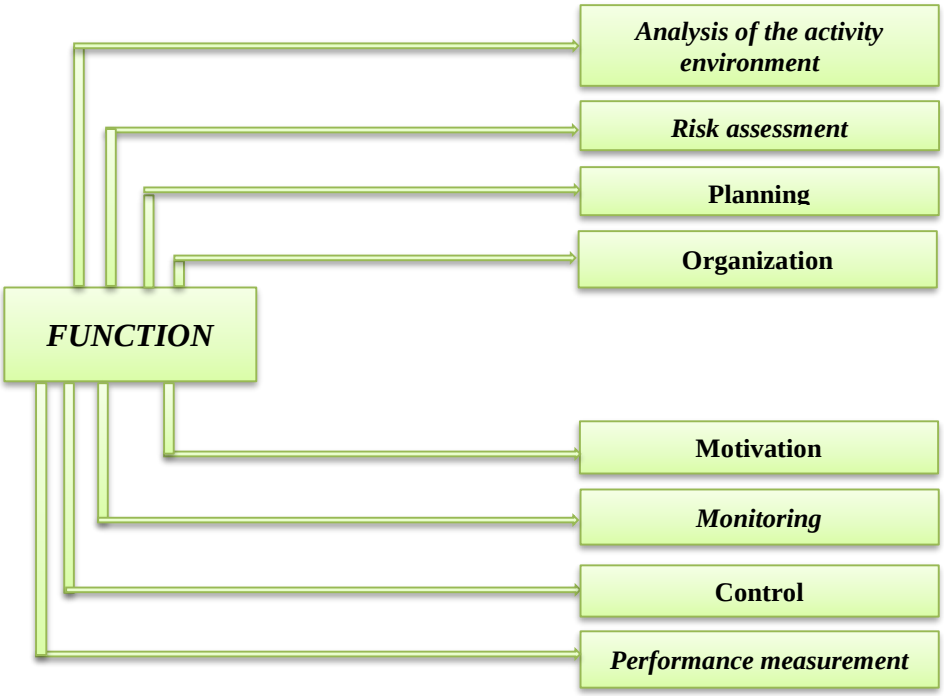

Figure 1. Performance management functions

Source: Systematized and adapted by the author based on the source [79, p.25].

We consider that the analysis of the activity environment is a welcome and necessary function of the performance management. Thanks to this function, the organization could better: determine the future evolution of economic and social phenomena; identify and manage all the opportunities and risks, the strengths and weaknesses, which would help to know competitors and to develop the objectives to be predicted in the near and distant future. Achieving this function with great care will condition the performance of the organization in all its areas of activity. Managers, recognizing and practicing this

function with great skill, would have much greater chances of success in achieving the goals with higher performances and for a longer period of time.

The function of the possible risk assessment is a necessary function of the performance management that implies risk identification through the activity environment analysis.

According to the author, this function must include the following actions:

- adopting decisions to assess the identified risky situation;
- determining of the expenses necessary for the identified risk assessment and the adoption of the final decision: to accept the risk; to avoid the risk; to transfer the risk;
- determining of the consequences of the identified risk and its severity by activity domains;
- quantification of the consequences (based on quantitative and/or qualitative methods), also taking into account certain limits of variability (size of admissible risk);
- determining the responsibilities and ways to minimize or eliminate the risk;
- applying the necessary measures to eliminate the causes of risk, minimize or liquidate the risk;
- developing a plan of actions and measures to prevent, combat, reduce and avoid risks.

Organization, as a function of the executive management, has a diversity of opinions regarding its definition. One of the definitions belongs to the local scholars Burlacu N., Cojocaru V., who mention that "the organizational function consists in creating the formal structure of the organization, the selection of the necessary staff to carry out the decisions adopted at the planning stage" [13, p.176].

The *motivation* function involves attracting staff to achieve the organization's goals. Without participation of the labour force, the achievement of the predetermined objectives is practically impossible, and the action of the managers in the application of the motivation function consists in attracting the staff so that the organization could function normally and achieve superior economic performance.

Monitoring, in the author's opinion, is defined as "all activities of surveillance, careful follow-up of activities at any level, at any organizational component in order to know and understand at any time the tendencies of carrying out the activities foreseen in the plans and programs ". Monitoring should be done on a daily basis in the full course of activities and can be done through selective discussions with the personnel involved in the various activities, by recording the results and the problems that have arisen, by observing the planned activities step-by-step.

Control requires permanent and complete verification of how different activities are carried out in relation to fixed programs, highlighting deviations and taking corrective measures [35, p.122]. From this definition and other definitions presented in the literature, we can assume that the exercise of the control function for a performance management must be performed in relation to the activities specific to the fulfilment of the other functions described above.

Performance measurement, in the author's opinion, is a specific performance management function that should focus on identifying, monitoring, and communicating results by using performance indicators. Performance measurement should be more complex in evaluating results, while performance management involves decision-making based on measurement results to achieve the desired performance. Performance indicators are core assessment tools, communicating important issues related to the definition and achievement of the objectives.

We believe that in order to achieve an efficient management and to ensure the long-lasting success of organizations, managers should apply all these functions.

Along with the functions we have determined that the main levers of the performance management that influence sustainable development are as follows:

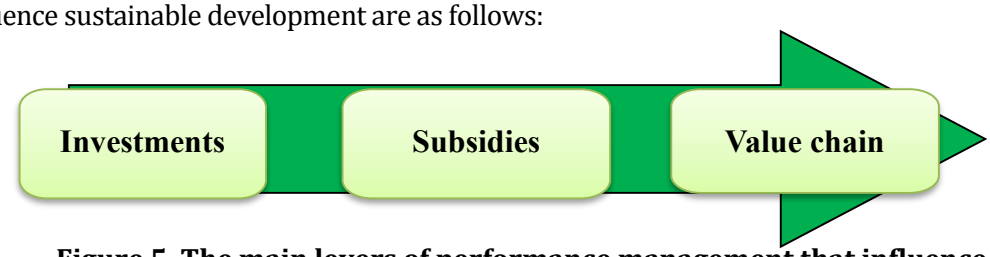

Figure 5. The main levers of performance management that influence sustainable development

Source: Elaborated by the author.

Investments, as one of the main levers of performance management, contribute to the sustainable development in all sectors, branches and sub-sectors of the national economy. Promoting investments in order to solve the problems of upgrading and modernizing the enterprises from different sectors of activity, implementing the achievements of the technical and scientific progress, increasing production and quality, increasing the economic efficiency and the competitive advantage, ensuring a higher level of employment, and so on, demonstrates their important role in ensuring sustainable development in all areas and sectors of activity.

Subsidies are another lever of performance management, which, as we consider, stimulates the sustainable business development in rural areas; subsidies aim to promote economic growth and reduce poverty. Subsidization is an absolutely necessary aid for the sustainable development of agriculture and also a mean of attracting investments in this field. The implementation of the subsidy policy, as well as the on-going review and improvement of the existing subsidy system in agriculture, is in the permanent state's focus. However, we consider it necessary for the state to focus on a series of support measures designed to increase investment in high performing agricultural activities and to limit the phenomenon of unfair competition between producers [6, p.230-231].

The value chain, whose model was first developed by Michel Porter, is another important lever of the performance management. By applying this lever, managers can better understand how added value can be enhanced by a branch, sub-branch or even an enterprise. The correct application and development of the value chain allows the identification of competitive advantage sources, as well as the opportunities for reviewing and designing strategies and activities, both at the enterprise level and at the sector, branch, sub-sector level.

The results provided by the application of this lever significantly contribute to ensuring the competitiveness and sustainable development of a sector, branch, sub-sectors, and enterprise.

The model of the developed value chain is the analysis of the peculiarities between the types of activities within an enterprise. Applying the value chain model, recommended by the author, will allow the identification of sustainable development opportunities for fruit growers. The determination of the value chain developed for certain fruit products has been done in terms of cost, for different clusters, depending on the current market and the potential export markets in the future.

Tables 1-3 present the value chain model developed for the following domestic fruit products: apples, nuts, raspberries.

Table 1

Value chain and added value for apples in the Republic of Moldova

Indicators	Markets				
	Russia	**Romania**	**Egypt**	**India**	**Moldova**
Field price (incl. harvesting) excluding VAT, euro / kg	0,179	0,196	0,113	0,117	0,198
Field price including VAT, euro / kg	0,195	0,213	0,123	0,127	0,215
Supermarket entry price, euro / kg	0,947	0,647	0,995	1,131	0,565
Supermarket price (retail), euro/kg	1,262	1,078	1,421	1,616	0,706

Source: Elaborated by the author based on the primary data collected within the research project "Sustainable development of the horticultural sector in the context of the economic security of the Republic of Moldova", no. 65P, cipher 15.858.06.02A and the sources [13, 14].

Thus, according to Table 1, it was determined that for the domestic apples the traditional export market is the Russian Federation, where the more developed is the storage and sorting infrastructure the more advantageous is the apples price. The major impediment to ensuring the competitiveness of domestic fruit is that the customs regime for the fruit export from the Republic of Moldova provides for the levying of customs duties, which are influenced by the trading period, which substantially increases the Moldovan fruits that become non-competitive on the given market.

At the same time, some alternative markets for diversification of apple trade, e.g. Egypt and India, have been identified, where year-on-year consumption has a fast-growing trend, as they are countries with demographic growth, affordable costs, and fast rhythm of growth. The added value for

these markets is much more advantageous provided that transport logistics is properly organized (fruits must be able to keep for 60 days: transport and supermarket shelves life) and fruits trading.

The value chain developed for nuts for different clusters, depending on the current market and future export potential, is presented in Table 2.

Table 2

Determination of value chain and added value for nuts from Moldova, euro

Indicators	Markets		
	Middle East	EU	Moldova
Field price (including harvesting cost) excluding VAT, euro / kg	4,248	3,760	4,417
Field price including VAT, euro/kg	4,617	4,087	4,801
Export price excluding VAT, euro/kg	5,470	4,979	
Supermarket entry price, euro/kg	6,405	5,697	6,242
Supermarket price (retail), euro/kg	10,675	11,394	8,918

Source: Elaborated by the author based on the primary data collected within the research project "Sustainable development of the horticultural sector in the context of the economic security of the Republic of Moldova", no. 65P, cipher 15.858.06.02A and the sources [13, 14].

Analysing the table data, we can see that nut marketing is much more advantageous and this is explained by increased interest in international markets and walnut kernel deficit. As to the walnuts, the traditional export market is the EU, but they are also steadily exported to the Middle East countries. The EU market will remain a basic customer, but other Asian markets will not be neglected to diversify trade and create added value to nuts marketing.

Table 3 reflects the developed value chain, determined for native raspberries, for different clusters depending on the current market and future export potential.

Table 3

Determination of the value chain and added value for raspberries from the Republic of Moldova, euro

Indicators	Markets		
	Russia	EU	Moldova
Field price (including harvesting cost) excluding VAT, euro / kg	1,226	1,188	1,024
Field price including VAT, euro/kg	1,333	1,292	1,113
Export price excluding VAT, euro/kg	1,592	1,553	-
Supermarket entry price, euro/kg	2,187	1,974	1,427
Supermarket price (retail), euro/kg	3,125	3,290	1,783

Source: Elaborated by the author based on the primary data collected within the research project "Sustainable development of the horticultural sector in the context of the economic security of the Republic of Moldova", no. 65P, cipher 15.858.06.02A and the sources [13, 14].

Analysing the data of Table 3, we can conclude that the Republic of Moldova has an unexplored potential in the raspberry industry, the intermediaries have to develop and diversify the trade, especially for export, to create opportunities for raspberry producers to develop their production capacities and to modernize technologies. We notice that the strategic markets for raspberries exports will be the EU and the CIS (especially the Russian Federation).

Conclusions

As a result of the study, we recognize that today's performance management, through its basic features, functions and levers, has become a complex practice that is increasingly difficult to master. But when management is an efficient one, the organization, employees, customers, society, and the country thrive, while poor management makes the same organizations suffer directly or indirectly. Only a management (performance or non-performance) can affect successes or failures for so many people over a long period of time.

Fruit growers need to understand that an important factor in value chain and added value development is the first segment of the value chain, where the fruit producer is the raw material, which is the most vulnerable segment where the lowest prices are recorded (depending on the field price, which is low in the mass harvesting period and the quality of production is rapidly deteriorating) and it is necessary to facilitate and assist producers to invest and create cold stores individually or through co-operation.

In this context, we recommend to the fruit growers to apply the proposed value chain development model in order to identify and diversify the markets for fruit exports.

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SOCIOLOGY

BIRTH CONTROL IN BELARUS AND CHINA: CURRENT POLICY

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Belarus and China are experiencing a decline of the total fertility rate (TFR). On the one hand, this was a natural response to the increasing role of women in society, on the labor market and increasing women's participation in education. As a result women are marrying and have children later in their life, which leads to a decrease in the number of children born. On the other hand, scientists state the role of the policy on childbearing, the strength of which is difficult to calculate although. Today, one can observe a rapid strengthening of bilateral relations in economic, social and other areas of regulation. Belarus and China had different birth control vectors. In the conditions of protracted depopulation in the Republic of Belarus, stimulation of the birth rate has become a priority goal of the state policy. Rapid population growth in China posed a threat to economic, food, and even environmental security. This led to the adoption of drastic measures to limit the number of children born in Chinese families. This paper focuses on how similar are birth control policies in Belarus and China. The choice of countries is also due to the fact that today both countries set the goal to stabilize the population in order to ensure sustainable economic development and improvement in the quality of life. The paper presents a description and analysis of legal acts that regulate demographic processes, as well as specific areas of support for families with children. It was revealed that Belarus provides multilateral (mostly financial) assistance not only for the birth of a child, but also for his upbringing. The system is designed so that a woman cares for a child 3 years after his birth. In China, in the face of fierce competition in the labor market, women go to work after maternity leave. They are forced to use the services of pre-school education, even if they are expensive. As a result, the decision to give birth to a child is weighed in terms of the economic possibilities of families. In China, measures may vary depending on the territory; in Belarus, politics is one for all. It is difficult to assess in which country the policy is more effective. The total fertility rate for the past 25 years is very similar.

Keywords: *Birth control, Family policy, Demographic policy.*

În Belarus și China se observă o tendință de scădere a ratei totale de fertilitate. Pe de o parte, aceasta prezintă un răspuns firesc la creșterea rolului femeilor în societate, pe piața muncii și gradului de implicare a fetelor în procesul educațional. Drept urmare, se constată majorarea vârstei la căsătorie și naștere, precum și reducerea numărului de copii născuți. Pe de altă parte, cercetătorii indică influența politicilor asupra natalității, efectul cărora este foarte dificil de evaluat. Anterior, Belarus și China aveau vectori diferiți în controlul natalității. În condițiile depopulării în Republica Belarus, stimularea natalității a devenit o prioritate a politicii de stat. În China, creșterea rapidă a populației a reprezentat o amenințare pentru securitatea economică, alimentară și chiar pentru mediu. Aceasta a dus la adoptarea unor măsuri drastice pentru a limita numărul de copii născuți în familii chineze. Cu toate acestea, acum ambele țări au un singur obiectiv – stabilizarea numărului populației pentru a asigura o dezvoltare economică durabilă și a îmbunătăți calitatea vieții oamenilor. În acest articol se analizează cât de asemănătoare este politica de control al natalității în aceste două țări. Alegerea țărilor se datorează și faptului că astăzi interacțiunea dintre China și Belarus crește rapid în multe domenii, inclusiv în domeniile economic și social. Articolul prezintă o descriere și o analiză a actelor juridice care reglementează procesele demografice, precum și zonele specifice de sprijin a familiilor cu copii. S-a dezvăluit că Belarus oferă o asistență multilaterală

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(preponderent financiară) nu numai pentru naşterea unui copil, ci şi pentru educaţia sa. Sistemul este conceput astfel încât, de regulă, o femeie să aibă grijă de un copil până la 3 ani de la naştere. În China, în condiţiile concurenţei acerbe pe piaţa muncii, femeile merg la muncă după concediul de maternitate. Ele sunt obligate să utilizeze serviciile educaţiei preşcolare, în pofida faptului că acestea sunt destul de costisitoare. Drept urmare, decizia de a naşte un copil este cântărită în ceea ce priveşte posibilităţile economice ale familiilor. În China, măsurile pot varia în funcţie de teritoriu, în Belarus, politica este una pentru toţi. Este dificil de evaluat în ce ţară politica este mai eficientă. Totodată, rata totală de fertilitate din ultimii 25 de ani se menţine la un nivel similar în ambele ţări.

Cuvinte-cheie: *controlul naşterii, politica familială, politica demografică.*

В Беларуси и Китае наблюдается падение суммарного коэффициента рождаемости. С одной стороны, это стало естественным откликом на возрастание роли женщины в обществе, на рынке труда и расширении вовлеченности девушек в образовательный процесс. Как результат, наблюдается более поздний возраст вступления в брак и рождения детей, а также сокращение числа рожденицъ. В другой стороны, ученые указывают на влияние на рождаемость политики, силу которого оценить очень сложно. Раньше Беларусь и Китай имели разные векторы регулирования рождаемости. В условиях затяжной депопуляции в Республике Беларусь стимулирование рождаемости стало безусловным приоритетом государственной политики. В Китае быстрые темпы роста населения выступили угрозой экономической, продовольственной и даже экологической безопасности. Это обусловило принятие кардинальных мер по ограничению числа рожденных детей в китайских семьях. Однако сейчас обе страны ставят перед собой одну цель – стабилизировать численность населения в целях обеспечения устойчивого развития экономики и повышения качества жизни людей. Насколько схожа политика в области регулирования рождаемости в двух странах рассматривается в данной статье. Выбор стран обусловлен также и тем, что сегодня все более стремительно укрепляется взаимодействие между Китаем и Беларусью во многих сферах, в том числе экономической, социальной и др. В статье представлено описание и анализ правовых актов, которые регулируют демографические процессы, а также конкретных направлений поддержки семей с детьми. Выявлено, что в Беларуси предоставляется многосторонняя (в большей степени финансовая) помощь не только при рождении ребенка, но и для его воспитания. Система устроена так, что, как правило, женщина ухаживает за ребенком 3 года после его рождения. В Китае в условиях жесткой конкуренции на рынке труда женщины выходят на работу по истечении декретных отпусков. Они вынуждены пользоваться услугами дошкольного образования даже, если они стоят дорого. Как следствие, решение о рождении ребенка взвешивается с точки зрения экономических возможностей семей. В Китае меры могут различаться в зависимости от территории, в Беларуси политика едина для всех. Сложно оценить в какой стране политика более эффективна. Суммарный коэффициент рождаемости уже на протяжении 25 лет очень схож.

Ключевые слова: *регулирование рождаемости, семейная политика, демографическая политика.*

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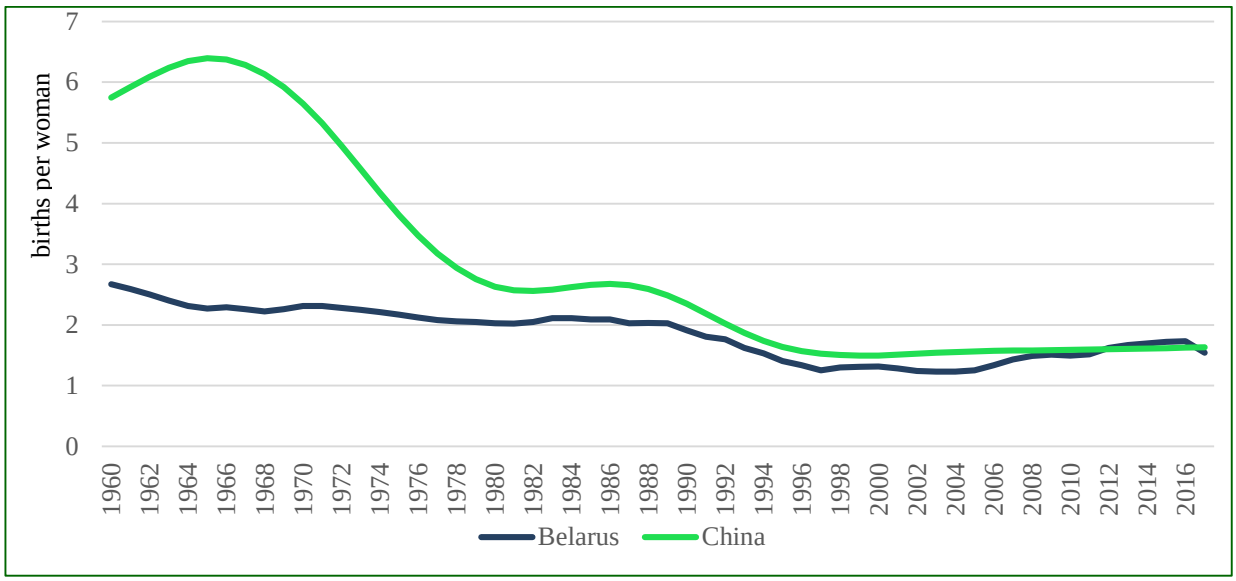
Introduction. Belarus and China had different birth control vectors. Nevertheless, the total fertility rate in Belarus and China is at the same level more than 25 years (Graph 1).

Today, both countries have the goal to stabilize the population in order to ensure sustainable economic development and improvement in the quality of life.

It is important to underline, that nowadays women are under double pressure: they have to work and they have to take care of the family [1]. The results of studies conducted in China showed a 7% reduction in wages with each subsequent child [2]. There is a problem of choice between working and rasing children [3].



Graph 1. Total fertility rate in Belarus and China, births per woman
Source: According to World Bank database.

In this situation, state policy aimed at supporting both labor and child rearing comes forward.

In addition, both Belarusian and Chinese scientists say that a number of important factors has an influence on the birth rate. Among them are the socio-economic, structural (transformation of the population structure) and individual factors [4; 5].

Modern Chinese authors focus on breastfeeding policy as one of the important factors in improving babies' health [6]. For example, in both countries, there is the possibility to take two maternity leaves for breastfeeding for working women (up to 1 year old in China, up to 1.5 years old in Belarus). However, it takes 30 minutes to get to the child and back to work. This provides an additional incentive for the decision to switch to artificial feeding. There is an acute problem with the availability of rooms for breastfeeding in public places.

Infrastructure becomes an essential part of family and children support policy. However, infrastructure development is not always properly implemented.

In Belarus, changes in the population structure are already hindering and will hinder in the next decade the achieving of the objective to increase the number of births.

The mean age at childbearing continues to increase. In 2017, the mean age at childbearing was 29.2 years. At the same time, the number of women aged 20-29 years in 2017 compared to 2010 decreased by more than 130 thousand people, which led to a reduction in the number of first childbirth.

In the past 2 years, the situation has become even more complicated. The effect of socio-economic factors decreased, the effect of structural factors intensified, especially in rural areas [4]. As a result, in 2016-2017 there was a decrease in the number of births. The number of first childbirth decreased both in absolute and relative terms from 50.9 thousand (42.8% of all births) in 2015 to 41.2 thousand in 2017 (40.2% of all births).

The situation was mitigated by the fact that a large cohort of children who was born at the mid-1980s continues to remain in reproductive age. Despite the fact that the total number of women aged 15-49 years since 2004 has been steadily declining, the number of women aged 30-34 years old is increasing. Timely implementation of demographic policy measures stimulated the birth in this cohort of women from 30.7 thousand in 2015 to 31.9 thousand children born in 2016. However, due to a general decline in the birth rate in 2017, the number of children born to mothers aged 30-34 years – declined up to 29.1 thousand.

In China due to the "One-child" policy there was a transition from the traditional to the modern type of the population replacement with moderate rates of demographic processes development. As a result, TFR decreased from 3.8 in 1975 to 1.6 births per woman at present. Such a small family in a

traditionally large, peasant and Confucian country is the effect of a special super-efficient government population planning policy. That proves the possibility of applying management and ideological decisions, in addition to the direct economic mechanism.

Since 2014, as a result of the fertility policy adjustment, there has been a significant increase in the number of births, especially in 2016, when the number of newborns exceeded 17.86 million, it was the highest figure since 2000.

However, over the past 40 years, especially in the post-reform years, irreversible changes have occurred in the mentality and value orientations of the new generations of Chinese. A different post-traditional model of family and family relations have been formed with later marriages and one-child family. A significant number of young married couples make a conscious choice in favor of childlessness. The motivations for such a choice are connected both with the unwillingness to bear responsibility, self-centeredness and the hedonistic values of the "little emperors" generation, as well as with economic considerations.

How government policy in Belarus and China helps families with children, thereby stimulating fertility, is considered below.

Special program

During the collapse of the USSR, Belarus was in the process of the demographic transition. The depopulation, started in 1994, was the result of a dramatic decline in birth rates, which took place in the process of rising mortality. Then, at state level, there was an awareness of the necessity to provide the legal foundation in the demographic sphere. In the period of 1994-1999 family law had the legal basis in: the Constitution of the Republic of Belarus (1994), the Marriage and Family Code (1999), the Law protecting Children's Rights (1993), as well as a number of other Laws, Decrees and Regulations.

The guarantees provided by the Labour Code (1972, amended), with the prohibition to terminate employment contract, providing maternity leave to take care of a child under 3 years, the regulation of night work, overtime work etc. have become a real support for parents. In 1995, there was issued a Decree, which developed additional measures for the protection of motherhood and childhood, providing one paid day off for single mothers and mothers with many children.

Despite the benefits and guarantees, the reproductive attitudes of the population have been transformed in the direction of reducing the real number of children born. As a result, the TFR decreased from 2 in 1989 to 1.2-1.3 births per woman in 1996.

There was a strong issue to develop a set of measures aimed at increasing the birth rate.

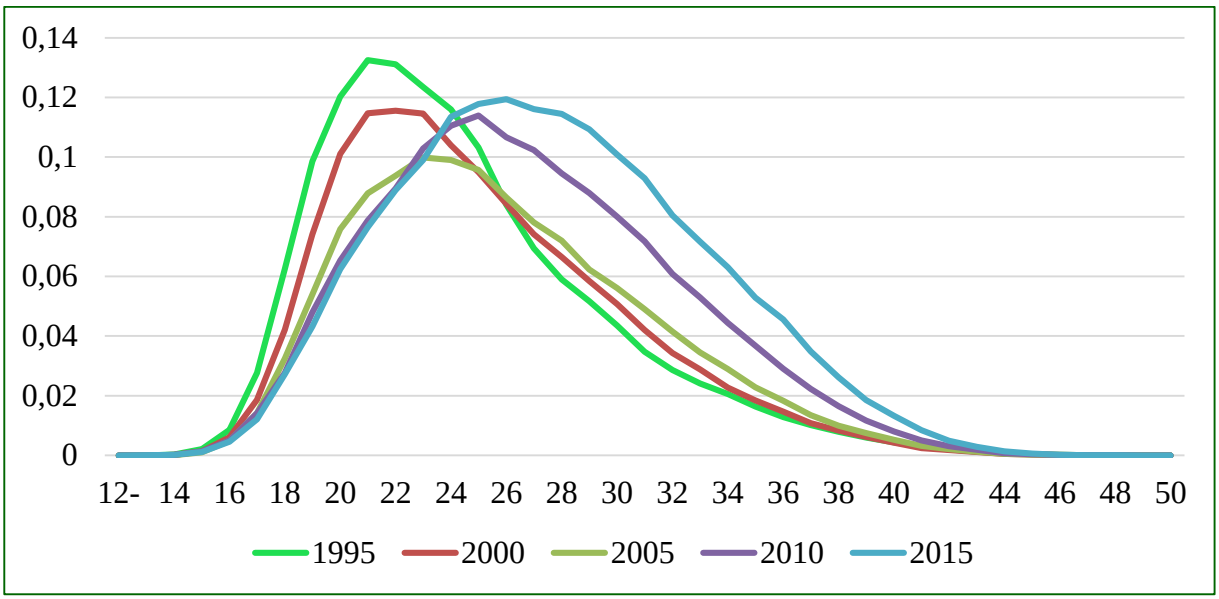
A breakthrough in the demographic policy was the adoption of the Law "On Demographic Security" in 2002, which established the legal and organizational framework for regulating demographic processes. In accordance with this Law, the National Program for Demographic Security for 2007-2010 was developed and approved [7]. The main goal was to prevent future worsening of the demographic situation.

The implementation of the measures of the program led to increase the TFR to 1.5 births per woman, although this was not enough.

The next National Program of Demographic Security of the Republic of Belarus for 2011-2015, among others, set the goal to increase the birth rate and strengthen the socio-economic support for families in connection with birth and upbringing of children [8]. According to the achievement of all the targets, the program was a success. TFR in 2015 was 1.7 births per woman. In comparison with the decrease of fertility at the beginning of 2000s, the intensity of fertility increased in almost all ages (Graph 2). At the same time, the mean age at childbearing significantly increased from 25.6 in 2000 to 28.6 in 2015.

Currently, the National Program "People's Health and Demographic Security for 2016-2020" is a continuation of the National Programs, which is aimed to stabilize the population, by increasing the birth rate by improving mother and child health care system, developing support systems for families with children and improving their living conditions [9].

In China, population issue has always been a strategic issue. Currently, the emphasis is on measures of birth control and reducing child and infant mortality with a flexible approach to employment issues and the status of women in society, and in the long term it is planned to solve the problems of the aging population and the development of the social security system.



Graph 2. The Age-Specific Fertility Rates in Belarus
Source: According to the HFD database.

In accordance with the Constitution of the People's Republic of China, the Law "On population and fertility planning" (as amended on December 27, 2015) was adopted in 2001 with the aim of coordinated development of population and economy, society, resources, environment, promotion of fertility planning, protection of rights and legitimate interests of citizens, promotion of family well-being, prosperity of the nation and social progress [10].

According to the latter, the government develops a plan for the development of population and includes it in the national socio-economic development plan.

Currently, in order to actively and effectively respond to the changes in population trends and its deep impact on economic and social development, supporting China's long-term sustainable development, the National Population Development Plan for 2016-2030 has been adopted [11]. This document prescribes the general requirements, main goals, strategic orientation and tasks of the national population during the planning period and it acts as a program document defining the development of the population over the next 15 years. This is an important basis for the full implementation of work in the field of socio-demographic development.

In 2017, the population of China was 1,394 million people. Since 2000, the annually population growth was no more than 0.57%, what is half less than the population growth from 1990 to 2000. In fact, this reflects the fact that China faces a decrease in the number of children born. TFR is 1.6 birth per woman of reproductive age.

The policy of restricting the number of children in China was associated with both budgetary expenditures and limited natural resources, worsening environmental conditions, and the goal, which lies in raising the standard of living of the people.

The basis for obtaining a positive effect from the government policy in China is to ensure a balance of interests of the population and the government. The goal of the policy of restricting the number of children is to improve the health of the next generation. Thus, family planning implements the goal of both economic development and improvement of the quality of life of the population and provides an organizational and management basis for birth control [12]. The positive effect was achieved due to the following implemented measures:

✓ Family planning policy is integrated into the general management system; party and economic bodies are created at all levels from medical teams to special birth control committees), birth rates are included in the target indicators of socio-economic development programs.

✓ Systematic propaganda is carried out through its daily and widespread infiltration into the mass consciousness.

✓ There has been implemented an integrated approach to measures of economic and material

incentives for families with children: if there is one child in the family, the family is exempted from paying taxes on upbringing and education, and even receives a monthly allowance of 10% of salary; if there are more children, the family is deprived of certain opportunities for medical and domestic services, labor insurance, and is also obliged to pay a fine.

✓ The social control system worked: material incentives are complemented with moral, negative sanctions are complemented with positive. For example, issuing to families voluntarily pledging to have only one child, "Certificate of Honor for Single-Child Parents".

✓ Family planning policies were distinguished by continuity, consistency and flexibility.

However, government family planning for 40 years was one of the main factors in the formation of disproportions in the age and sex structure of the population (the excess of men over women, the decrease of the working age population and the growth in the number of older people, decrease of the average size of the Chinese family to 3.1 people (2010 census) compared with 4.23 in 1988 [13]. The necessity to adjust the "one-child" policy has become obvious.

In 2011, a new concept of the demographic policy "one married couple – two children" was proposed, if one of the spouses is an only child in the family. About 1 million married couples fall under this policy. In fact, permission to have a second child was obtained at the end of 2015, and the corresponding amendments to the "Population and Family Planning Law" entered into force on January 1, 2016. The "Regulations" abolished maternity leave due to the late marriage and childbirth, as well as stimulating birth control measures were cancelled, currently the use of contraceptive measures is carried out conscientiously.

Currently the fine for unplanned birth of a child is imposed only on those families in which the child was born less than four years after the birth of the first and the age of the mother is less than 28 years. It is planned, that such measures will help to change the demographic situation in the country for the better, at the same time it is expected that it will not cause a sharp jump in the birth rate. The authorities, while easing the birth control policy, see the second child as an asset that in the future will ensure not only the stability of the pension system, but also social stability.

However, the main factors of birth control today are no longer act as administrative restrictions, but the socio-economic conditions of the population.

The reluctance to have children, among other reasons, is due to the fact that only women who work in big cities can feel socially protected in China. [14; 15] There is a serious problem for residents of remote (rural) areas, where there is a high unemployment rate and there is no social insurance. For the rural population there are almost no guarantees for pregnancy and childbirth.

Measures that promote the compatibility between work and family life of parents *(labor guarantees for employees with children, encouraging fathers to become involved in the process of child-care, encouraging the expansion of the range of child-care services).*

A wide range of pro-natalist policies to stimulate fertility are being implemented in Belarus today.

Belarus has kept the Soviet rules on parental leave related to the birth of children. The duration of maternity leave is regulated by law and is not connected with work experience, position or other aspects of labor relations. Maternity leave is provided to women for a period of 126 or 140 calendar days (in case of complicated childbirth). Maternity leave begins 70 calendar days before the childbirth and ends 56 days after (70 days in case of birth of two or more children or complicated childbirth). Since, at the time of maternity leave, the date of birth of the child can not be predicted, the woman takes the maternal leave at 30 weeks pregnant.

As the Minister of Labor and Social Protection, I.A. Kostevich rightly pointed out at the last meeting of the National Council on Gender Policy (Minsk, May 14, 2018): "Belarus is one of the few countries that have left parental leave for children under three years old, realizing how important it is for the mother and child's health" [16].

Usually, women take a maternity leave. Only 1% of men apply for parental leave for children aged up to 3 years. Involving fathers in the process of childcare is a stimulating measure, which ensures the possibility of preserving women's labor potential and the compatibility between work and family life.

In Belarus, organizational and legal conditions are created for the practical using of certain flexible forms of employment (flexible working hours, home-based work), there have been developed recommendations for employers on how to use them.

However, it is too early to judge the effectiveness of the implementation of policies aimed at supporting the competitiveness of women with children in the labor market. Lack of flexible working hours and the low availability to childcare services for children under 3 years old is an obstacle for women who are ready to take full time work. In addition, when a woman starts to work full-time before the child is 3 years old, the amount of childcare benefit is reduced by half. As a result, only 10-13% of women start to work before the child reaches the age of 3 years [17].

Currently in Belarus, the number of children under 5 years with preschool education is 100% [18]. The network of preschool education is represented by more than 3.8 thousand institutions, which educate 426.2 thousand children. Private kindergartens appear: currently there are only 10, 6 of them are located in Minsk.

The number of children under two years attending nursery and nursery groups was just over 1% of all children attending kindergartens. The low number of children under 2 years with preschool education is due to poorly developed system of providing services for this group of children.

In Belarus, parents pay only the cost of feeding the child, an exception being private kindergartens.

In China the period of maternity leave depends on the age of the future mother. After 23 years, mother is considered of "advanced maternal age", so maternity leave is 120 days, up to 23 years – 90 days; in case of birth of twins or complicated childbirth – + 15 days; for cesarean section – + 30 days. The total period is from 90 to 180 days. The future mother is allowed to take the maternity leave from the seventh month of pregnancy. Usually, future mother can go on a maternity leave two weeks before the delivery, as prolonged absence from work is discouraged and it is punishable by sanctions affecting career growth and bonuses.

The Law "On population and fertility planning" of the People's Republic of China provides a number of other incentives.

Citizens who follow the late marriage and late childbirth policy can receive encouragement in the form of extended leave, in connection with marriage and maternity leave and other types of benefits.

In accordance with the version of the Law "On population and fertility planning", which entered into force on January 1, 2016, several changes were adopted, such as the cancellation of maternity leave due to late marriage and late childbirth, the cancellation of the benefits due to the fact that there is already a child, as well as the extension of maternity leave and the provision of parental leave for the father to stimulate fertility. Specific measures are being taken in provinces, autonomous regions and cities of central subordination in accordance with the Law "On population and fertility planning", approved by Standing Committee of the National People's Congress.

The Labor Code clearly defines that a woman has the right to take maternity leave for 90 or more days. Usually, a pregnant woman goes on a maternity leave two weeks before the delivery, and goes back to work after 2.5 months after giving birth. In cases of late marriage and childbirth, maternity leave is extended to 4 months. If the future mother has a sick-list this time is paid like a sick-leave.

Maternity benefit's amounts vary by region. Attention should be paid to the fact that maternity benefit is not paid simultaneously with the salary, due to maternity leave. The payment will be made according to the higher cost of the benefit.

If pregnancy is more than 7 months, then the employer is obliged to provide a break for one hour, and cannot make the future mother work the night shifts. In case of obtaining a permit from work, at the request of the employee herself, the employing company may apply for providing maternal leave to the employee for two and a half months. Maternity benefit is paid in the amount of 80% of the basic salary of a woman per month.

The time for examinations of pregnant women, including examination during the first 12 weeks, which coincides with working time is fully paid.

A woman has the right to take 6.5 months maternity leave for breastfeeding if she has applied for maternity leave and has the permission of the organization. Salary is paid in the amount of 80% of the salary of an employee during the period of breastfeeding, if employee wants to extend the maternity leave in case of special circumstances, future mother has to provide a medical certificate. Salary rate for the extension of the maternity leave for breastfeeding is 70% of the employee's salary.

Unlike Belarus, China has very high costs for raising a child, including kindergartens. According to a study by Shanghai Academy of Social Sciences in 2004, the direct costs of raising one child before

graduating from a university in the Xuhui district of Shanghai are about 480,000 CNY (about 58,000 USD). The average cost of raising children in Shanghai can be estimated at 1.66 million CNY (about $ 246,000). [19]. According to the statistics from The State Family Planning Committee, there is a number of reasons why Chinese women do not want to have a second child: the economic burden is 74.5%, the need to pay much attention to child-care is more than 60%. Such factors as increasing costs on raising a child, a desire for career growth, and a higher standard of living have a restraining effect on the implementation of reproductive attitudes. The cost of raising children in Chinese families is about 50% of total family income. The main part of the expenses consist of education costs [20].

Financial transfers *(family allowances, child-care allowances for social and public services, tax deductions for families with children).*

The solution of the problem how to increase the birth rate should be closely linked to the ensuring a high quality of life for mother and child. Currently, young parents are stimulated through effective economic incentives for childbirth and child rearing, which creates a significant burden on the Social Protection Fund. More than 20% of the Fund's expenses are accounted for the payment of temporary disability, maternity, family, child care, and disabled person care benefits.

A significant form of social support for families with children in Belarus are maternity, family and temporary disability allowances (table 1).

Table 1

Benefits for families raising children in Belarus

Maternal		Parental	
maternity benefit	average daily salary for 126 or 140 calendar days	**childbirth**	1 - 10 minimum subsistence budget; 2 + - 14 minimum subsistence budget;
registration before the 12th week of pregnancy	minimum subsistence budget	**child care for a child up to 3 years**	1 - 35% of the average salary; 2+ - 40% of the average salary; disabled person - 45% of the average salary; in the Chernobyl NPP zone - 150% of the amount of the allowance;
Temporary disability		**for a child aged 3-18 years while raising a child under 3 years old**	50% of minimum subsistence budget;
to care for a sick child up to 14 years old, a disabled child up to 18 years old	average daily salary for all days of sick leave	**For children aged 3-18 years from certain categories of families (disabled parent, parent involved in regular service, disabled child, child with HIV)**	50% of minimum subsistence budget; disabled child and child with HIV - 70% of minimum subsistence budget;
to care for a child up to 14 years old, a disabled child up to 18 years old, in case the person caring for a child is ill		**to care for a disabled child under the age of 18 (if the parents are not employed or work part-time)**	1 and 2 degree of invalidity– 100% of minimum subsistence budget; 3 and 4 degree of invalidity– 120% of minimum subsistence budget;
to care for a disabled child up to 18 years for his sanatorium-resort treatment, medical rehabilitation			

*average per capita minimum subsistence budget is 206,58 BYN or 85 euro (the 1st May, 2018)

The amount of benefit is regularly reviewed and increased. The most serious changes occurred on January 1, 2013, after the Law "On State Benefits for Families Raising Children" entered into force, in accordance with which monthly allowances for childcare for children aged up to 3 years were significantly increased. Earlier the amount of allowance was 100% of the subsistence minimum budget (in accordance with Article 13 of Law No. 1898-XII of October 30, 1992 "On State Benefits for Families Raising Children"), i.e. 880 thousand rubles, then the new Law connected the allowance to the average monthly salary in the country. Thus, the benefit for the first child increased by 60% (35% of the average monthly salary); for the second and subsequent child by 80% (40% of the average monthly wage).

This was an effective incentive for giving a birth to a second child and another children, especially in rural areas. In 2013, rural fertility was the maximum for the entire 2000s.

In order to strengthen government support for the population of low-income and difficult-to-live families, state targeted social assistance has been strengthened since 2012 in Belarus [21].

For families with twins or more children, such assistance is provided regardless of the size of the average per capita income. Such families are also eligible for a free babysitting service until the children reach 3 years old.

In 2017, state targeted social assistance in the total amount of 87.9 million BYN was provided to 310.2 thousand people, among this, 28 thousand children were provided with food worth 22.1 million BYN.

The main recipients of monthly and one-time social benefits are traditionally large and incomplete families raising minor children, which was 67% in 2017. Among families, provided with food, large families hold the leading position with 42%.

Awareness of the possibility of facing a decrease in the birth rate has set to the government new challenges in finding additional incentives to support families with children. From January 1, 2015, a new monthly allowance for families with children aged from 3 to 18 years has been introduced during the period of raising a child.

A breakthrough in family policy was the introduction of a fundamentally new measure of long-term support for large families – the amount of $ 10,000 at birth, when family gives birth or adopts third or more children. As at January 1, 2018, 47 405 "family capital" deposit accounts were opened in ASC "ASB Belarusbank" in the amount of 474.05 million dollars. Families can use the funds when the child reaches 18 years old to improve their living conditions; to get education or social services, to form a cumulative (additional) pension for a mother (stepmother) in an entire family, a parent in an incomplete family, and also to receive early health services.

For the certain categories of citizens (mostly low-income and large families, families with disabled children) a number of other benefits is provided: textbooks fees; preferences for admission, the right to receive a loan on favorable terms for tuition fees, the provision of essential drugs, tax incentives.

Today in China, the provision of medical care and the payment of material benefits during the period of maternity leave is regulated by the Temporary Rules for Pregnancy and Birth Insurance of Employees. Contributions for pregnancy and childbirth insurance are made by the enterprise to the social insurance bodies in a certain proportion of the company's wage fund. In Beijing, pregnancy and childbirth insurance is now 0.8% and it is paid by the company [22].

Recipients of social guarantees are employees of both sexes (mother or father).

Pregnancy insurance is paid by the employing company in the amount of 0.6% of the base value of the city where the organization is registered. The term of the required insurance premiums varies from place to place. For example, in Beijing it is required that the continuity of contributions should last for at least 9 months, in Guangzhou city – the period of accumulative contributions is over a year, and in Shanghai if an employee has made a contribution in the month of birth of the child, he is considered insured.

For insured workers, there is a system of reimbursement for the costs of pregnancy, medical obstetric care, surgery, treatment in the clinic and the provision of medicine. The amount of compensation for medical expenses is set at a time, excessive costs are not reimbursed by Pregnancy and childbirth insurance. The amount of compensation is setted according to the province, city

or village. For example, in the Shaoxing city (Zhejiang Province), the allowance for uncomplicated childbirth is 2.5 thousand yuan (US $ 380), for complicated childbirth and the delivery of more than one child – 3.5 thousand yuan (530 US dollars), cesarean section – 5,000 yuan ($ 760).

Due to planned fertility policy, some types of medical care costs are also reimbursed, for example premature birth and sterilization costs. In Shaoxing city, the reimbursement amount ranges from 0.5 to 3 thousand yuan.

The maternity benefit itself is understood as the salary for the period of pregnancy and childbirth. Pregnancy benefits are calculated and issued by the relevant social insurance authority, based on the average monthly wage of the employee in the previous year. In Shaoxing city there is established the number of days for transferring benefits in some cases: childbirth after 7 months of pregnancy (including 7 months) – 128 days, for complicated childbirth – 143 days, for caesarean section – 143 days, for multiple births – 15 days for each child, abortion up to 4 months of pregnancy – 15 days, with abortion less than 4 months of pregnancy (inclusive) – 42 days. Childcare allowance which is provided to the father is paid within 15 days.

If a woman had an uncomplicated childbirth, she spent 3,500 CNY (1,000 CNY above the norm) on medical care, the average monthly salary for the previous year was 4,500 CNY, then she receives an allowance of 4,500 ÷ 30 × 128 + (3,500-1,000) = 21,700 CNY.

Previously, the government issued the "Certificate of Honor for Single-Child Parents" to parents who, throughout their lives, had brought only one child during the period when the government encouraged the birth of one child by one married couple. Since January 1, 2016, after changing the family planning policy, spouses who gave birth to one child on a voluntary basis don't receive anymore the "Certificate of Honor for Single-Child Parents" and they are not eligible to receive appropriate benefits. Those who have already received the "Certificate of Honor for Single-Child Parents" continue to enjoy benefits according with the established provisions and criteria in the field of family planning.

According to state regulations, the provisions of provinces, autonomous regions, cities of central subordination, there is a number of benefits for families who have a "Certificate of Honor for Parents of an Only Child".

In accordance with the directive "On Further Work on Planned Fertility", issued by the CPC Central Committee and the State Council of the People's Republic of China, from 1982, childcare benefit for one child is paid throughout China in the amount of 10 CNY, 50% of the amount is paid by each parent's company per month . For example, currently in Guangdong province, the following benefits are established in accordance with the Regulation "On Population and Family Planning" [23]:

- workers and employees, residents of cities and towns, are paid a one-time child health benefit every month, starting from the date of issue of the "Certificate of Honor for Single-Child Parents" and until the child reaches the age of fourteen. The amount of child health benefit and incentive payments are made in the amount of 50% by the employing organization of each parent. The question of benefits for those who do not work is decided on a comprehensive basis by local people's governments. For residents of cities and towns, family planning allowance is paid according to certain criteria (usually, the payment is 1,000 CNY and above) for parents of an only child who have reached the age of 60 for men and 55 for women;
- residents of rural areas receive benefits or old-age pension from local people's governments;
- in case of death or disability of an only child, and if married couples no longer have or have not adopted a child, the government pays benefits;
- under equal conditions, first of all, they provide care for families with an only child, primarily when there are questions about employment, living quarters, helping the poor, taking a child to kindergarten and school, medical care for a child, etc.;
- extension of the duration of maternity leave for 35 days, with the exception of maternity leave, set by the state; the husband has the right to receive parental leave for child care for 10 days. Maternity and parental leave are fully paid.

On January 1, 2016, in the Regulation "On Population and Family Planning" in Guangzhou province, in Chapter 3 "On Birth Control" a number of articles restricting the category of increasing the planned fertility and the category of late marriage and childbirth was also canceled. In this

regulation, stimulating contraceptive measures was also abolished, and currently the use of contraceptive measures is carried out on a voluntary basis.

If the provisions of laws, subordination or departmental acts provided for the use by the company-employer individual incentive measures for parents who have an only child throughout their life, the company has to take these measures.

If the staff or organization is the leader in the results of work and achievements in the field of planned fertility, the amended legislation provides the declaration of gratitude and the provision of material rewards.

Planned childbirth incentive payments in administrative and non-manufacturing organizations are covered by the organization's annual budget in the amount of 5 percent of the average salary of employees for the previous year at the county location (city, district). Planned childbirth incentive payments can be received in the amount of not more than 2% of annual taxable income.

In case of injury due to an accident or the death of an only child, local people's governments are required to provide the necessary assistance to the parents.

Older people, who should receive benefits or who need to be given an assistance in accordance with the birth planning policy during the period when the state encourages the birth of one child by one couple, continue to receive appropriate benefits and assistance.

Local people's governments at all levels provide to rural households, which follow fertility planning policies, support for the development of the agriculture with money, technology, training, benefits; poor households following fertility planning policies are given high priority by providing loans to struggle against poverty, providing jobs, implement projects to struggle against poverty, and provide social assistance.

Special measures

One of the main measures to implement the government family policy in the Republic of Belarus is to create conditions for economic independence and growth of family well-being, including lending and partial subsidization of families building and purchasing housing, maintaining preferential housing for young and large families [4].

To a greater extent, housing support becomes an incentive for the birth of third and subsequent children. But there is no special research.

As at 2011-2015 in terms of housing policy financial assistance of the government was provided to 55 thousand large families, especially, in repayment of debts on concessional and non-concessional loans for housing construction.

In China in order to respect human rights and the principles of gender equality, to minimize abuse of women and girls, the Law prohibits discrimination against women who have given birth to girls or against infertile women, as well as discrimination, abuse or abandonment of newborn girls. The use of ultrasound technology and other technical methods for determining the sex of embryos for non-medical purposes is strictly prohibited; artificial termination of pregnancy based on the choice of the sex of the child, not for medical purposes is strictly prohibited.

Conclusion. In recent decades, birth control policy in Belarus and China has been carried out in different ways, both organizationally and strategically.

The birth control policy in modern Belarus is part of the demographic policy and has a pro-natalistic goal. In China, for nearly 40 years, a birth control policy has been pursued. Only since 2016, due to the transformation of policy in China, a number of articles has been cancelled, limiting the category of increasing the planned fertility and the category of late marriage and childbirth.

In Belarus and China, families with children are a special object of the government policy. Belarus has focused on alleviating economic difficulties for families with children, especially in the first years after the childbirth. The Republic of Belarus has developed a system of government support for families with children, which includes various types of benefits. The way of supporting families with children also includes assistance to large families (with 3 or more children) for the school year, provision of a social and maternity benefits.

A fairly effective measure was financial assistance to families (especially those with many children) in purchasing housing.

In general, the system works in such a way that a woman can be on parental leave until the child is 3 years old: the whole period is paid for benefits, nursery places are few, private kindergartens are more the exception and the payment is very high relative to the average wage.

A whole layer of support for large families allows to stimulate the birth of the 3 children in the last years. Although the effect of new measures is manifested only in the first years and rather accelerates the birth of the next child, than influencing the change in family attitudes.

In China, there is no such comprehensive targeted support for families with children as in Belarus. As there is no preferential housing loans.

The system of financial support in China includes both universal benefits, and those that depend on the territory of residence or assignment to certain categories.

It should be noted that patriarchal value systems continues to be maintained in Belarus: it is provided a long-term maternity leave to take care for a child under 3 years old, 99% of mothers and only 1% of fathers or other relatives are provided with parental leave. In China women are provided only with maternity leave, so they have no opportunity to lose their qualifications due to the long leave from the work process. However, it complicates and increases the cost of childcare.

In China, measures may vary by territory. There is no differentiation in Belarus. This, in turn, does not allow to take into account the peculiarities of reproductive attitudes, for example, in the city and the village (in rural areas the amount of the allowance coincides with the size of the average salary of a woman, in the city there is an urgent need for infrastructure development and flexible employment conditions).

In both countries, there is a lack of flexibility in the ability to combine both childcare and professional implementation, and there is poorly developed gender quality, which is the basis of birth control programs in developed countries.

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HOME CARE IN THE REPUBLIC OF MOLDOVA: THE CHALLENGES FOR HEALTH AND SOCIAL POLICIES

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Home care responds to people's health and social needs by offering quality services at the recipient's residence. Demand for these services is steadily increasing, especially due to the aging population. The purpuse of this study is to analyze the situation in the field of home care in the Republic of Moldova. The study is based on a methodological approach focused on the analysis of the normative framework, the opinions of the service providers (public and private), but also of the representatives of the local public authorities, including the beneficiaries. Quantitative and qualitative research methods have been used. Sociological survey based on a questionnaire was applied to 84 home care providers from 23 out of 35 Moldovan administrative territorial units. In-depth individual interviews were conducted with 2 categories of people: 20 home care beneficiaries and 24 mayors. The results of the assessment reveal shortcomings and achievements in the field of home care in the Republic of Moldova and gives recommendations for governmental and local authorities, public and private providers in order to develop home care services and policies in the field of home care, organization of advocacy activities.

Keywords: *home care, health policies, social policies, challenges, social home-based care, medical home-based care, providers, beneficiaries.*

Îngrijirea la domiciliu răspunde la necesităţile de sănătate şi cele sociale ale oamenilor prin oferirea de servicii calitative acolo unde beneficiarul trăieşte. Cererea faţă de aceste servicii este în continuă creştere, în mod special datorită procesului de îmbătrânire a populaţiei. Scopul acestui studiu este de a analiza situaţia în domeniul îngrijirii la domiciliu în Republica Moldova. Studiul dat are la bază o abordare metodologică axată pe analiza cadrului normativ, opiniile prestatorilor de servicii (publici şi privaţi), dar şi ale reprezentanţilor autorităţilor publice locale, inclusiv a beneficiarilor. S-au utilizat metode cantitative şi calitative de cercetare. Ancheta sociologică pe bază de chestionar a fost aplicată la 84 de prestatori de servicii de îngrijire la domiciliu din cele 23 din 35 de unităţi administrativ teritoriale ale Moldovei. Interviuri individuale aprofundate au fost realizate cu 2 categorii de persoane: 20 de beneficiari ai serviciilor de îngrijire la domiciliu şi 24 de primari. Rezultatele evaluării relevă deficienţele şi realizările din domeniul îngrijirii la domiciliu în Republica Moldova şi prezintă recomandări destinate autorităţilor guvernamentale şi locale, prestatorilor publici şi privaţi pentru dezvoltarea serviciilor şi politicilor în domeniul îngrijirii la domiciliu, organizarea activităţilor de advocacy.

Cuvinte-cheie: *îngrijire la domiciliu, politici medicale, politici sociale, provocări, îngrijire socială la domiciliu, îngrijire medicală la domiciliu, prestatori, beneficiari.*

Уход на дому отвечает медицинским и социальным нуждам людей, предлагая качественные услуги там, где живет получатель. Спрос на эти услуги неуклонно растет, особенно из-за старения населения. Целью данного исследования является анализ ситуации в сфере ухода на дому в Республике Молдова. Исследование основано на методологическом подходе, ориентированном на знание ситуации в сфере услуг по уходу на дому, на основе анализа нормативной базы, мнений поставщиков услуг (государственных и частных), а также представителей местных органов власти, включая бенефициаров. Были использованы количественные и качественные методы исследования. Социологический опрос проводился среди 84 поставщиков услуг по уходу на дому в 23 из 35 административно-территориальных единиц Молдовы. Индивидуальные углубленные интервью были проведены с 2 категориями

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людей: 20 получателями услуг по уходу на дому и 24 мэрами. Результаты исследования выявляют недостатки и достижения в области ухода на дому в Республике Молдова и предлагают рекомендации для государственных и местных органов власти, государственных и частных поставщиков услуг для развития политики в области ухода на дому, организации адвокационных мероприятий.

Ключевые слова: *уход на дому, медицинская политика, социальная политика, проблемы, социальный уход на дому, домашняя медицинская помощь, поставщики, бенефициары.*

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Home care: an overview

Home care aims at satisfying people's health and social needs in their home by providing appropriate and high-quality home-based health care and social services, by formal and informal caregivers, with the use of technology when appropriate, within a balanced and affordable continuum of care [1]. Life expectancy has risen sharply in the European countries in the last few decades. The proportion of older people in the general population is increasing steadily and it is predicted to rise still further in the coming decades. This will mean increasing rates of care-dependent older people [2, p.1-2]. The next decades will also see dramatic changes in the needs of those with health diseases, as the leading cause of disability and death. A variety of people with chronic conditions may be in the situation to stay at home given difficulties in mobility, and dependent children with severe health problems or people with mental disorders may also require home care.

Sociodemographic change and mobility trends affect home care needs. The break-up of the traditional large family group and other sociological trends, such as urbanization, complicate the situation. Family groups are often intact in rural areas, with many generations living in a household and family members taking care of the older or disabled family members. Urban communities are different, with small family units, limited living space and the younger generations often moving away from their families because of work commitments. All these factors increase the likelihood of today's and future generations needing additional care that their relatives are unlikely to provide and place a major responsibility on all levels of government: national, regional or district and especially municipal, where home care is applied in practice [3].

Home care as a concept is not clear, which may lead to uncertainty in its application and in the training of those working in home care [4, p.861]. Home care can be defined as an array of health and social support services provided to clients in their own residence. Such coordinated services may prevent, delay or be a substitute for temporary or long-term institutional care. The concept comprises a comprehensive field of actions and gives no clear understanding of the objectives of home care and who is the recipient, what is actually done and what effects would be desirable. A more specific clarification of the concept may be helpful in education and practice [5, p.9].

The home care concept, how it appears in practice, what are the underlying goals and when it is applied, who its recipients are and what it consists of was analyzed by Meleis A. [6]. The author specifies that home care as a phenomenon seems to be best understood as activities representing the whole span of care activities from the primary prevention to the palliative care at the end of the life. As home care represents a large field of care activities, it might be appropriate to use home care as an umbrella concept with different subconcepts describing the level of the activity and objectives in focus.

Thome B., Dykes A.-K., Hallberg I. (2003) done a review of the empirical literature for the description of home care as a phenomenon and as a concept, especially with regards to who the care recipients are, what actions and assessments are performed and what effects are achieved for the care recipients in terms of functional health status and quality of life. The authors concluded that home care as phenomenon is the care provided by professionals to a person in his/her own home with the ultimate goal being not only to contribute to his/her life quality and functional health status, but also to replace hospital care with care in the home for societal reasons and covering a wide range of activities from preventive visits to end/of life care [7, p.871].

Genet N., Boerma W., etc. (2011) had done a systematic literature review of home care in Europe. The authors focus on 74 relevant studies, providing information on characteristics of home care recipients and the organization of home care in 18 countries. The main conclusions reveal that home care systems appeared to differ both between and within countries. Many studies focus only on the one aspect of home care system and little information emerged on home care in Eastern Europe. The authors highlight the need for more scientific publications on home care, especially for comprehensive and more complete insight [8].

The overall objective of the paper is to analyse the home care in the Republic of Moldova, to assess the home care service providers (private and public) and the needs of the population in such services, to help Moldovan authorities develop evidence-based policies and contribute to the sustainable home-based care development.

The article is based on comprehensive analysis of home-based care in the Republic of Moldova. The methodology combines local approach with international experience and relied on primary and secondary data sources. Thus, a desk review was conducted on legal framework and analysis of provision home-based care characteristics and models. Additional to these data, field information was collected from home-based care service providers, service beneficiaries and local public authorities (LPA) at I and II levels. The assessment is mixing quantitative and qualitative research methods. The survey sample comprised 84 home-based care service providers from 23 of 35 administrative territorial units. The qualitative research involved 2 target groups: 20 beneficiaries of home care services and 23 LPA representatives.

Types of home care services

In the Republic of Moldova, the concept of home care gives no clear understanding and comprises different types of home care services: social home-based care services, medical home-based care services and integrated home-based care services (Are not regulated by normative acts.), (see Figure 1). One way of understanding the concept of home care is to describe the phenomenon, how it appears in practice, how it is provided, what are the underlying goals, who are recipients.

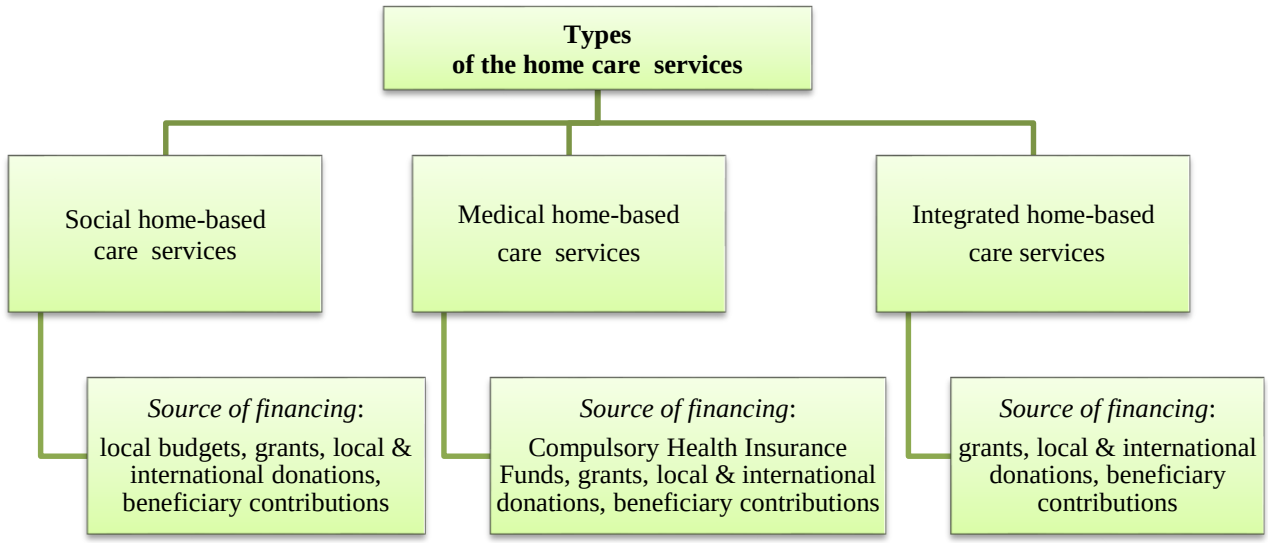

Figure 1. Home care services types and sources of funding
Source: Author's analysis.

The social home-based care is one of the oldest social services in the Republic of Moldova. Social workers were the first specialists to be employed in the social assistance sphere to provide social home-based care services. Within the first years of the Republic of Moldova's independence, social workers providing social home-based care services were employed by the National Social Insurance House and with the creation of Territorial Units of Social Assistance (TUSA) in 1998, they were subordinated to the last. Gradually, social home-based care service has been developed and private providers have emerged alongside with public providers.

The bedrock of medical home-based care services, in the Republic of Moldova was put in December 1999 by the Catholic Religious Mission "Caritas-Moldova", Interconfessional Society of Christian Doctors "Emanuil" and the Civil Society Organization (CSO) "Nursing Association from Republic of Moldova", with the support of "CORDAID" organization, Holland, that implemented the first pilot project on home care. An essential step in the development of the medical home-based care services was the approval in 2007 of the Unique Compulsory Health Insurance Program and the inclusion of medical home-based care services as a form of medical assistance, alongside with pre-hospital emergency, primary, ambulatory and hospital care [9]. The section 6 of this Program stipulates that insured bedridden patients are entitled to medical home-based care services. These services are provided individually by service providers contracted by the National Health Insurance Company (NHIC) according to the law. The first service providers were contracted in 2008.

The social home-based care service [10] represents a public (established within territorial structures of social assistance) or private service (created by foundations, private non-profit organizations, registered according to the law, dealing with social sector). The purpose of the service is to provide quality social home-based care services as to ensure better quality of the beneficiaries' life. The providers of social home-based care services are presented in the Figure 2.

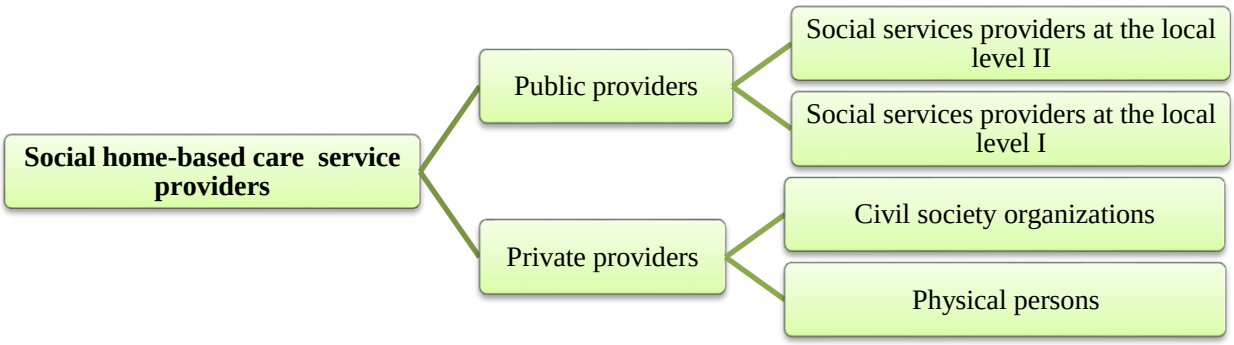

Figure 2. Social home-based care service providers
Source: Author's analysis.

Medical home-based care service represents a public or private service provided, in accordance with the law in force, by a healthcare institution, irrespective of its type of ownership and legal form of organization, usually CSOs (the model in which the "medical" component stays a part of the health care system and the "social" component of the social system exist in the Czech Republic, Slovak Republic, Romania). The providers of medical home-based care service are presented in Figure 3. The purpose of medical home-based care services is to provide the patient with qualified, dignified and appropriate care according to his individual needs, in order to stimulate the rehabilitation, maintenance and/or rehabilitation of the health condition and reduce the negative effects of the disease. The public medical home-based care service providers are mainly medical public institutions and a few private institutions. In 2017 NHIC contracted, for the provision of medical home-based care services, 131 state medical institutions and other 9 private institutions.

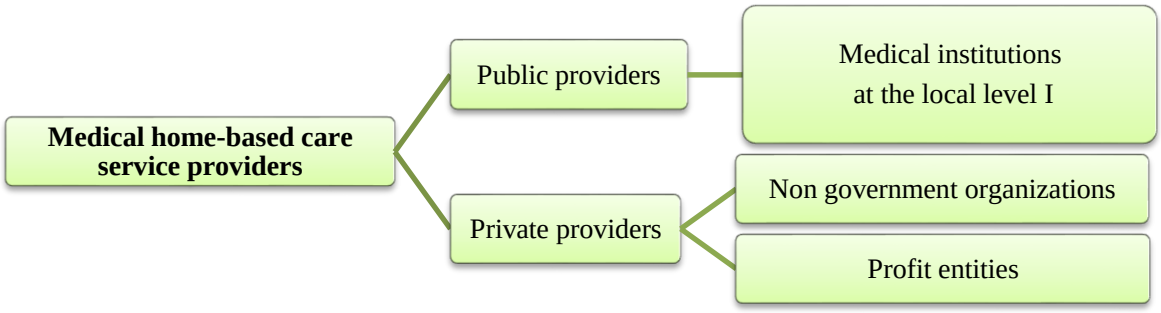

Figure 3. Medical home-based care service providers
Source: Author's analysis.

There are no legal provisions regarding the **integrated home-based care services**, neither standards (the model in which social and medical are almost fully integrated is the "Scandinavian model" – Sweden, Finland, Norway). However, certain service providers, especially the CSOs, but also some public institutions, operate within this notion. Integrated services provide, as per particular needs, both social and medical home-based care services or in other words, the same beneficiary receives support from a social worker and from a medical assistant, but not always with common coordination of their efforts.

Characteristics of home-based care service providers

The mapping of home-based care service providers, reveals a wide range of service providers **according the organization and legal status**: medical institutions, TUSA, CSOs, providers appointed by LPA[1], including profit entities. Most of the service providers are public institutions (medical institution, TUSA), followed by CSOs.

From the perspective of the geographical coverage, most of the home-based care service are provided at the community/first level (50), followed by those operating at the district/second level (29), regional (2) and national providers (3). Thus, public medical institutions usually provide home-based care at community level, TUSA – at the district level (except Administrative Territorial Unit Gagauzia, where TUSA does not provide social home-based care services, but the mayoralties), providers appointed by LPA at both, community level and district, profit entity at the district level. The CSOs are diverse and operate in different geographical areas – starting with the community, district, regional and finishing with national coverage (Table 1).

Table 1

Home-based care providers according to the geographical coverage, number

		Medical institutions	TUSA	CSO	Provider appointed by LPA	Profit entity
Geographical area	National	-	-	3	-	-
	Regional	-	-	2	-	-
	District	3	22	4	1	1
	Local	39	-	8	1	-
Total		**42**	**22**	**17**	**2**	**1**

Source: Author's analysis.

According the types of provided home care, it was established that most of providers offer medical services, followed by those providing social services and only a few provide integrated services (Table 2). The CSOs, most often, provide integrated home-based care services. However, some medical institutions and TUSA follow their example. The home-based care services depend on the beneficiaries' needs and possibility of provider to respond to these needs.

Table 2

Types of home-based care providers, number

Type of home-based care services	Medical institutions	TUSA	CSO	Provider appointed by LPA	Profit entity
Social	-	20	9	1	-
Medical	39	-	1	-	1
Integrated	3	2	7	1	-
Total	**42**	**22**	**17**	**2**	**1**

Source: Author's analysis.

[1] There are 2 situations in this case: home-based care service provider appointed by the LPA of the II level and the provider appointed by the LPA of the I level. Social workers from Administrative Territorial Unit Gagauzia are employed within the municipality, not the TUSA. The representative of LPA of the II level believes it is more correct that social home-based care services is within TUSA ensuring in this way a methodological control and increasing social home-based care quality.

According to home-based care service for free or for a fee, out of the 84 service providers, 74 render free home-based care services, 3 from 74 providers render home-based care services for free and for a fee, while 10 providers offer only co-paid services[1] (Table 3).

Table 3

Home-based care service providers ensuring services for free or for a fee, number

	Free services	Co-paid services	Paid services
Medical institutions	42	-	-
TUSA	22	-	3
CSO	7	10	-
Provider appointed by LPA	2	-	-
Profit entities	1	-	-
Total	**74**	**10**	**3**

Source: Author's analysis.

The number of service beneficiaries differs from one provider to another, including from one type of service to another. Thus, the research data reveal that medical institutions provide services to a minimum of 2 persons (Health Centers from rural areas) and to maximum – 107 persons (20 beneficiaries on average). The number of CSOs' beneficiaries is much higher, from at least 8 persons to maximum 2100 (472 beneficiaries on average). TUSA registered the highest number of beneficiaries, from a minimum of 298 persons to 2171 persons (636 beneficiaries on average) (see Table 4).

Table 4

The number of beneficiaries per home-based care providers, number[2]

	Medical institutions	TUSA	CSO
Mean	20	636	472
Median	10	522	142
Mode	5	412	44
Minimum	2	298	8
Maximum	107	2171	2100

Source: Author's analysis.

Almost every 4th institution[3] of those 84 participating in assessment, asserted that they have restrictions in providing home-based care services.[4] Most restrictions were mentioned by medical institutions, followed by TUSA and CSOs. Medical institutions have contracted an exact number of visits – 36 visits per beneficiary (72 visits in special cases), visits exceeding this number are not paid. Some CSOs also have to provide services to beneficiaries in rotation (once every 3 or 6 months) at the donor's request or according to their own regulations. Maintaining a fixed period for home-based care service provision is targeted to serve much more beneficiaries requiring home-based care services. The number of those in need is high and it is still growing, triggered by the ageing of the population (the national ageing index in 1980 was 10.7%, while in 2018 it reached 17.7%) [11].

Service providers revealed both, **advantages and disadvantages of a fixed period for service** provision to both, providers and beneficiaries (see Table 5). Based on some arguments, certain CSOs

[1] An amount is paid by the beneficiary, a part by – LPA and the rest by – CSO "CASMED" or an amount is paid by the beneficiary and the rest by different CSOs.

[2] Service providers appointed by LPAs and businesses will not be assessed, due to their small number. The profit entity provided services in 2016 to 101 persons. The service provider appointed by LPA that operates in the district, provided services to 110 in 2016, while that working in the community – to 58 persons.

[3] 22 institutions.

[4] There are restrictions regarding free services.

manage to get the opportunity to extend the provision of home-based care services. As arguments serve: (i) lack of a positive evolution or worsening of the beneficiary's health, (ii) beneficiary's impossibility to take care of himself, (iii) people of the waiting list are less disadvantaged. The possibility of extending the period of home-based care provision may be negotiated for private providers or in the case of partially paid services.

Table 5

Advantages and disadvantages of a fixed period for service provision

Advantages for institution	Advantages for beneficiaries
- Big number of beneficiaries, - Rigorous planning and well-established individual plan, - High level of specialist's responsibility to provide quality services for a period, - Development of intersectoral collaboration, - Do not develop dependence.	- Improvement of health condition in a short time, - Motivation of the beneficiary, including the family, - Social inclusion, - Prevention of institutionalization.
Disadvantages for institution	**Disadvantages for beneficiaries**
- In 36 visits / 6 months, the complete improvement of the situation is not achieved, - Increased workloads for specialists, - Job burnout, - Conflicts with the beneficiaries.	- Worsening of the health condition, - Isolation, marginalization, loss of hope in a bright tomorrow.

Source: Author's analysis.

Geographical coverage of home-based care services

From the geographical perspective the analysis reveals **national coverage with social home-based care** of elderly people officially registered single and people with disabilities without support from children, extended family and other people (friends, relatives, neighbors), with the exception of very small villages. TUSA from all administrative territorial units try to provide social home-based care services in every village according to the normative documents in force. Authorities from one administrative territorial unit have developed social home-based care for people requiring this type of services but people cannot receive it as they do not meet the requirements of the Government Decision no. 1034.

Medical home-based care are distributed non-uniformly. For example, in 2017 NHIC contracted 131 state medical institutions (Territorial Medical Associations (5), Health Centers (126) of 258 public health institutions and other 9 private institutions (6 CSOs, including 2 religious organizations and 1 profit entity).

In general, just half (51%) of public health institutions were contracted for the provision of medical home-based care services, when speaking about the geographical coverage, there are administrative territorial units covered by more providers and administrative territorial units served only by one or no one. The number of contracted visits groups by medical home-based care service providers (4 categories) is presented below (see Table 6).

Table 6

Number of visits contracted by service providers from NHIC in 2017

Number of contracted visits	Number of providers	Type of providers according the legal form of organization	Type of provider, according the location
From 12 to 299 visits	107	Health Centers	Mostly from rural areas
From 300 to 999 visits	25	20 Health Centers and 5 CSOs	Town or administrative territorial units, region
From 1000 to 2230 visits	7	4 medical institutions, 2 CSOs, 1 profit entity	Town or administrative territorial units, region
14 940 visits	1	1 CSO	Town

Source: Author's analysis.

These data reveal that there are no well-defined criteria for contracting a certain number of visits for medical home-based care services. The number of people is not taken into account when contracting service providers thus leading to discrepancies. For example, of the total amount of funds allotted for medical home-based care in 2017, about 35% are given to the municipality of Balti, and only 10% to the municipality of Chisinau which is 5 times bigger than Balti in terms of the population number and other 55% to the rest of localities of the Republic of Moldova. The fact that the municipality of Balti representing 5% of the total population of the Republic of Moldova absorbs about 35% of the funds denotes that (i) there are people requiring medical home-based care services, (ii) the lack of a mechanism to ensure the coverage with medical home-based care services, (iii) medical institutions are not encouraged to sign contracts with the NHIC on medical home-based care services or (iv) the current cost covered by the NHIC discourages potential medical home-based care providers.

The geographical distribution of private home-based care service providers (CSOs and profit entities) is also not homogeneous. The distribution is frequently determined by LPA's readiness to collaborate with CSOs in developing home-based care.

Criteria for admission to home-based care services

TUSA provide social home-based care services according to the Government Decision no. 1034. Free services are offered to elderly people who have reached the standard retirement age and people with disabilities without support from children, the extended family and other people (friends, relatives, neighbours). However, lack of children/support from children stipulated in the law is actually interpreted mainly as childless.

All accredited public and private providers provide medical services to beneficiaries in accordance with the Regulation and Standards related to medical home-based care set forth in the Orders of the Ministry of Heath no. 855 of 29.07.2013 and no. 851 of 29. 07.2017. The person has to meet a few criteria to benefit from services: (i) to have medical insurance, (ii) to have a recommendation from the family doctor / specialist, (iii) to reside on the territory served by the medical institution.

The admission to home-based care within the CSOs is based on specific criteria of donors. The basic request from donors is to include the most vulnerable in home-based care service. Usually, individuals are accepted based on certificates from TUSA, LPA (wage/pension, family composition), medical institution (referral from family doctor/specialized doctor from hospital/health center), without infections or mental illness. CSOs provide home-based care services to people that do not benefit from such kind of services from public or private providers.

There are differences in the characteristics of the beneficiaries from one type of providers to another, determined by the peculiarities of institutions providing services and the normative documents. TUSA beneficiaries are more often women, single and from rural area. The evaluation data indicate that medical home-based care services are more gender balanced, targeted at people with disabilities and are particularly accessible to people from urban area. CSOs are oriented to the categories of beneficiaries that are not covered by public medical institutions and TUSA, thus increasing the number of men, people under the age of 65, those with relatives.

Offer and demand for home-based care services

The analysis of home-based care services from geographical perspective reveals a national coverage with social home-based care services of elderly registered as single and people with disabilities without support of children, extended families and other people. Medical home-based care services are not distributed uniformly. Half of public health institutions from the local level I were contracted by NHIC for the provision of medical home-based care services. When speaking about the geographical coverage, with medical home-based care services, there are administrative territorial units covered by more providers and administrative territorial units served only by a few or no one. The analysis of private home-based care service providers (CSOs and profit entities), is also not homogeneous. The distribution is frequently determined by LPA's readiness to collaborate with CSOs in developing home-based care.

So, the home-based care services are not available to all those who needs them. Home-based care services are not accessible because some persons who need them do not comply with the

normative provisions for admission to such services. Also, home-based care services, especially medical services, are not provided in all localities of the Republic of Moldova. Home-based care services offered by CSOs are not available in all localities of the country. Lonely old people abandoned by their children are disadvantaged and deprived of home-based care services.

Assessment has allowed to made estimations about people who need home-based care services. The estimated number of people who need home-based care social services is 33 915 people. Currently, social home-based care services are offered for about 2/3 of those who need it. The estimated number of people in need of medical home-based care services is 13 972 people. Currently, medical home-based care services are offered to about 18 percent of those who need it.

Home-based care service models

The assessment revealed **various models of home-based care service provision**. Within each type of home-based care service (medical, social, integrated), several models were identified based on 9 main criteria: (i) type of provided service, (ii) legal form of organization of the provider, (iii) human resources involved in the provision of services, (iv) working mode of the provision of home-based care services, (v) type of beneficiaries, (vi) criteria for admission to service, (vii) duration of service provision, (viii) area of service delivery (ix) cost of the service paid by the beneficiary.

The models of social home-based care services have in common only the development of partnerships and, with few exceptions, the working hours. Social models are designed to complement each other (see Table 7) which is a major advantage. Thus, local private providers, or even the public ones, target vulnerable beneficiaries that do not meet the criteria of the Government Decision no.1034 of 31.12.2014.

Table 7

Models of social home-based care services delivery

Criteria for differentiation	Model A	Model B	Model C	Model D
Type of provided service	**Social home-based care services**			
Form of organization	Public	Private (CSOs)	Public	Public
Human resources	Head of the service, Social workers	Head of the service, Social assistant, Social workers	Social workers	Head of the service, social workers
Working mode	8 hours per day, on Saturdays and Sundays at request	8 hours per day 5 days a week	8 hours per day 5 days a week	8 hours per day 5 days a week
Type of beneficiaries	Categories enlisted in the pt. 11 and 12 of the Regulatory Framework on Home based Social Care Services, Government Decision no.1034	Categories enlisted in the pt. 11 and 12 of the Regulatory Framework on Home based Social Care Services, Government Decision no.1034, vulnerable people that have not reached the retirement age	Vulnerable people that have reached the retirement age	Categories enlisted in the pt. 11 of the Regulatory Framework on Home based Social Care Services, Government Decision no.1034
Criteria for admission to service	Based on the eligibility criteria for care services and the results of the assessment of applicant's care needs	Based on the eligibility criteria for care services and the results of the assessment of applicant's care needs. Referral mechanism applied by TUSA, LPA, other relevant institutions. Beneficiary's own request or request from his/her representative	Request from LPA	Request from LPA

Criteria for differentiation	Model A	Model B	Model C	Model D
The duration of service provision	Untill the decease, improvement of the beneficiary's condition or the occurrence of circumstances that makes the person ineligible	3-6 months, till the improvement of the beneficiary's condition or the occurrence of circumstances that makes the person ineligible	Untill the decease, improvement of the beneficiary's condition or the occurrence of circumstances that makes the person ineligible	Untill the decease, improvement of the beneficiary's condition or the occurrence of circumstances that makes the person ineligible
Area of service delivery	District	Local	District	Local
Cost of the service paid by the beneficiary	Free of charge For a fee	Free of charge Symbolic co-payment of the cost of the service	Free of charge	Free of charge

Source: Author's analysis.

The strong points of the **model A-social** consist in provision of funding from the LPA budget and the presence of social workers in almost all localities of the Republic of Moldova. The weak points of the model lie in the fact that vulnerable people requiring home-based care are not admitted to services if they do not meet the provisions of the Government Decision no. 1034. The opportunity of this model is the development of services provided for a fee that could be delivered to beneficiaries with a better financial situation but still requiring such services. **Model B-social and C-social** are designed to complement the gaps of the model A, through undertaking certain responsibilities by LPA (model C) or by assigning responsibilities to both, LPA and beneficiaries (model B). **Model D-social** exists only in the Gagauzia and is the archaic model from the Soviet Union period. The gaps of this model lie in the fact that social workers employed by LPA of the 1st level are not part of a service evaluation and monitoring system.

Medical home based-care models have much in common (see Table 8).

Table 8

Models of medical home-based care services delivery

Criteria for differentiation	Model A	Model B	Model C	Model D	Model E
Type of provided service	**Medical home-based care services**				
Form of organization	Public	Private (business entity)	Private (CSO)	Private (CSO)	Private (CSO)
Human resources	Doctors, medical assistants	Doctor, medical assistants	Doctor, medical assistants	Doctor, medical assistants	Doctor, medical assistants
Working mode	Differ from 2/4 hours to 7 hours per day or a few hours 2-3 days a week	7 hours per day, on Saturdays and Sundays at request	7 hours per day, at request	7 hours per day, at request	7 hours per day, at request
Type of beneficiaries	Insured people	Insured people	Insured people, uninsured people, without identity documents inclusively	Insured people, uninsured people, without identity documents inclusively	Insured people
Criteria for admission to service	Family doctor's recommendation written in the patient's medical record	Referral form (form no. 027/e) from the family doctor or specialist	Referral form (form no. 027/e) from the family doctor, specialist, doctor employed by the provider, case referral from TUSA or LPA, including patient's individual request	Referral form (form no. 027/e) from the family doctor, specialist, doctor employed by the provider, case referral from TUSA or LPA, including patient's individual request	Referral form (form no. 027/e) from the family doctor, specialist, LPA

Criteria for differentiation	Model A	Model B	Model C	Model D	Model E
The duration of service provision	36 visits, sometimes 72 visits	36 visits, sometimes 72 visits	36 visits, sometimes 72 visits contracted from the NHIC. Up to 365 visits per year, depending on the current financial resources of the provider (donations, sponsorship, co-financing)	36 visits, sometimes 72 visits contracted from the NHIC. Up to 365 visits per year, depending on the current financial resources of the provider (donations, sponsorship)	36 visits, sometimes 72 visits
Area of service delivery	Local	District	Regional (more Districts)	Regional (more Districts)	Local
Cost of the service paid by the beneficiary	Free of charge	Free of charge	Free of charge, a symbolic co-payment of the cost of the service	Free of charge	Free of charge

Source: Author's analysis.

Model A-medical addresses the insured people, but does not allow all insured people to benefit from such services (the evaluation study outcomes show that not all medical institutions contract medical home-based care services from NHIC). It can be explained by the small number of visits offered to medical institutions from rural areas and the low cost of a visit reimbursed by the NHIC. **Model B-medical** is a successful one, from the perspective of the working schedule – 7 hours per day, in this way meeting the beneficiaries' needs. This model aims to provide services to the large majority of insured beneficiaries from the district. **Model C-medical** has as advantage the opportunity to access the service – 7 hours per day, admission to services of uninsured people, people without identity documents, multiple funding (NHIC, donors, LPA), including the empowerment of beneficiaries to come up with a symbolic co-payment, possibility to provide services for a period of time up to one year. **Model D-medical** differs from **model C-medical** in the absence of the symbolic co-payment from the beneficiaries' side. **Model E-medical** differs from **models C-medical** and **D-medical** in the existence of funding exclusively from the NHIC, provision of services for 36/72 visits and limited collaboration with authorities.

The integrated models meet a wider variety of needs (social, medical) through the presence of a diverse team of professionals. They provide services 8/24 hours per day, 5/7 days a weeks and focus on the establishment of partnerships in the community, district, region or national (see Table 9).

Table 9

Models of integrated home-base care service delivery

Criteria for differentiation	Model A	Model B	Model C	Model D
Type of provided service	**Integrated home-based care services**			
Form of organization	Private (CSOs)	Private (CSOs)	Private (CSOs)	Private (CSOs)
Human resources	Doctor, medical assistants	Social workers, medical assistants	Doctor, medical assistants, social workers	Medical assistants, social workers, psychologist, jurist
Working mode	7 hours per day 5 days a week	7-8 hours per day 5 days a week	7-8 hours per day 5 days a week	7-8 hours per day 5 days a week
Type of beneficiaries	Insured people, uninsured people	Uninsured people, including without identity documents, vulnerable people that have not reached the retirement age	Insured people, uninsured people, including without identity documents, vulnerable people that	Insured people, uninsured people, including without identity documents, vulnerable people that

Criteria for differentiation	Model A	Model B	Model C	Model D
			have not reached the retirement age	have reached the retirement age
Criteria for admission to service	Referral form (form no. 027/e) from the family doctor, specialist, doctor employed by the provider, case referral from TUSA or LPA, including patient's individual request	Based on the eligibility criteria for care services and the results of the assessment of applicant's care needs. Referral mechanism applied by TUSA, LPA, other relevant institutions. Beneficiary's own request or request from his/her representative	Referral form (form no. 027/e) from the family doctor, specialist, doctor employed by the provider, case referral from TUSA or LPA, including patient's individual request. Based on the eligibility criteria for care services and the results of the assessment of applicant's care needs. Referral mechanism applied by TUSA, LPA, other relevant institutions. Beneficiary's own request or request from his/her representative	Referral form (form no. 027/e) from the family doctor, specialist, doctor employed by the provider, case referral from TUSA or LPA, including patient's individual request. Based on the eligibility criteria for care services and the results of the assessment of applicant's care needs. Referral mechanism applied by TUSA, LPA, other relevant institutions. Beneficiary's own request or request from his/her representative
The duration of service provision	3-12 months till the improvement of the beneficiary's condition or the occurrence of circumstances that makes the person ineligible	Unlimited	3-6 months till the improvement of the beneficiary's condition or the occurrence of circumstances that makes the person ineligible	3-6 months, till the improvement of the beneficiary's condition or the occurrence of circumstances that makes the person ineligible
Area of service delivery	Local / district	District	Regional (more districts)	Regional (more districts)
Cost of the service paid by the beneficiary	Free of charge	Free of charge	Free of charge, symbolic co-payment of the cost of the service	Free of charge

Source: Author's analysis.

The development of these models has been possible due to funding from international donor agencies. All models address the vulnerable categories of beneficiaries, besides the referral from the family doctor and/or the specialist; they also need referral from the LPA, churches, and religious missions. It is important that 3 of the 4 models of the integrated home-based care services are accredited to provide medical services and contract medical visits from NHIC. Not less important is the fact that the 3 models render services for a period of 3 months (with the possibility to extend it up to 6 months or 1 year), which enables a rotation of the beneficiaries and delivery of services to a larger number of people requiring these services. In the favor of the integrated models are also the ways of fund allocation as well as the cost of the provision of services, which is lower, compared to the delivery of two separate components.

Peculiarities of the **model A-integrated** consists in the team of medical experts providing a limited range of social services. The services are delivered most often at the community level, sometimes in several villages from the district. **Model B-integrated** implies a team of social workers and medical assistants, providing services in district, but has no accreditation for the medical services rendered, respectively has no financing from NHIC, relying exclusively on the non-reimbursable external funds. This model stands out by offering the widest range of social services. We also point out that services are provided for an unlimited period of time. **Model C-integrated** implies a larger team of experts if compared to **models A and B-integrated**, based on the financial participation of LPA for the provision of services, including on a contribution from the beneficiary and renders regionally-based services. **Model D-integrated** implies the largest team of specialists (medical assistant, jurist, psychologist) providing services regionally.

The main conclusion of the research is that the Republic of Moldova should define the position of home-based care services in the whole health and social system and the level of integration that should medical and social services achieve. Home-based care services should be placed as an intersection between the health care system and the social system or fully integrated. At this stage, it is necessary for the Ministry of Health, Labour and Social Protection to decide what organizational model will be chosen for the Republic of Moldova for the next decades as each of the models requires deeper reforms in other sphere of governance.

The assessment data allows us to come with some **recommendations** for the Ministry of Health, Labour and Social Protection representatives and other government authorities responsible for health and social policy development, LPA, but also home-based care providers: (i) to develop integrated home-based care services and a regulatory basis for this purpose, including a mechanism for cooperation between healthcare institutions, social services and CSOs to provide integrated services; (ii) to develop standard job descriptions that would outline the responsibilities of medical assistant and social worker in providing home-based care services; (iii) to develop policies for providers contracting visits for medical home-based care to meet the needs for these services at the national level; (iv) to continue partnerships with LPA and home-based care service providers; (v) to promote volunteering among home-based care service providers; (vi) to improve the access of vulnerable people to home-based care services by changing the Regulations on social home-based care services, to provide services to the elderly whose children live in other localities but have a poor family situation and are unable to help their parents.

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THE BARRIERS TO SOCIAL INCLUSION OF PEOPLE WITH DISABILITIES IN THE REPUBLIC OF MOLDOVA

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The social inclusion of people with disabilities is a current area of research. This group of people continues to be marginalized and excluded from the society's life. This situation is determined by the high level of discrimination and stigmatization, unequal opportunities, physical and attitudinal barriers that predominate in society. More than one billion people with disabilities worldwide, accounting 15% of the world's population, face social inequality and the authorities' limited capacities to respond to the needs of the persons with disabilities. In the European Union, about 80 million people live with disabilities and in the Republic of Moldova about 182.0 thousand people, which represent about 5% of the country's population. This study aims to analyse barriers to social inclusion of people with disabilities from the Republic of Moldova from the perspective of social roles valorisation. The sociological research methods used in this study are statistical data analysis, documentary analysis; sociological survey based on the questionnaire; the focus group; in-depth interview and sociological observation. The main barriers to social inclusion faced by people with disabilities in the Republic of Moldova are: low living standards compared to the general population, non-observance of the general accessibility principle, limited access to social services, education, health and very low participation of people with disabilities on the labour market. Analysis of social inclusion issues identified through research on the views of people with disabilities, service providers and experts will help strengthen the mechanisms for evaluating, monitoring and improving social inclusion policies.

Keywords: *social inclusion, exclusion, disability, social policies, inclusion issues, accessibility, participation, non-discrimination, institutional mechanisms.*

Incluziunea socială a persoanelor cu dizabilități constituie un domeniu actual de cercetare. Acest grup de populație continuă să fie marginalizat și exclus de la viața societății. Situația dată este determinată de nivelul înalt al discriminării și stigmatizării, oportunităților inegale, barierelor fizice și atitudinale care predomină în societate. La nivel mondial, peste un miliard de persoane cu dizabilități, ceea ce constituie cca 15% din populația lumii se confruntă cu probleme de inechitate socială și incapacitatea autorităților de a răspunde nevoilor. În Uniunea Europeană, circa 80 milioane de persoane trăiesc cu dizabilități, iar în Republica Moldova sunt circa 182.0 mii persoane, ceea ce constituie aproximativ 5% din populația țării. În acest articol sunt prezentate rezultatele cercetării barierelor de incluziune socială a persoanelor cu dizabilități din Republica Moldova din perspectiva valorizării rolurilor sociale. Metodele de cercetare sociologică utilizate la realizarea acestui studiu sunt: analiza datelor statistice, analiza documentară; ancheta sociologică în bază de chestionar; metoda focus-grupului; metoda interviului aprofundat și observația sociologică. Principalele probleme și bariere ale incluziunii sociale cu care se confruntă persoanele cu dizabilități din Republica Moldova sunt: nivelul de trai scăzut comparativ cu populația generală, nerespectarea principiului general al accesibilității, accesul limitat la servicii sociale, educaționale, de sănătate, și participarea foarte scăzută a persoanelor cu dizabilități pe piața muncii. Analiza problemelor incluziunii sociale identificate în urma cercetării opiniilor persoanelor cu dizabilități, ale prestatorilor de servicii și ale experților va contribui la consolidarea mecanismelor de evaluare și îmbunătățire a politicilor de incluziune socială și la consolidarea mecanismelor instituționale de monitorizare a politicilor de incluziune socială.

Cuvinte-cheie: *incluziune socială, excluziune, dizabilitate, bariere ale incluziunii, oportunități, accesibilitate, participare, nediscriminare, mecanisme instituționale.*

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Социальная инклюзия людей с ограниченными возможностями является актуальной областью исследований. Эта группа людей продолжает оставаться маргинализованной и исключенной из жизни общества. Эта ситуация определяется высоким уровнем дискриминации и стигматизации, неравными возможностями, физическими и поведенческими барьерами, которые преобладают в обществе. Более одного миллиарда людей с ограниченными возможностями во всем мире, что составляет около 15% населения, сталкиваются с социальным неравенством и недостаточным действием властей по удовлетворению их потребностей. Около 80 миллионов человек с ограниченными возможностями живут в Европейском Союзе, а в Республике Молдова около 182,0 тысяч человек, что составляет около 5% населения страны. Целью данного исследования является анализ барьеров в социальной интеграции людей с ограниченными возможностями в Республике Молдова через призму повышения их социальных ролей в обществе. Методы социологического исследования, используемые в этом исследовании: статистический анализ данных, документальный анализ, социологический опрос на основе анкетирования; фокус-группа; углубленное интервью и социологическое наблюдение. Основные проблемы и препятствия для социальной интеграции, с которыми сталкиваются люди с ограниченными возможностями в Республике Молдова являются: низкий уровень жизни по сравнению с населением в целом, несоблюдение принципа общей доступности, ограниченный доступ к социальным услугам, образованию, здравоохранению и очень низкий уровень участия людей с ограниченными возможностями на рынке труда. Анализ проблем социальной интеграции, выявленных в результате исследований у лиц с ограниченными возможностями, поставщикам услуг и экспертам, поможет укрепить механизмы оценки, мониторинг и совершенствования политики социальной интеграции.

Ключевые слова: *социальная интеграция, исключение, ограниченные возможности, проблемы интеграции, доступность, участие, недискриминация, возможности и ресурсы, институциональные механизмы.*

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Relevance of the research. The social inclusion of people with disabilities is a relevant area of research. This group of people is still marginalized and excluded from the life of the society. This situation is determined by a high level of discrimination and stigmatization, unequal opportunities, physical and attitudinal barriers that predominate in the society. At the same time, people with disabilities face the highest rate of poverty, they have shortages and the lowest incomes in comparison with the rest of population. The poverty has a direct impact upon their health condition, participation and accomplishment of their social roles, leading to their exclusion and auto-exclusion. Out of the overall number of people with disabilities in the Republic of Moldova, approximately 2000 people still live in residential institutions.

At the global level, over a billion of people with disabilities, representing 15% of the world's population, face problems of social inequity and the authorities' incapacity to satisfy their needs. Approximately 80 million people in the European Union have disabilities [7, p. 3]. At the same time, there are almost 182.0 thousand people with disabilities in the Republic of Moldova; it constitutes nearly 5% of the population of the country [17]. In the Republic of Moldova, the lower rate of people with disabilities compared with the rate at the European and global level can be explained by the differences in the groups included in the statistical data. Thus, the data regarding people with disabilities in the Republic of Moldova does not include pensioners of age limit with disabilities, people with disabilities who benefit from the state complete support, children between 0 and 3 years old and people with disabilities who have no certificate of determining disability and working capacity. If the statistical data also included these groups of people, the rate of people with disabilities in the Republic of Moldova would be much higher that it actually is.

The social inclusion of people with disabilities in the Republic of Moldova became a priority for the Government, being stipulated in the Action Plan for implementing the Association Agreement between the Republic of Moldova and the European Union. In the same direction the State has assumed this responsibility when ratifying the UN Convention on the Rights of Persons with

Disabilities in 2010 [5]. However, neither the people with disabilities, nor the service providers in the domain do not observe some significant changes of the situation. The State, having these responsibilities and being under the society pressure, started to develop certain policies related to the social inclusion of people with disabilities. The UN Committee has observed that the medical approach of disability still predominates in the Republic of Moldova; the policies related to social inclusion are approached sectorial and considered to be the responsibility of the Ministry of Health, Labor and Social Protection without any clear mechanisms of coordination between all governmental institutions [19].

The relevance of the research domain results, also, from the fact that the stigmatizing and discriminatory attitudes towards the people with disabilities, along with inaccessibility and lack of services at the community level, predominate in our society. Even though there is a developed and approved policy framework in certain domains. These policies are not so easy to implement because the reforms do not have the necessary financing, as well as because of low level of informing and awareness about the problem by the central and the local public authorities, the private institutions, the civil society and the general population.

The goal of this paper is to analyse the barriers of social inclusion of people with disabilities and the degree of implementing the social policies elaborated in the last years and issuing practical recommendations in order to improve the institutional mechanism of developing, implementing and monitoring the current framework of policies that shall comprise all aspects of social inclusion.

The degree of scientific approach of the domain of research. The theoretical and methodological background of the research is represented by the fundamental sociological theories. According to the structural-functionalist theory (A. Compte, E. Durkheim, M. Weber), a society represents a functioning social system that offers to its members opportunities of social inclusion by eliminating the barriers. The theory of stigmatization (E. Goffman) stipulates that an unusual attribute or stigma of a person may underline him and cause other society members' separation from him. The theory of social role valorisation (W. Wolfensberger) that forms the theoretical and scientific basis of substantiating the concept of disability and determining the model of disability approach through the prism of attributing valuable social roles to people with disabilities is very important for investigating the barriers of inclusion [20]. At the same time, the social inclusion of people with disabilities was analysed from the perspective of specific theories applied in the practice of social assistance (theory of care, theory of attachment, theory of participation) described by M. Bulgaru and M. Dilion in the work *Concepte fundamentale ale asistenței sociale* [2].

At the European Union level, the researches carried out by A. Lawson [10] and L. Gronvik [8] address the social inclusion barriers faced by the people with disabilities in different areas of interest negotiated with the Council of Europe and with the authorities of the member states. The main domains of research are the following: accessibility, access of people with disabilities to the services of support for their independent life in the community, inclusive education, employment, monitoring the social inclusion policies at the European Union level according to the EUROSTAT indicators etc.

In Romania, the issues of social inclusion represent a domain of research for D. Arpinte [1], L. Manea [15] and M. Preda [16], who analyse the indicators of monitoring the groups with an increased risk of social exclusion. According to this analysis, the recommendations for social policies focused on evidence and needs are elaborated.

In the Republic of Moldova, L. Malcoci [13,14], M. Vremeș, D. Vaculovschi, V. Craevschi-Toartă [18] studied initially the process of inclusion as an answer to the social exclusion situations and afterwards analysed the process of inclusion of disadvantaged groups, as well as the problems faced by them in the process of social inclusion.

It is worth mentioning that most of the researches from the domain focus on certain aspects of inclusion. There are no comprehensive sociological researches that address all aspects of social inclusion of people with disabilities from the perspective of social role valorisation taking into account the opinions of people with disabilities, service providers and experts from the domain.

Methodology of research. In order to study the barriers of social inclusion of people with disabilities from the Republic of Moldova we used a methodology on a representative sample at the national level that allows carrying out a multidimensional research. It were used the sociological

survey based upon the questioning of 1108 people with disabilities who live in families; 59 interviews with people with intellectual disabilities who live in residential institutions; 20 in depth interviews with experts in the field and 5 focus group discussion with participation of 43 representatives of social services providers. The methods of sociological research used while carrying out this study are the following: statistical data analysis; documentary analysis; sociological survey based upon a questionnaire; focus group method; in-depth interview and the sociological observation. The research period is 2017-2018 years.

Results of research. This compartment of the study includes the analysis of the process of social inclusion of people with disabilities by identifying the barriers that influence their living standard and their full participation in the social life based upon the general principle of accessibility, the access to social, educational and healthcare services and their presence on the labour market.

Approximately 31% of the interviewed people with disabilities, in comparison with 47% of the general population, mentioned that the income they disposed of was enough only to cover their absolute necessities. Only 4% of the interviewed people with disabilities, in comparison with 17% of the general population, mentioned that the income they disposed of was enough for a decent living standard, without expensive things. Only 1% of the interviewed people with disabilities, in comparison with 5% of the general population, mentioned that the income they disposed of was enough for a decent living standard, as well as for expensive things [9].

The rate of people who have mentioned that their income does not cover even their absolute necessities is higher among the unemployed people with disabilities (72%), people with lower level of education (71%) and people with mental disabilities (75%) [17, p. 21].

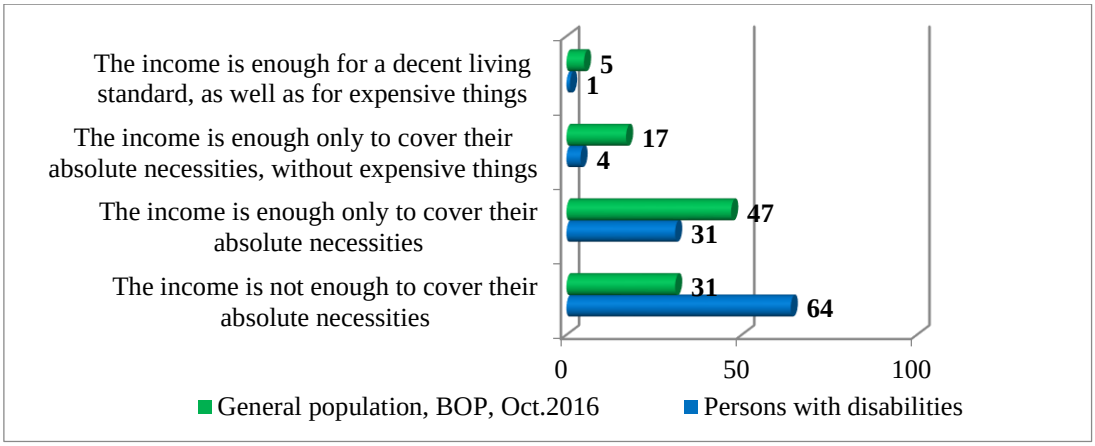

Figure 1. Perceptions of the people with disabilities and the general population about the income they dispose of, %

Source: Malcoci L., Munteanu P. Studiu sociologic: Incluziunea socială a persoanelor cu dizabilități [14, p. 19].

The reduced incomes of people with disabilities limit their access to various goods and services, firstly, to the strictly necessary ones: clothes, shoes, food, drugs, water, heating and sewerage services. The results of field research show that the people with disabilities are able to cover fully or to a large extent only the monthly expenditures for electricity, water, sewerage and telecommunications (phone, TV, Internet). Fewer people afford paying for heating, transport, drugs, vegetables and fruits. Even a smaller number of people can purchase with their income clothes, shoes, meat or dairy products. Almost nobody can afford a holiday with the family once in a year, new furniture and new home appliances, or pay for the recovery and rehabilitation services. At the same time, the low incomes of people with disabilities are enough neither for creating normal living conditions, nor for ensuring the minimum consumption basket.

According to the results of the research, we can conclude that the living standard of the people with disabilities, apart from the income, living conditions and the access to utilities, depends very much upon the support received by the person from the loved ones and upon the relationships with

them built through the years [14]. *"The life of a person with disabilities depends very much upon the support group he has at the levels of family, community and society. The larger the group of support, the more intense the life is and the more various the social roles acquired by the person are. An active life means inclusion"* [in-depth interview with a person with disabilities].

The most of service providers and experts from the domain have mentioned that there is a significant connection between the living standard and the social inclusion of people with disabilities. The small and non-diversified incomes are the main cause of the low living standard. The public authorities do not pay an increased attention to studying and evaluating the living standard of people with disabilities. This is the reason why the policies of social inclusion do not provide specific measures for improving the situation. The National Bureau of Statistics so far does not calculate the monthly consumption basket for people with disabilities. However, it is a very important criterion in evaluation and investigation of the living standard. The experts from the domain consider that one of the barriers that prevent determining the minimum consumption basket is the fragmentation of allowances for people with disabilities, depending on their contribution to the budget of social insurances, the disability type and its degree of severity. This fragmentation of social allowances for people with disabilities creates *"confusions in the process of their management among officials as well as among people with disabilities, without any real impact on their well-being"* [in-depth interview with an expert from the Ministry of Finance]. Besides that, the amount of social allowances is miserable in comparison with the minimum consumption basket and the state does not take any measures for their increase because of the lack of financial resources.

The research results highlight the fact that the living standard of the people with disabilities contributes directly to the process of social inclusion. Thus, the process of social inclusion of people with disabilities is longer and more difficult because the households where at least one family member has a disability, still have a disadvantage in comparison with the households without people with disabilities. The people with disabilities represent the group with the lowest incomes in comparison with the general population. Their income is equal to approximately 40% of the value of the minimum consumption basket; the rate of people with disabilities who are not able to cover their absolute necessities is twice as high as the same rate among the general population.

This study also investigates the inclusion barriers faced by people with disabilities depending upon a set of indicators, namely: the general principle of accessibility, the access to social, educational and healthcare services and the presence of people with disabilities on the labour market.

From the perspective of accessibility, the social inclusion of people with disabilities highlights the problems, which prevent the people with disabilities to live independently and to fully participate in all life aspects. The Convention, as well as the Law on social inclusion of people with disabilities, defines accessibility as a set of measures which comprises identifying and eliminating the obstacles and the barriers to the full access, in equal terms with the others, to physical environment, transport, information and means of communication, including the IT and communication technologies and systems, as well as to other facilities or services opened and offered to public in urban and rural areas [12].

The analysis of legal and normative documents that regulate ensuring accessibility conditions for people with disabilities in the Republic of Moldova shows that a set of normative documents with the content based upon the Law on social inclusion of people with disabilities has not been elaborated yet. The set lacks the following documents: the national policy of reasonable accommodation; the norms of reasonable accommodation; the standards of transport accessibility and the minimum requirements for universal design. Every third person with disabilities questioned during the research considers that the absence of accessibility is one of the main reasons why the people with disabilities feel completely or partially isolated from their community [14, p. 40-41].

The results of the performed analysis show that so far there is no policy document describing the main measures and requirements in order to ensure accessibility in conformity with the principles of reasonable accommodation and universal design. In comparison to the social inclusion practices in the EU member states, depending upon the principle of accessibility, the Republic of Moldova is very poor at the level of legal and normative regulations, as well as at the practical level of ensuring accessibility. For these reasons, the absence of accessibility represents one of the main problems of the social inclusion process.

The investigation of social inclusion with respect to the access of people with disabilities to social services was approached being based on the Law No. 123 from June, 23, 2010 on social services. According to this law, people with disabilities from the Republic of Moldova may have access to different types of social services: primary specialized and highly specialized. Mostly, the primary social services are provided at the community level, but the specialized and highly specialized services are provided at the level of district, region or republic [11].

During the research, we analysed the system of social services provided from the public resources and found that approximately 24 types of social services for all groups of population are financed from the state budget and from the budgets of the administrative territorial units. The people with disabilities are eligible for 14 types of social services. The regulatory framework of creating and functioning of the last 7 types of social services was developed with the support from the civil society organizations after the Convention had been ratified. Despite the fact that innovative social services for people with disabilities were developed in the last years, the participants in the research (questioned people with disabilities and experts) mentioned that these services were unevenly developed, were not sufficient and did not meet all special needs of people with disabilities. Only 23% of the questioned people with disabilities mentioned that in comparison to 2010 there are more social services for people with disabilities at the level of community and district, 63% mentioned that they did not see any difference and 14% of the respondents could not give an answer. The analysis of the system of the services developed by the local public authorities highlighted the fact that some administrative territorial units do not have any type of specialized social services. The people with disabilities from these communities have access only to services provided by the community social worker. Every third person with a disability questioned during the research considers that the absence of social services is one of the main reasons why the people with disabilities feel completely or partially isolated from the community [14, p. 40-41].

In the opinion of experts, there is no national mechanism of coordinating the development of social services at the level of administrative territorial units based upon the individual needs and evidences. Most of specialized social services are developed in collaboration with non-governmental organizations and financed by donors in the districts where the public authorities are more open to pilot new services. In these conditions, some essential risks appear: (a) in the districts where the local public authorities are more reluctant to social services, the people with disabilities have no possibility to access services in conformity to their needs; (b) in the districts where more services are developed as soon as the district authorities and their priorities change, the sustainability of some social services can be exposed to a major risk.

The experts have also mentioned that in some cases the social services are developed without having initially a strategy of ensuring the financial sustainability. Many services do not have regulations on functioning and standards of quality and, as a result, cannot be accredited. According to experts' opinion, *"if the social services are managed by the local public authorities and depend upon the amount of local financing, people with disabilities will still have a limited and unfair access to social services. The service of personal assistance is an eloquent example in this context. Even though this service is very necessary for the people with severe disabilities, who need a continuous care, the capacity of local authorities to allocate resources in order to increase the number of personal assistants is reduced because of the budgetary austerity"* [in-depth interview with an expert from the Ministry of Health, Labour and Social Protection].

The investigation of social inclusion of people with disabilities from the perspective of education was focused on the identification of the barriers to access to educational services by analysing the services of support for inclusive education; by determining whether there are services of support for the period of transition of people with disabilities from one level of education to another, and by analysing the policies and practices of inclusive education. Regarding the access to education of children with disabilities, the regulatory framework of the Republic of Moldova [4] includes provisions related to the equality of opportunities to access to education for all children. The Republic of Moldova is a signatory to the Convention of the Rights of the Child and the Convention on the Rights of Persons with Disabilities. Both of these documents support that political engagement should ensure the opportunities and the access to a high-quality education for all children, including children with disabilities.

In this context, the authorities had to face the following barriers: lack of support services for children with severe disabilities, as well as for children with sensory disabilities; lack of social services for children with disabilities; lack of legal framework in order to ensure the financing of the supporting

services for inclusive education; the lack of statistical data that may serve as a basis for planning the programs. This fact makes it necessary to map the support services [3, p. 23-24].

The inclusion of the people with disabilities in educational institutions is conditioned by the general policies of education promoted at the national and at the local level. It is worth mentioning that the incomes and the residence of people with disabilities influences the opportunities to continue their studies after graduating from a secondary school or a lyceum. According to the results of the research, the people with disabilities from rural area plead mostly for professional studies, while those from urban area plead for continuing their studies at colleges and universities. It can be explained by the better access of the people with disabilities from urban areas to studies and employment in comparison to those from rural areas. The analysis of the results, open interviews and discussions from the focus groups highlights the fact that the problem of respecting the right to education of the people with disabilities in institutions of professional studies and higher education is still relevant despite the public authorities' policies aimed to ensure the inclusive education.

According to experts, Moldova registered positive changes in the domain of inclusive education in comparison with 2010. However, there is still a lot to do; the process of inclusion in general education is still quite difficult. At the same time, the experts mentioned that there were almost no changes related to inclusive education in professional and secondary specialized studies. They say that the secondary professional and specialized education is not attractive enough, being too expensive for the state.

The research of social inclusion of people with disabilities with respect to their access to healthcare services highlights the fact that the services of primary, specialized and hospital medical care are not fully provided to people with disabilities. One of the main challenges is related to the reduced degree of accessibility of healthcare services determined by the lack of adapted infrastructure of medical institutions, especially in rural areas. Even though the people with disabilities benefit from a free medical insurance from the system of medical insurances, they receive partially or do not receive at all some necessary drugs, because these expenditures are not covered from the state funds of medical insurances. Thus, the results of the research of social inclusion of people with disabilities show that 69% of the questioned people with disabilities have access to healthcare services in equal measure with other citizens, 10% consider that they have more benefits related to the access to healthcare services in comparison to the others and 18% of the respondents think that they have fewer possibilities to access medical services.

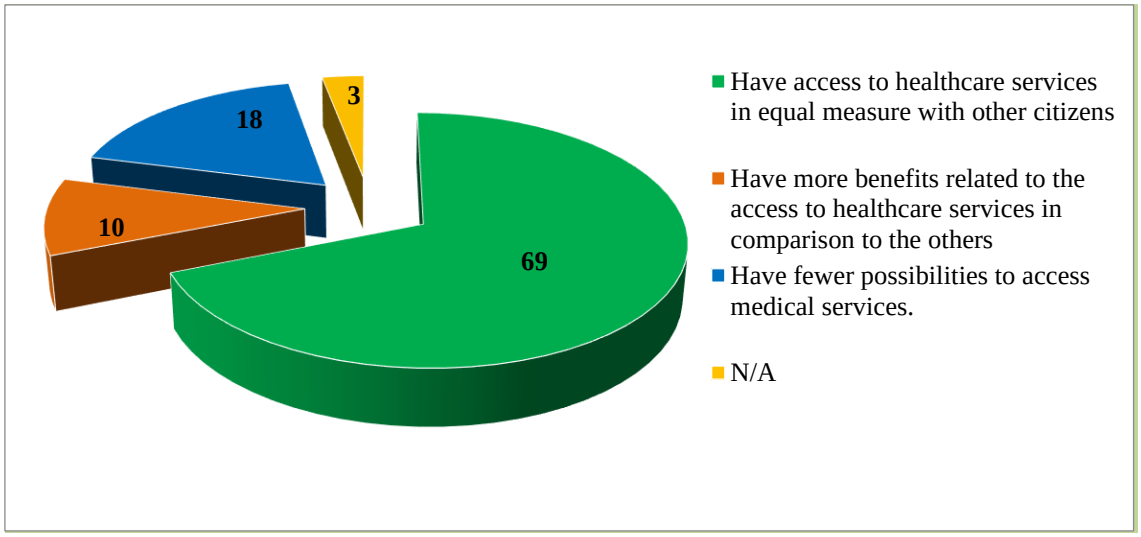

Figure 2. Respondents' opinions regarding their access to social services, %
Source: Malcoci L., Munteanu P. Studiu sociologic: Incluziunea socială a persoanelor cu dizabilități [14, p. 36].

The results of the qualitative research carried out according to the experts' opinions about the social inclusion with respect to the access of people with disabilities to healthcare services highlighted many barriers faced by people with disabilities during the access to healthcare services. One of these barriers refers to the impossibility of the people with severe mobility disabilities to benefit at home

from services of specialized medical assistance. On the one hand, these people are able to go to medical institutions; on the other hand, the medical institutions do not have conditions of physical accessibility for wheelchairs and for appointment to the specialists (neurologist, cardiologist etc.) who may go home to people with severe disabilities.

The reduced access of people with disabilities to free services of prosthetics, rehabilitation and recovery justified by the experts with insufficiency of resources allocated by the public local authorities leads to inclusion problems caused by the reduced mobility of people with disabilities. Thus, the research results demonstrate that the access of people with disabilities to healthcare services represents one of the pillars of the social inclusion process at all levels. The problems that prevent the process of social inclusion in the domain of healthcare are the following: absence of physical accessibility and of modern medical equipment accessible for everyone, limited access to free healthcare services and compensated drugs, inefficient collaboration between medical institutions of all levels, as well as between medical institutions and those of social protection and assistance.

The research of social inclusion with respect to participation of people with disabilities in the labour market aims to identify and analyse the problems faced by people with disabilities regarding their employment. The level of workforce employment decreases continuously. The working population leaves abroad because the jobs in Moldova are not well paid. Those who do not leave prefer either not to work, benefitting from remittances from abroad or from social allowances. When the lack of qualified workforce becomes an important constraint for employers, the employment policies should be oriented inclusively towards promoting employment services among people with disabilities.

The valorisation of experience of people with disabilities accumulated in a non-formal and an informal context represents an essential factor for ensuring the access of the person to work. It is worth mentioning that 78% of people with moderate or accentuated disabilities graduated from at least one educational institution. Every fourth person out of them graduated from a professional school; it is an advantage for the labour market because there are major problems related to lack of human resources or large fluctuation of employees. Besides that, around 67% of the respondents involved in the research have mentioned that they are not employed now but have been employed before. Most of them left their job because of disability, because they did not have the necessary support for adapting the workplace, or in order to be able to benefit from social allowances, although keeping the job does not affect in any way the person's right to disability allowances, others were fired by their employers because of their disabilities.

The results of the research highlight several problems that prevent ensuring the right to work of people with disabilities: reduced level of information; lower self-esteem and motivation of people with disabilities; the problem of professional training and qualification; reduced quality of secondary professional education, secondary specialized education or higher education that contributes directly to enlarging or narrowing the possibilities of employment.

General conclusions and recommendations. The main problems of social inclusion faced by the people with disabilities from the Republic of Moldova are the following: the decreased living standard in comparison to general population; the infringement of general principle of accessibility; the limited access to social, educational and healthcare services and a very low participation of people with disabilities in the labour market.

The living standard, as an important dimension of the process of social inclusion of people with disabilities, denotes the existence of social inequalities in comparison to the general population; it has a negative influence upon the process of social inclusion. This aspect of inclusion highlights the problems preventing people with disabilities from having a decent living standard. In order to overcome the barriers of social inclusion faced by people with disabilities, according to the results of the research, **a set of recommendations** is suggested to the authorities:

1. **To improve the system of social welfare of people with disabilities by** revision of the way of calculating and offering social allowances in line with individual needs for fulfilling the social roles; delimitation of money amounts that may be considered sources of income from the social allowances offered for care. Estimation by the National Bureau of Statistics of the minimum consumption basket for people with disabilities depending upon: the degree of severity of disability (severe, accentuated, and moderate) and the employment status (employed, unemployed).

2. **To increase the access of people with disabilities to education, including the vocational one, by** development of support services in all educational institutions in order to increase the access to studies for people with disabilities. Development of continuous training programmes, including programmes of learning at home for adults with disabilities; improvement of services of professional re-qualification for the people who got their disability during the life.

3. **To increase the access of people with disabilities to healthcare services by** including some specialized medical services (consultations of neurologist, cardiologist, psychiatrist, orthopaedist etc.) at home for the people with severe mobility disabilities into the set of medical services covered by the National Company of Medical Insurances. Revising the list of compensated drugs; ensuring the accessibility of medical infrastructure and informational materials for people with all types of disability.

4. **To increase the access of people with disabilities to social services by** developing public policies in the domain of disability on the basis of evidence and evaluation of the social impact. Empowering the local and national public authorities in the context of ensuring the rights of people with disabilities to benefit from social services depending upon their needs. Re-evaluating the current system of social services and modifying it in conformity with the present needs of the people with disabilities. Revising the mechanism of financing the social services and the staff structure from the perspective of social role valorisation of people with disabilities.

5. **Increasing the employment of people with disabilities by** strengthening active measures of stimulation of the workforce employment. Elaborating, approving and applying a mechanism of creation, reservation and keeping the workplaces in line with the provisions of the Law on social inclusion of people with disabilities. Elaborating mechanisms of stimulation and subsidisation of the employers who have additional expenditures for reasonable accommodation of the workplaces reserved for people with disabilities. Promoting practices of supported employment piloted by the civil society organizations at the national level.

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CLUSTERING OF UKRAINIAN REGIONS BASED ON VALUE ORIENTATIONS AND POLITICAL CHOICE OF THE POPULATIONS: METHODOLOGICAL RATIONALE AND ANALYSIS USING COMBINING DATA SOURCES

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The aim of this study is clustering of administrative-territorial units of Ukraine on the basis of value orientations and the electoral choice of the population of these units. The k-means method is used. Creation of macroregions based on the political orientations of the population is quite widespread, but such approaches have a number of limitations, primarily due to the fact that the list of political leaders or political parties can change significantly in rather short periods of time and because of difficulties with using of several political parties/leaders simultaneously in the analysis. The «value» in this article is defined within Schwartz's theory as desirable goals that go beyond specific situations, differ in importance from each other and are guiding principles in human life. The analysis uses the ten Schwartz's values, which are grouped into four dimensions: «Conservation», «Self-Enhancement», «Self-Transcendence» and «Openness to Change». The data set for this study is a combination of two sources of data – sample survey and electoral statistics. Thus, the data set in this study is formed by a combination of the results of the Ukrainian vote in the Parliamentary elections in 2012 and sample survey – European Social Survey – the latest wave of which was held in Ukraine in 2012. The European Social Survey is the most actual source of data on the value orientations of Ukrainians which is in free access. After 2012 this study in Ukraine was no longer conducted. The main result of this study is the creation of clusters of administrative-territorial units based on the similarity of the results of voting and value orientations of population in these units. The first cluster includes administrative-territorial units, where population has more expressed values of Self-transcendence than in Ukraine as a whole. In the second cluster there are units where population has more expressed values of Self-enhancement and Openness to change. The third cluster is characterized by more expressive values of Self-transcendence and Conservation. Except of different levels of expression values, clusters differ by the level of support of political parties that participated in Parliamentary elections. This approach allows evaluate the received cluster structure in dynamics, use in analysis results of national and local elections in different years. Also it makes clustering space two-dimensional, which enables not only to discover similar administrative-territorial units, but also, for example, to identify groups of parties whose supporters share similar values. Although the article uses data from 2012, the successful application of this approach to the clustering of administrative-territorial units opens up the ways for such clustering on more recent data.

Keywords: *value, value orientations, political orientations, electoral choice, Schwartz value theory, cluster analysis, k-means.*

Scopul acestui studiu este gruparea unităților administrativ-teritoriale din Ucraina pe baza orientărilor de valoare și a alegerii electorale a populației acestor unități. Se folosește metoda k-means. Crearea macroregiunilor bazate pe orientările politice ale populației este destul de răspândită, însă astfel de abordări au o serie de limitări, în primul rând datorită faptului că lista liderilor politici sau a partidelor politice se poate schimba semnificativ în perioade scurte de timp și din cauza dificultății de a folosi mai multe politici părțile / liderii în analiză în același timp. «Valorile» din acest articol sunt definite în conformitate cu teoria lui S. Schwartz ca scopuri dorite care depășesc situațiile specifice, diferă una de cealaltă în grade de importanță și sunt principii directoare în viața umană. Analiza folosește cele zece valori Schwartz, grupate în patru sectoare de valoare: «Conservarea», «Afirmarea de sine», «Grijă pentru oameni și natură» și «Deschiderea spre schimbare». Matricea datelor pentru acest studiu este o

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combinaţie a două surse de date – un sondaj prin sondaj şi statistici electorale. Astfel, datele stabilite în acest studiu se formează prin combinarea rezultatelor votării populaţiei Ucrainei în alegerile parlamentare din 2012 şi printr-un sondaj prin sondaj – Cercetarea Socială Europeană – ultimul val de care sa desfăşurat în Ucraina în 2012. Cercetarea socială europeană este cea mai relevantă sursă de date privind orientările valorice ale ucrainenilor, care este disponibilă în mod liber. După 2012, acest studiu în Ucraina nu mai era efectuat. Principalul rezultat al acestui articol este crearea de grupuri de unităţi administrativ-teritoriale bazate pe similitudinea rezultatelor voturilor şi a orientărilor valorice ale populaţiei în aceste unităţi. Primul grup include unităţi administrativ-teritoriale, unde populaţia are valori mai pronunţate de «Grijă pentru oameni şi natură» decât în întreaga Ucraina. În cel de-al doilea grup, există zone în care populaţia are valori mai pronunţate de «Afirmarea de sine» şi «Deschiderea spre schimbare». Al treilea cluster se caracterizează prin valori mai pronunţate ale «Grijă pentru oameni şi natură» şi «Conservarea». Pe lângă diferitele niveluri de exprimare a valorilor, grupurile diferă în ceea ce priveşte nivelul de sprijin pentru partidele politice care au participat la alegerile parlamentare. O astfel de abordare face posibilă evaluarea structurii clusterului obţinută în dinamică, folosirea în analiză a rezultatelor alegerilor naţionale şi locale pentru anii diferiţi. De asemenea, ca urmare a aplicării acestei abordări, spaţiul clusterului devine bidimensional, ceea ce permite nu numai găsirea unor unităţi administrativ-teritoriale similare, dar şi, de exemplu, identificarea grupurilor de părţi ale căror suporteri împărtăşesc valori similare. Începând cu anul 2012, succesul a fost folosit pentru a facilita accesul la clasificări administrativ-teritorială a unităţilor din perspectiva desfăşurării unor astfel de clasificări ale bolilor noi.

Cuvinte-cheie: *valori, orientări de valoare, orientări politice, alegeri electorale, teoria valorii lui Schwarz, analiză cluster, k- means.*

Целью данного исследования является кластеризация административно-территориальных единиц Украины на основе ценностных ориентаций и электорального выбора населения этих единиц. Используется метод k-means. Создание макрорегионов на основе политических ориентаций населения довольно широко распространено, но такие подходы имеют ряд ограничений, в первую очередь из-за того, что список политических лидеров или политических партий может значительно измениться за довольно короткие периоды времени и из-за трудности с использованием нескольких политических партий/лидеров в анализе одновременно. «Ценности» в этой статье определяются согласно теории Ш. Шварца как желаемые цели, которые выходят за рамки конкретных ситуаций, отличаются друг от друга по степени важности и являются руководящими принципами в жизни человека. В анализе используются десять ценностей Шварца, которые сгруппированы в четыре ценностные секторы, а именно: «Сохранение», «Самоутверждение», «Забота о людях и природе» и «Открытость к изменениям». Массив данных для этого исследования является комбинацией двух источников данных – выборочного исследования и электоральной статистики. Таким образом, массив данных в этом исследовании формируется путем объединения результатов голосования населения Украины на Парламентских выборах 2012 года и выборочного опроса – Европейского социального исследования – последняя волна которого была проведена в Украине в 2012 году. Европейское социальное исследование является наиболее актуальным источником данных о ценностных ориентациях украинцев, которое находится в свободном доступе. После 2012 года это исследование в Украине больше не проводилось. Основным результатом данной статьи является создание кластеров административно-территориальных единиц на основе схожести результатов голосования и ценностных ориентаций населения в этих единицах. Первый кластер включает в себя административно-территориальные единицы, где население имеет более выраженные ценности «Заботы о людях и природе», чем в целом по Украине. Во втором кластер входят территории, где население имеет более выраженные ценности «Самоутверждения» и «Открытости к изменениям». Третий кластер характеризуется более выраженными ценностями «Заботы о людях и природе» и «Сохранения». Помимо разных уровней выраженности ценностей, кластеры различаются по уровню поддержки политических партий, которые участвовали в Парламентских выборах. Такой подход позволяет оценивать полученную кластерную структуру в динамике, использовать в анализе результаты

общенациональных и местных выборов за разные годы. Также, в результате применения данного подхода, кластерное пространство становится двумерным, что позволяет не только обнаружить похожие административно-территориальные единицы, но и, например, выявить группы партий, сторонники которых разделяют схожие ценности. Хотя в статье использованы данные 2012 года, успешное применение данного подхода к кластеризации административно-территориальных единиц открывает перспективы для проведения подобной кластеризации на более новых данных.

***Ключевые слова**: ценности, ценностные ориентации, политические ориентации, электоральный выбор, теория ценностей Шварца, кластерный анализ, k- means.*

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Introduction. Creation of macroregions on the basis of administrative-territorial units is quite common among sociological researches. The basis for clustering may be different, but the resulting cluster structure gives the researcher a new variable – «macroregion», which can be used in a variety of explanatory and predictive models. It's no exception for political orientations and electoral choice: these variables quite often are used in approaches to regionalization of the territory based on the political preferences of the population or on the results of voting at national or local elections. With this approach, the «macroregion» can serve as a powerful explanatory variable in electoral models, and it is possible to predict the electoral choice of the population through the regional structure of political preferences.

The approach to regionalization of the territory of Ukraine on the basis of political orientations has been widespread for many years among Ukrainian sociologists. In fact, based on the results of several Parliamentary and Presidential elections, it is indeed possible to see a certain division into regions based on electoral choices. Certain stereotypes concerning voting in different regions of Ukraine are repeatedly broadcast in the mass media and in scientific publications. But nowadays there are more and more ideas about the artificial construction of such a regional division. The simplified understanding of the division of Ukraine into two split regions (Western and Eastern) is used not as an explanatory variable in scientific research, but in order to manipulate public opinion. For example, the clear segmentation of the electoral space of Ukraine on the basis of civilizational and, consequently, foreign policy characteristics, was first used as a mobilization electoral technology during the 2004 Presidential campaign [12, p.291]. The basis of many studies of the relationship between political orientations and the place of residence of the population is the concept of «regional identity». The main assumption here is about existence of a certain regional identity that can be more powerful than, for example, national or ethnic. And identity affects the range of orientations, attitudes and preferences of the population living in these territories. Within this approach, the term «regional voting» is often used [13]. The factor that influences the electoral choice is the cultural characteristics of the population, which, according to this approach, are different in different regions. There are differences in foreign policy orientations, language, and national heroes. Such regional identities are the product of historical development, settlement, educational and age structure of the population, which are rooted in habits, lifestyles, perceptions and explanations by individuals of reality, their social and economic status [15, p.32]. Another approach to the role of residence in explaining political orientations and electoral choices is to distinguish such a key factor as the role of political elites.

One more approach to the use of spatial data in investigations of Ukrainians political orientations is the construction of the opposition «Center-Periphery». Some researchers assume that the population's readiness for change is a factor that influences the difference in voting between cities and villages. So, people in cities may easier to learn new trends and adapt to change. In political preferences this can be manifested, for example, at the highest level of conservatism among population in villages compared with urban residents [13, p.58]. In addition, factors affecting the voting outcomes of this approach can be the standard of living and the level of education of the population, the density of social networks, specific problems and needs that are significantly different for urban and rural populations. In the sociological literature the region is considered, first of all, as

the space of a certain social structure, the organization of power and cultural traditions, which gives grounds for sociologists to speak of a territorially differentiated association of people [14, p.94].

Thus, for modern Ukrainian researches of political orientations it is actual to develop new approaches to the use of spatial data in the study of political orientation and electoral choices of the Ukrainian population. One such approach can be the combination of electoral choice and value orientations for clustering administrative-territorial units to create macroregions. Value orientations are more stable than political ones, therefore, such a combination makes the cluster structure more reliable. Also, the combination of values and voting results gives an opportunity to evaluate the cluster structure in dynamics, combining the results of national and local elections in different years with the value orientations of Ukrainians. In addition, the values reflect the cultural and historical features of the region, which increases the validity of such clustering.

The value theory. There are two approaches to the definition of values in social sciences: "values" can bee defined as characteristics of individuals or social groups. An approach to the interpretation of values as individual characteristics was formed within psychology, where values were used as a variable through which human behavior can be explained. For example, Allport and Vernon define values as individual's basic convictions about what is and is not important in his/her life. [1, p.505]. In Rokeach's definition of values, as well as Allport's and Vernon's, the central element is conviction. Rokeach defined the value concept as «an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence». [7, p.5]. Rokeach distinguished two main types of values: terminal and instrumental values [11, p.154]. Terminal values refer to desirable and end-state existence, the goals that a person would like to achieve during them. On the other hand, instrumental values refer to preferable modes of behavior, means of achieving the terminal values. The Rokeach theory of individual values was gradually superseded by Schwartz's theory of basic values. Today Schwartz's approach, with the approach of R. Inglehart, is one of the most authoritative method of measuring values, including both national and international comparative studies (for instance, European Social Survey or World Value Survey). According to S. Schwartz's values theory, values are defined as transsituational goals, varying in importance, that serve as guiding principles in the life of a person or group [9, p.903].

It is quite right to agree with Allport's, Vernon's, Rokeach's and Schwartz's statements, who consider values to be basic beliefs and guiding principles in human life, because in this case, values can be considered as an integrative element that combines the distinct attitudes and orientations of a person in relation to various spheres of society's life, including in the sphere of politics.

But values can also be defined as characteristics of social groups. With such an approach, values express an understanding of what is considered acceptable in a society and desirable in its culture, that is, certain cultural ideals. Cultural values form and justify individual and group beliefs, actions and goals, these values are the basis of institutional norms and daily practices. For example, a cultural value emphasis on success and ambition may be reflected in and promote highly competitive economic systems, confrontational legal systems, and child-rearing practices that pressure children to achieve [8, p.139]. Kluckhohn also is one of the researches who interpret values as characteristics of social groups. He assumes that people have certain biological features and characteristics that are the basis for the development of culture, and that people consider their own beliefs and practices to be natural, and those beliefs and practices that differ from their own are strange and even false. He defines value as a conception, explicit or implicit, distinctive of an individual or characteristic of a group, of the desirable, which influences the selection from available modes, means, and ends of action [3, p.362]. Schwartz, in addition to the theory of individual values, also developed an approach to measuring cultural values. The idea underlying this approach is similar to that of Kluckhohn: Schwartz also assumes that cultural values are manifested in how societies oppose the basic problems in daily human activity. People must recognize these problems, plan responses to them, and motivate one another to cope with them [8, p.140]. Hofstede focused extensively on national-level patterns of values, arguing that values form a stable portion of national culture. [3, p.378]. Hofstede in his approach to the definition of values tries to combine both individual and cultural values: he thinks that values are simultaneously characteristics of individuals and communities. He defines values as the tendency to choose a certain mode of action among other possible ways [4, p.19].

In our opinion, understanding of values as beliefs and ideas inherent in social formations may be helpful to the understanding of values as individual characteristics.This perspective opens up the way for the analysis of values not only at the level of an individual, but also at the level of small or large social groups, for example, at the level of the regions of the country.

Data and methods. In this study the correlation between electoral choice and value orientations is researched using data of sample survey and the results of the voting of the Ukrainian population on the Parliamentary elections. The results of the voting in the elections are presented on the site Central Election Commission, this data is aggregated to the level of polling stations. The interpretation of the concept of «value» is based on S. Schwartz approach. Accordingly, values are defined as transsituational goals, varying in importance, that serve as guiding principles in the life of a person or group [9, p.903]. Schwartz's main innovation, in comparison with earlier approaches to the definition of values, is the assumption that there is a particular structure between the different values, which may be universal for different cultures. Schwartz suggests that this structure has the form of circular motivation continuum. This model has some special features [10, p.110]:

- adjacent values in the circle are motivationally compatible;
- values become less compatible as the distance between them around the circle increases;
- values on opposite sides of the circle express conflicting motivations.

In the initial version of the Schwarz's value theory it is proposed to include in the circular continuum 10 basic human values that can be reduced to 4 dimensions. According to Schwarz's model dimension «Conservation» consists of values «Security», «Conformity» and «Tradition», the opposite dimension «Openness to change» includes values «Stimulation», «Self-Direction» and «Hedonism». Dimension «Self-enhancement» consists of values «Power» and «Achievement», and the opposite dimension «Self-transcendence» includes values «Universalism» and «Benevolence». On the basis of this model Schwarz created two questionnaires – The Schwartz Value Survey and The Portrait Values Questionnaire. For analysis of value orientation in this study we use The Portrait Values Questionnaire. This questionnaire includes 21 value portraits of abstract persons. Respondent should decide how he or she is similar to this portraits using scale with 6 items: from «very much like me» to «not like me at all» [9, p.10]. There are examples of such portraits in Table 1.

Table 1

Indicators using for measuring the value «Security» in The Portrait Values Questionnaire

Value	Indicators in The Portrait Values Questionnaire
Security	It is important to him/her to live in secure surroundings. He/she avoids anything that might endanger his/her safety.
	It is important to him/her that the government ensures his/her safety against all threats. He/she wants the state to be strong so it can defend its citizens.

Source: Elaborated by the author.

The Portrait Values Questionnaire is included to the questionnaire of the European Social Survey. Ukraine took part in this project from 2004 to 2012. The European Social Survey is the most actual source of data on the value orientations of Ukrainians which is in free access. Last Ukrainian wave of European Social Survey, conducted in 2012, is used to analyze the value orientations in this study. As a variable, which indicate the electoral choice of the population, in this study is used the results of the voting in the Parliamentary elections held in 2012. Only political parties that gain more than 1% of the vote are selected for analysis. As noted above, The Portrait Values Questionnaire includes 21 indicators for measuring 10 values. Each of these portraits respondent estimates from 1 («very much like me») to 6 («not like me at all»). For each portrait the arithmetic mean is calculated, and then this indicator was subtracted from each value index. Such a calculation technique makes it possible to overcome the problem that some respondents are inclined to identify all the portraits as very much like to him or her. Similarly, four value dimensions are formed: «Conservation», «Self-transcendence», «Openness to change» and «Self-enhancement». We use these four dimensions to simplify interpretation of values.

Thus, the data set in this study is formed by a combination of the results of the Ukrainian vote in the Parliamentary elections in 2012 and sample survey – European Social Survey – the latest wave of which was held in Ukraine in 2012. Such data sets have a number of features. Working with statistical data we usually don't have information on individual level, just aggregated data. In the electoral statistics used in this study, polling station, which, depending on size, can represent the results of voting from ten voters to almost three thousand, is the unit of analysis. On the other hand, in sample survey there is data on individual level, but, in the same time, there are limited opportunities to identify the domicile of the respondents. Using data set of European Social Survey, we can identify only region and the type of settlement (urban or rural). The data set of the European Social Survey is aggregated at the region level, and the arithmetic mean for four value dimensions is calculated. These results are attached to an array of voting results.

Results. In this study we classify administrative-territorial units on the basis of value orientations and electoral choice of population in these units. Accordingly, the **hypothesis** is that there is a statistically significant correlation between the value orientations and the electoral choice of the population of Ukraine at the regional level. To test this hypothesis, the Pearson correlation coefficient is calculated between the expressiveness of the values of «Conservation», «Self-transcendence», «Openness to change» and «Self-enhancement» and the results of voting for political parties at the 2012 Parliamentary elections, the results are presented in Table 2.

Table 2

Correlation coefficients between voting for political parties and the expressiveness of value orientations

Share of party	Value orientations			
	Self-enhancement	Self-transcendence	Openness to change	Conservation
«Partiya Regioniv»	-0,15**	0,13**	-0,07**	-0,06**
«Batkivshchyna»	0,13**	-0,09**	-0,10**	0,07**
«UDAR»	0,13**	-0,10**	0,06**	-0,09**
Communist Party of Ukraine	-0,10**	0,09**	0,08**	-0,09**
«Svoboda»	0,02**	-0,05**	-0,14**	0,18**
Party of N. Korolevskaya «Ukraina -Vpered!»	0,02**	0,004	-0,05**	-0,08**
«Nasha Ukraina»	0,17**	-0,15**	-0,04**	0,03**
Radical Party of O. Lyashko	0,11**	-0,20**	0,13**	-0,06**

** the correlation is significant at the 0,01

Source: Elaborated by the author.

Before the interpretation of the correlation coefficients, it is necessary to provide information on the parties who participated in the 2012 Parliamentary elections. Ideological differences between parties in the Ukrainian political space are practically absent. It is possible to note only the left orientation of the Communist Party, as well as the right radical orientation of the «Svoboda». But a differential criterion in this case may be a foreign policy vector. Thus, the «Partiya Regioniv», the Communist Party and the Party of N. Korolevskaya support the eastern foreign policy vector. While the other five parties support the western foreign policy vector. In addition, the «Partiya Regioniv» and the Communist Party created a coalition in 2010-2012. At the same time, a coalition, which was formed in 2014, included the «Batkivshchyna», «UDAR» and «Svoboda».

Based on the correlation coefficients, we can confirm the hypothesis about statistically significant relationship between expressiveness of value orientations and the level of support for political parties. Coefficients are not high, but the reason of this is indirect influence value orientations on electoral choice [5; 2; 6]. Whereas the correlation between value orientations and electoral choice is confirmed, this allows clustering administrative-territorial units based on these two variables. The division of administrative-territorial units into macroregions in this study is proposed to be carried out by cluster analysis using the k-means method. Coordinates for cluster centers are based on the

correlation between the level of support for political parties and the expressiveness of value orientations, divided into four dimensions: «Conservation», «Self-transcendence», «Openness to change» and «Self-enhancement». If a political party has a statically significant positive correlation with one of the value dimension, then the cluster center is given the maximum values for the share of this party, and for this value dimension. If this political force also has a statistically significant negative correlation with some value dimensions, the cluster center is assigned the minimum value for these sectors. The following cluster structure is shown in the Table 3.

Table 3

Initial cluster centers based on Ukrainians value orientations and the results of the 2012 Parliamentary elections

	cluster №1	cluster №2	Cluster №3
Level of support of the «Partiya Regioniv»	max		
Level of support of the Communist Party of Ukraine	max		
Level of support of the Party of N. Korolevskaya «Ukraina -Vpered!»	max		
Level of support of the «Batkivshchyna»		max	
Level of support of the «Nasha Ukraina»		max	
Level of support of the «Svoboda»			max
Level of support of the «UDAR»		max	
Level of support of the Radical Party of O. Lyashko		max	
Self-enhancement values	min	max	
Self-transcendence values	max	min	
Openness to change values			min
Conservation values			max

Source: Elaborated by the author.

For example, the first cluster includes administrative-territorial units, which are characterized by a high level of support for the «Partiya Regioniv» and Communist Party (the maximum values for the shares of these parties for this cluster center), the high level of values «Self-transcendence» (the maximum value for the cluster center) and low level of «Self-enhancement» values (the minimum value for a cluster center). Similarly, two other clusters are formed. Cluster analysis is done using k-means. The final cluster centers are shown in the Table 4.

Table 4

Final cluster centers based on Ukrainians value orientations and the results of the 2012 Parliamentary elections

	cluster №1	cluster №2	cluster №3	arithmeti mean for whole data set
Level of support of the «Partiya Regioniv»	0,447	0,181	0,145	0,271
Level of support of the Communist Party of Ukraine	0,217	0,095	0,065	0,133
Level of support of the Party of N. Korolevskaya «Ukraina -Vpered!»	0,017	0,014	0,012	0,014
Level of support of the «Batkivshchyna»	0,146	0,352	0,398	0,287
Level of support of the «Nasha Ukraina»	0,005	0,017	0,017	0,013
Level of support of the «Svoboda»	0,027	0,123	0,175	0,100
Level of support of the «UDAR»	0,103	0,156	0,152	0,135
Level of support of the Radical Party of O. Lyashko	0,008	0,025	0,010	0,015
Self-enhancement values	-0,246	-0,013	-0,319	-0,174
Self-transcendence values	0,447	0,226	0,501	0,375
Openness to change values	-0,438	-0,293	-0,600	-0,422
Conservation values	0,227	0,111	0,398	0,224

Source: Elaborated by the author.

Thus, the first cluster includes administrative-territorial units, where population has more expressed values of Self-transcendence than in Ukraine as a whole, as well as a significantly higher level of support for two parties – «Partiya Regioniv» and Communist Party. In the second cluster there are units where population has more expressed values of Self-enhancement and Openness to change, and the level of support of three parties («Batkivshchyna», «Nasha Ukraina» and «UDAR») is higher than in Ukraine as a whole. The third cluster is characterized by more expressive values of Self-transcendence and Conservation, as well as a higher level of support for the «Svoboda».

Distribution of administrative-territorial units by clusters is visualized on Figure 1.

Figure 1. Clustering of the administrative-territorial units of Ukraine on the basis of value orientations and electoral choice of the population in these territories
Source: Elaborated by the author.

The first cluster has clear geographic boundaries: the administrative-territorial units applied to this cluster are concentrated in the southeastern part of Ukraine. The second and third clusters do not have clear geographic boundaries and intersect with each other, which can be explained by the correlation between rates of political parties.

Conclusions. This study shows the potential of combining two data sources: sample survey and electoral statistics. Such data sets have a number of features. Working with statistical data we usually don't have information on individual level, just aggregated data. On the other hand, in sample survey there is data on individual level, but, in the same time, there are limited opportunities to identify the domicile of the respondents. As a result, value orientations, measured in European Social Survey, were aggregated at the region level for combining with results of the Ukrainian vote in the 2012 Parliamentary elections.

The main result of this study is the creation of clusters of administrative-territorial units based on the similarity of the results of voting and value orientations of population in these units. The approach to constructing macroregions based on the political preferences of the population is quite widespread. With this approach, the macroregion is represented as an explanatory variable in electoral models. But such an approach has a number of limitations, primarily due to the fact that the list of political leaders or political parties can change significantly in rather short periods of time.

On the same time, value orientations, measured according to standardized methods, can be compared in dynamics. In addition, the study of human values proves that value orientations are more stable than political orientations or electoral choice, which makes the resulting cluster structure more

reliable. The combination of values and results of voting enables to evaluate the received cluster structure in dynamics, combining the results of national and local elections in different years with the value orientations of Ukrainians. Merging of value orientations and voting results, makes the clustering space two-dimensional. This enables not only to discover similar administrative-territorial units, but also, for example, to identify groups of parties whose supporters share similar values. In addition, the values reflect the cultural and historical features of the region, which increases the validity of such clustering.

So, the combination of two sources of data, electoral statistics and a sample survey gives opportunities for expanding existing knowledge both on values and political orientations, and on the relationships between these variables. Using values in cluster analysis make resulting cluster structure more valid and reliable. In addition, one of the perspectives for future researches is the possibility of clustering of political actors themselves based on the value orientations of their supporters. But this approach also has a number of limitations, which are primarily related to combining data from different sources. Since the value orientations were calculated at the level of the regions, the interpretation of the results can be made only at the aggregated level and does not apply to the level of individuals. One of the perspectives for further research is to increase the accuracy of aggregation of data from two sources, for example, by taking into account not only the region but also the type of settlement.

But, at the same time, despite the fact that the article uses data of 2012, the results of the analysis do not lose their relevance, since they demonstrate the potential of using simultaneously values and political orientations for the clustering of administrative-territorial units. The successful application of such approach on data of 2012 opens up the ways for conducting such clustering on more recent data.

Thus, existing approaches to clustering of administrative-territorial units mainly involve one-dimensional space, which complicates using of several political parties/leaders simultaneously in the analysis. Also, within such approaches it is quite difficult to compare the cluster structure in dynamics, such as political actors can change very quickly, and, in the result, common basis for clustering disappears. The approach presented in this paper makes it possible to combine and use in the analysis several political actors simultaneously. In addition, using of value orientations makes it possible to make comparisons in time, since values become the common basis for clustering even in the case of different political actors. Also, using of values makes it possible to take into account, in addition to political orientations, the cultural characteristics of the population of the analyzed areas.

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SOCIAL PATTERNS OF SMOKING AND ALCOHOL DRINKING AMONG YOUNG PEOPLE IN MOLDOVA

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This paper explores the incidence and individual determinants of smoking and alcohol drinking with a high prevalence among young people in Moldova. It goes beyond epidemiological approach and descriptive analysis and provides a sociological explanation for these risk-taking behaviours by linking them to local social context in which young people inhabit. The study is based on secondary data analysis of National Youth Survey of Moldova among 14-29 aged population (1112 respondents) carried out in 2016, commissioned by the EU-OECD Youth inclusion project and Ministry of Education, Culture and Research of the Republic of Moldova. Data were processed in SPSS. Multivariate analysis, adjusting for demographic co-variates was performed using logistic regression. The results of this study show that rates of male smoking and alcohol drinking are high, while rates in women are far lower. According to multivariate data analysis, gender and age are strong individual determinants for both health-risk practices. As well, another important predictor for these behaviors is young people's educational level – those with lower education level were particularly likely to smoke and drink alcohol. The study revealed also a strong interrelation between these health-risk practices. In paper is argued that high prevalence of smoking and drinking in male may reflect a normative structure for male socializing. Taking into consideration that strongest predictor variable overall is male gender, and strong relationship between heavy drinking and smoking, these behavioral factors might be responsible for the increasing in premature deaths among males in middle age.

Keywords: *socio-demographic factors, incidence, prevalence, smoking, alcohol consumption, interdependence.*

Acest articol explorează incidența și factorii individuali determinanți ai fumatului și consumului de alcool care au o prevalență ridicată în rândul tinerilor din Moldova. Această lucrare depășește abordarea epidemiologică și descriptivă și oferă o explicație sociologică, prin conectarea acestora la contextul social în care locuiesc tinerii. Studiul se bazează pe analiza secundară a datelor Sondajului Național al Tinerilor din Moldova în rândul populației de 14-29 ani (1112 respondenți) realizat în 2016 în cadrul proiectului de incluziune UE-OCDE și Ministerul Educației, Culturii și Cercetării din Moldova. Datele au fost procesate utilizând SPSS. Analiza multivariată, cu ajustarea co-variatele demografice a fost efectuată utilizând regresia logistică. Studiul arată că ratele de consum de tutun și alcool în rândul bărbaților sunt mult mai înalte comparativ cu ratele înregistrate în rândul femeilor. Conform analizei multivariate, sexul (masculin) și vârsta sunt factorii individuali determinanți pentru ambele practici comportamentale. Un alt predictor important îl constituie nivelul de educație al tinerilor – tinerii cu un nivel de educație mai scăzut au o probabilitate mai mare să fumeze și să consume alcool. Studiul a arătat o puternică interdependență între aceste comportamente cu risc pentru sănătate. Prevalența ridicată a fumatului și a consumului de alcool în rândul bărbaților reflectă o structură normativă pentru socializarea acestora. Luând în considerație faptul că cea mai importantă variabilă predictivă este sexul (masculin) și relația puternică dintre consumul ridicat de alcool și fumat, acești factori comportamentali ar putea fi responsabili de creșterea numărului de decese premature în rândul bărbaților de vârstă mijlocie.

Cuvinte-cheie: *factori socio-demografici, incidența, prevalența, fumat, consum alcool, interdependență.*

В этой статье рассматриваются распространенность и индивидуальные детерминанты курения и потребление алкоголя среди молодежи в Молдове. Анализ выходит за рамки описательного и эпидемиологического подхода и приводит социологическое объяснение поведению с риском для здоровья, связывая их с социальным контекстом, в котором проживает молодежь. Исследование основано на анализе вторичных данных Национального Опроса среди Молодежи в возрасте от 14 до 29 лет (1112 респондентов), проведенном в 2016 г. по заказу EU-OECD и

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Министерства Образования, Культуры и Исследований Республики Молдова в рамках проекта по вовлечению молодежи. Данные были проанализированы с использованием SPSS. Многофакторный анализ с учетом демографических ко-вариаций проводился с использованием логистической регрессии. Результаты данного исследования показывают, что показатели курения и потребления алкоголя среди мужчин намного выше, чем выше, чем среди. Многомерный анализ показал, что пол и возраст являются главными факторами, определяющие поведенческие практики с риском для здоровья. Еще одним важным предиктором такого поведения является уровень образования молодежи – люди с более низким уровнем образования чаще курят и употребляют алкоголь. Исследование выявило также сильную взаимосвязь между этими двумя поведенческими практиками с риском для здоровья. В статье утверждается, что высокая распространенность курения и употребления алкоголя у мужчин может отражать нормативную структуру их социализации. Принимая во внимание, что определяющим фактором является пол (мужской), а также учитывая тесную связь между алкоголизмом и курением, они могут быть причиной преждевременной смерти среди мужчин среднего возраста.

Ключевые слова: *социально-демографические факторы, курение, потребление алкоголя, взаимозависимость.*

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Introduction. Young people's health-related attitudes and behaviours, especially health-risk practices, and their determinants are major topics in both medical and psychosocial studies, while their findings and recommendations are crucial for informing the development of effective health education and health promotion policy, programs and practices.

The interest for studying health behavior has considerably increased over the past decades and is related to two main findings, namely that a great part of morbidity and mortality is caused by behavioral factors [1, 2, 3] and behavior can be 'influenced' or 'changed', which place a particular emphasis on prevention and education individual responsibility for health [4, 2, 5]. In other words, some illnesses and premature deaths could be considerably reduced if people would adopt lifestyles that promote wellness, such as eating healthful diets, exercising, avoiding binge drinking and not smoking.

Adolescence and youth[1] are understandably considered as critical stages of individual's life. There are periods of major physical, psychological, and behavioural changes, as well as periods of socialization experience through participation in education and employment, formal and informal institutions and groups, and, generally, are shaped by social context they inhabit. All these might influence young people's perceptions and decisions on health-related behaviors [6], both protective and health-risk practices, which can be continued throughout the life. Most important that unhealthy behavioural patterns could determine their current and prospective health status and the risk for developing some chronic diseases in adulthood and lead to premature death [6, 4]. Moreover, early initiation of health-risk practices is associated with an increased risk of developing addiction, i.e. alcohol, nicotine [7, 4] that can negatively influence physical and mental health, obstruct school and occupational pathways, and affect interpersonal relations. These behaviors can also have a generally detrimental impact on quality of life.

This paper explores the prevalence and socio-demographic factors of smoking and alcohol drinking as most common health-risk practices with a high prevalence among young people in Moldova. It should be mentioned that alcohol consumption and smoking are currently some of the major challenges for public health, while the harmful use of alcohol and smoking are among the leading risk factors for disease burden in populations worldwide [8, 9, 10].

As well, this study goes beyond epidemiological approach and descriptive analysis and provides a

[1] There is considerable ambiguity in the definition of young people in the specialized literature and terms like young, adolescents, young adults are often used interchangeably. The National Youth Policy of the Republic of Moldova defines the youth population as those in the age group of 14-35 years. However, due to the availability of data, in this paper we refer to young people aged 14-29 years.

sociological explanation for these risk-taking behaviours by linking them to local social context in which young people inhabit. Some scholars suggest that only by adopting a distinctively sociological as opposed to socio-epidemiological approach, behavioural factors can be appropriately situated, theorised and explained [11].

Theoretical approach

Health behavior is defined as any activity people perform to maintain or improve their health, regardless of their perceived health status or whether the behavior actually achieves that goal [2]. Generally, these can be health protective or confer health risk, may be intentional or unintentional and could have an immediate or long-term effect on people's health. As mentioned above, this study focuses on smoking and alcohol consumption among youth, especially on binge drinking, as most harmful for individual's health and investigate how these influence each other.

Traditionally, there are two main conceptual approaches for explaining health-related behaviours. The first one focus mainly on individual choice in explaining why people engage or not in health practices in terms of their reasons, knowledge, and health beliefs. It should be mentioned that belief models and other individualistic theories have been criticized for an overemphasis on individual choice and that have showed little impact on changing individual health behavior [12].

Sociological theories are opposed to the individualistic ones and point on structural factors and social context in which individual inhabit, recognizing a role for structure as well as agency [13, 14]. It may be argued that sociological approaches reflect on inequality and power in society. From this point of view, health lifestyles are collective patterns of health-related behavior based on choices from options available to people according to their life chances" [13]. This definition within Contemporary Health Lifestyle Theory was developed by Cockerham [13, 14] and reflects Weber's (1978) seminal conceptualization of lifestyles that evokes life choices and life chances relate with one another in a dialectical relationship. Life choices are either empowered or constrained by a person's life chances and likely to be consistent with the capability to achieve them. According to Cockerham, structural life chances are influenced by material and social class circumstances: the degree of social stratification by age, gender, race/ethnicity; collective social relationships based on shared norms, ideals. Further, all these variables provide the social context for the socialization process and influence people's experiences throughout life that, and in turn shapes their capacity to make conscious, particular choices.

As it can be seen, person's life chances are largely described as being determined by social position and thus characteristic of particular status groups. This is also reflected in Bourdieu's (1984) concept of habitus. According to Bourdieu, lifestyles are generated by a habitus, which is a range of dispositions used by individuals to guide and evaluate their behavioural choices and options; it is formed through socialization and experience, and is shaped by the individual's class circumstances.

This approach has been used to explain the rise of mortality in the former Soviet countries, however, mainly focusing on Russia. It was argued that a habitus producing an enduring disposition toward a negative health lifestyle appears to have become normative for many people, especially males, and reproduced over time when regularly acted out in unhealthy routine drinking, smoking, and other practices [15, 16, 17]. As well, according to many scholars little or no social stigma is attached to heavy drinkers and smokers in some societies. While it can argued that such a habitus is ultimately harmful, the dispositions it produces may though be the normative lifestyle for a person's group or gender.

General youth situation

Youth in the Republic of Moldova stand in a special position within the population and the country's social and economic development. According to official statistics, young people aged 15-29 years accounts for about 22% of the total population. Beginning with 2011, the number of young people is reducing considerably and according to specialists' prognoses will continue to decrease [18]. Many national and international studies show that young people in Moldova face multiple and interdependent challenges. Thus, Youth Multidimensional Deprivation Indicator show that more than one-third (36.2%) of young people suffer deprivations in multiple wellbeing dimensions (share of youth affected by multiple deficits in the areas of education, employment, health, civic participation and social inclusion at the same time) [19].

Youth integration in the labour market is of particular concern in Moldova. They are facing a range of challenges in their school to work transition. Furthermore, economic recession and political instability still reduce their chances to integrate into the domestic labor market. Currently, both the activity rates and

employment rates are low for young people, while it is high the inactivity rate. According to the latest official statistics, the NEET rate (not in employment, education or training) in Moldova accounts for up to 29% among young people aged 15-29 years (2017), being one of the highest in Europe.

The general health status of young people in terms of both objective and subjective indicators performs better compared to other age groups. However, health challenges persist and are mostly related to health-risk behaviours. According to estimates, alcohol and tobacco consumption in Moldovan youth is high and is still higher than the EU average, thus threatening adolescent and youth physical and mental health. This is mainly explained by a reduced awareness of individual responsibility for health, lack of preventive health behaviour, insufficient and poor quality of educational programs on healthy lifestyle etc.

In this regard, it is important to update the data on prevalence and explore the socio-demographic factors of health-risk behaviours. This information could serve as a reference point on development national health education and health promotion policy, strategies and programs tailored for adolescents and young people.

Data and methods

The paper is based on secondary data analysis of National Youth Survey of Moldova among 14-29 aged population, commissioned by the EU-OECD Youth inclusion project and Ministry of Education, Culture and Research of the Republic of Moldova. From the methodological point of view, this survey offers enough cases for advanced statistical analysis due to a large sample (N=1112 respondents). The survey "Problems, values and aspiration of young people in Moldova" was carried out in June 2016 in 92 urban and rural localities.

Questions related to smoking and drinking habits and associated demographic and socio-economic variables were used for secondary data analysis. Data were analyzed using SPSS. Multivariate analysis, adjusting for demographic co-variates was performed using logistic regression. The advantage of logistic regression is that it calculates the probability of a discrete outcome for each dependent variable, rather than predicting the effects of several continuous independent variables on a single dependent variable. The statistics presented express the direction and magnitude of the relationship between an independent and dependent variable. Because several statistical tests were performed using a large sample size, statistical significance was taken as $p<0.01$. The 95 percent confidence intervals associated with the odds ratios are also reported. A limitation of the study is that while the overall sample size is relatively large, the small size of specific population subgroups, particularly in young women, where the number of smokers and binge drinkers is smaller, reduced the power to detect significant differences.

Socio-demographic data on respondents. Table 1 gives some general demographic and socio-economic characteristics of the study respondents. As mentioned, this survey is representative for the population of Moldova aged 14-29 years with a maximum standard error of ±3%.

Table 1

Distribution of demographic and socio-demographic variables

Variables		N	Valid, %
Gender	Male	524	47,1
	Female	588	52,9
Age	14-19 years	334	30,0
	20-24 years	366	32,9
	24-29 years	413	37,1
Residence	Urban	473	42,5
	Rural	639	57,5
Marital status	Married / in partnership	484	43,5
	Unmarried	628	56,5
Education	Primary / secondary school *(low)*	466	41,9
	Vocational / high school / post secondary school *(medium)*	419	37,7
	University / post university *(high)*	226	20,3
Occupation	Employed	309	27,8
	NEET *(not in employment, nor in education)*	376	33,8
	Pupil / student	358	32,2
	Other	69	6,2

Source: Survey "Problems, values and aspiration of young people in Moldova", OECD and Ministry of Education, Culture and Research, 2016.

Prevalence of smoking among young people

Smoking and heavy drinking habits are considered highly negative health lifestyle practices not only because of their strong relationship with specific diseases, such as different types of cancer, digestive and heart disease [7, 8, 10], but also due to their high economic and social costs for individual and society. As it was mentioned, in order to inform policy makers on the population subgroups at higher risk, it is crucial to define the prevalence and determinants of these health-risk behaviours and their social context.

There is a consistent and large amount of evidence demonstrating that these health-risk behaviours are initiated in adolescence and youth [21]. This is especially true in case of smoking. Thus, according to many studies, over 90 percent of daily smokers started to smoke by the age of 30 years [15, 17].

In this study, young people were asked several question related to smoking: if they currently smoke (yes, daily or occasionally and not smoking), for smokers – the average number of cigarettes they smoke daily and a question measuring young people's attitudes toward smoking one cigarette or more per day (agreement or disagreement).

The table 2 shows the prevalence of smoking among young people. There were calculated age and gender specific prevalence, and and gender differences in smoking habits were assessed using chi-squared tests and two-sample t-tests. As data shows, rates of male smoking are high, while rates in women are far lower. Thus, about one third of young men aged 14-29 years are smoking daily and 13% – occasionally, while the prevalence among young women from the same age category is only 4% within daily and 2% within occasionally smokers. As it can be seen, the overall trend in smoking rates is for both male and female to increase with increasing age and the highest smoking rate is observed in male of 25-29 age category (41%).

Table 2

Prevalence of smoking among young people, %

			Yes, daily	Yes, occasionally	No (non-smoker)
Male		14-19 years	13,7	12,4	73,9
		20-24 years	34,1	15,6	50,3
		25-29 years	41,3	10,6	48,1
	Total		**30,4**	**12,8**	**56,8**
Female		14-19 years	1,2	1,7	97,1
		20-24 years	3,6	2,1	94,3
		25-29 years	6,7	2,7	90,6
	Total		**4,1**	**2,2**	**93,7**
Total		14-19 years	7,2	6,9	85,9
		20-24 years	18,1	8,5	73,4
		25-29 years	22,5	6,3	71,2
			16,5	**7,2**	**76,3**

Source: Survey "Problems, values and aspiration of young people in Moldova", OECD and Ministry of Education, Culture and Research, 2016.

There are several aspects to be elucidated regarding the low smoking rates among young women and that could lead to its underestimation. Taking into consideration that questionnaires were administered in the respondents' home and many of them are still living with parents, young women may avoid answering honestly to smoking related questions, as this is still culturally unacceptable among women in Moldova, regardless of their age. On the other hand, it should be noted that statistical data for the last decades shows an increase in sales of slim, menthol and flavored cigarettes that are consumed mostly by women. As well, this trend is observed in marketing studies. Nevertheless, many studies that are based on self-reported smoking status have confirmed that compared with male smoking patterns, smoking in women is far less common and has a different age-specific pattern in Moldova compared to other countries [17]. Moreover, the

rates have been far slower to rise than would be expected given male rates and trends observed in the western countries [17].

The number of cigarettes smoked per day are often seen as main indicator of dependence and is used to assess the levels of moderate to severe nicotine dependency, as well is an indication of smokers' ability to quit. The higher the number of smoked cigarettes per day, the higher is the level of nicotine dependency. In this context, it is worth mentioning that both most of young men and women that are smoking daily tend to smoke more than 10 cigarettes per day, while occasional smokers – under 10 cigarettes (Table 3).

Table 3

Number of cigarettes smoked per day, %

			Yes, daily	Yes, occasionally
Male		Up to 10 cigarettes	50,4	49,6
		More than 10 cigarettes	94,3	5,7
	Total		**71,3**	**28,7**
Female		Up to 10 cigarettes	57,1	42,9
		More than 10 cigarettes	88,9	11,1
	Total		**64,9**	**35,1**
Total		Up to 10 cigarettes	51,7	48,3
		More than 10 cigarettes	93,9	6,1
	Total		**70,4**	**29,6**

Source: Survey "Problems, values and aspiration of young people in Moldova", OECD and Ministry of Education, Culture and Research, 2016.

Prevalence of alcohol drinking among young people

Over a long period of time, Moldova was considered a traditional wine-drinking country, while current drinking patterns, especially of young generations, suggest a trend towards the homogenization of drinking habits and reveal the growing choices of alcoholic beverages available on the local markets due to opening to global alcohol markets [8]. Besides, there is well known that Moldova is amongst highest alcohol consuming countries in the world, even if a decreasing in the total alcohol per capita consumption is attested (from 21.6 litres in 2005 to 15.1 litres in 2016) [8]. Most important is that according to many national [20, 22] and international reports [8], the harmful use of alcohol is among the leading risk factors for disease burden in populations both in Moldova and worldwide.

This study included the questions on alcohol intake (any alcoholic beverage like wine, beer, vodka or other liquor) during the last 12 month; frequency of drinking; frequency of heavy drinking, defined as 6 glasses of wine (600 gr.) or more, or 6 cups (300gr.) of strong drinks (vodka, brandy) consumed on one occasion.

According to survey results, more than 70% of interviewed young persons reported that they consumed any alcoholic beverage like wine, beer, vodka or other strong spirits during the reference year. Those who never drank alcohol were defined as abstainers. As would be expected, the highest rate of drinking prevalence is among male of 20-24 years (72%) and 25-29 years (81%), while the highest abstention rates were found among female of 14-19 years (67%).

Table 4 shows the reported frequency of alcohol consumption by age groups and gender. The proportion of young respondents who drink alcohol frequently (at least two times or more per week) is quite high for male for both age groups 20-24 and 25-29 years (22% in both cases). Moreover, the prevalence rates of alcohol intake two or four times per month is particularly high in males from 20 to 29 years (about 40%). Overall, young women are less likely to drink frequently any alcohol beverages. Most of young women (75%) reported that they drink alcohol once in a month or even rarely.

Table 4

Frequency of alcohol consumption, %

			2 times or more per week	2 or 4 times a month	Once in a month or rarely
Male		14-19 years	8,5	36,2	55,3
		20-24 years	22,0	39,0	39,0
		25-29 years	22,8	43,6	33,6
	Total		**18,9**	**40,2**	**41,0**
Female		14-19 years	7,1	12,5	80,4
		20-24 years	3,3	19,7	77,0
		25-29 years	4,3	23,0	72,7
	Total		**4,4**	**19,9**	**75,7**
		14-19 years	8,0	27,3	64,7
		20-24 years	12,7	29,4	58,0
		25-29 years	13,9	33,7	52,4
	Total		**12,2**	**30,7**	**57,1**

Source: Survey "Problems, values and aspiration of young people in Moldova", OECD and Ministry of Education, Culture and Research, 2016.

As mentioned, in this paper a special attention is given to the frequency of heavy drinking situations among young people. Heavy episodic drinking is an important indicator of the pattern of alcohol consumption (defined as 600 gr. of wine. or more, or 300gr. of strong drinks at one occasion, and at least once per month) that can have a detrimental impact on individual's physical and mental health. As well, heavy drinking has been identified as an important risk factor in different types of injury, such as unintentional injuries (road traffic injuries, drowning, poisoning, falls) and intentional injuries (suicide, violence).

According to data, heavy drinking is clearly more frequent in men than in women (table 5). In this respect, it is noted that more than 70% of young males had at least one episode of heavy drinking during the year, while among them nearly 18% are consuming large amount of alcohol each month and 7% – every week or even more. Despite an overall low prevalence rate of heavy drinkers among women compared to men, more than 40% of them had at least one heavy drinking occasions during the year.

Table 5

Frequency of heavy drinking episodes (600 gr. of wine. or more, or 300 gr. of strong drinks at one occasion), %

			Every week and more	Each month	Less than once a month	Never
Male		14-19 years	5,2	10,4	40,6	43,8
		20-24 years	8,1	21,8	48,4	21,8
		25-29 years	6,1	18,9	52,7	22,3
	Total		**6,5**	**17,7**	**48,1**	**27,7**
Female		14-19 years	0,0	1,8	28,6	69,6
		20-24 years	0,0	3,3	42,1	54,5
		25-29 years	0,7	2,2	42,0	55,1
	Total		**0,3**	**2,5**	**39,7**	**57,5**
		14-19 years	3,3	7,2	36,2	53,3
		20-24 years	4,1	12,7	45,3	38,0
		25-29 years	3,5	10,8	47,6	38,1
	Total		**3,7**	**10,7**	**44,2**	**41,4**

Source: Survey "Problems, values and aspiration of young people in Moldova", OECD and Ministry of Education, Culture and Research, 2016.

As in case of smoking, the alcohol consumption according to some scholars tends to be underestimated (deliberately or otherwise) by survey respondents [8], while underreporting of alcohol intake could be higher in women. As a rule, the volume of drinking from surveys is compared to the volume derived from alcohol sales data. Due to the large amount of homemade wine consumption in Moldova that are not officially registered, this can be hardly achieved.

In many qualitative studies conducted both with young people and experts, the alcohol consumption comes out as one of the main behavioural risk behaviour among youth, especially among those not in employment, education or training – NEET. Thus, the results of NEET study in Moldova showed that health-risk behaviour, such as abusive alcohol consumption, is one of the major factor that places young people in this category or increases the risk of becoming NEET [5]. However, this has come out during the interviews with main local stakeholders, rather than during the interviews with targeted young people.

Determinants of smoking and heavy drinking and their interrelation

Several major determinants have an impact on levels and patterns of tobacco and alcohol consumption. While some are individual factors such as gender, age, education, etc., others are environmental factors, such as availability of alcohol, policy regulation on tobacco products and alcoholic beverages etc. This paper looks at individual determinants of smoking and heavy alcohol use among young people and investigates the relationships between these health-risk behaviors.

In this paper, current smokers were defined as young people reporting smoking daily, heavy drinkers were delimited as those who intake per occasion 600 gr. of wine or 300 gr. of strong drinks. The selected socio-demographic correlates of smoking and drinking included gender, age, marital status, area of residence, education level and occupational status. This analysis consists of a series of three statistical tests. The first examines the determinants of smoking, the second one explores the determinants of binge drinking, and the third investigates the relationship between smoking and drinking. Although variations in the alcohol consumed need to be examined cautiously due to the small numbers of respondents in some sub-groups, particularly in women. There are described only statistical significant variables (Sig ≤ 0,05).

Tables 6 and 7 show the distribution of the dependent and independent variables in the analysis. The variable of principal interest is gender and the results are noticeable. Young men are more than nine times (Exp(B)= 9,288) likely than young females to smoke cigarettes daily and, among drinkers, they are nearly nine times (Exp(B)= 8,503) more likely to be binge drinkers – to drink a large amount alcohol at one occasion and at least once a month.

The results for age suggest that young respondents aged 25-29 years are nearly four times more likely to drink frequently, be binge drinkers and they are significantly more likely to smoke daily. With respect to marital status, the results indicate that unmarried respondents are somewhat more expected to drink alcohol more frequently, while in case of smoking this variable is not statistically significant.

Table 6

Determinants of smoking (smoking daily)

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Gender (Male)	2,229	,250	79,786	1	,000	9,288	5,695	15,146
Age (14-19)			13,078	2	,001			
Age (20-24)	,876	,316	7,683	1	,006	2,402	1,293	4,464
Age (25-29)	1,305	,361	13,077	1	,000	3,689	1,818	7,484
Marital status (single)	-,402	,242	2,761	1	,097	,669	,416	1,075
Place of residence (rural)	-,808	,197	16,869	1	,000	,446	,303	,655
Education (high)			14,649	2	,001			
Education	,983	,281	12,213	1	,000	2,671	1,540	4,635

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
(medium)								
Education (low)	1,062	,293	13,129	1	,000	2,894	1,629	5,141
Status (pupil / student)			10,800	2	,005			
Status (employed)	1,028	,329	9,783	1	,002	2,794	1,468	5,320
Status (NEET)	,990	,324	9,362	1	,002	2,692	1,428	5,077
Constant	-4,570	,487	87,962	1	,000	,010		
-2 log likelihood: 739,881[a]; Nagelkerke R Square: ,322; df: 8								

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than ,001.

Source: Survey "Problems, values and aspiration of young people in Moldova", OECD and Ministry of Education, Culture and Research, 2016.

The variables education and occupational status were quite powerful predictors overall of unhealthy lifestyle practices such as smoking and binge drinking. Higher educated persons are less likely to smoke or to drink high volumes of alcohol per occasion compared to less educated young persons. Thus, respondents with low level of education are nearly three times more likely to smoke daily and almost four times more likely to be binge drinkers. Occupational status performed better in case of smoking – employed young people or NEET youth had more chances to smoke daily compared to those involved in education. On the other hand, occupational status had no significant effect on binge drinking habits. Place of residence had no significant effects on any of the dependent variables, despite an overall perception that in rural area the prevalence of smoking and drinking among young people is higher.

Table 7

Determinants of heavy drinking

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Gender (Male)	2,140	,368	33,800	1	,000	8,503	4,132	17,497
Age (14-19)			9,420	2	,009			
Age (20-24)	1,147	,402	8,130	1	,004	3,148	1,431	6,923
Age (25-29)	1,336	,461	8,406	1	,004	3,802	1,541	9,378
Status (single)	-,899	,348	6,672	1	,010	,407	,206	,805
Place of residence (rural)	,415	,259	2,569	1	,109	1,514	,912	2,516
Education (high)			14,080	2	,001			
Education (medium)	,510	,386	1,748	1	,186	1,666	,782	3,548
Education (low)	1,263	,379	11,119	1	,001	3,537	1,683	7,433
Status (pupil / student)			1,360	2	,507			
Status (employed)	,200	,408	,241	1	,624	1,221	,549	2,715
Status (NEET)	,422	,392	1,157	1	,282	1,524	,707	3,287
Constant	-4,409	,691	40,669	1	,000	,012		
-2 log likelihood: 448,523[a]; Nagelkerke R Square: ,253; df: 8								

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than ,001

Source: Survey "Problems, values and aspiration of young people in Moldova", OECD and Ministry of Education, Culture and Research, 2016.

One of the main objective of this paper is to elucidate the relationship between heavy consumers of alcohol and tobacco consumption. It should be noted that the link between these health

risk behavior and its impact on individual's health is strong and it is well documented in many studies. For example, one of the main conclusion of Swedish longitudinal is that the relative risk of head and neck cancers from heavy use of alcohol was 4.2 and from regular smoking was 6.3, while from both behaviours the relative risk has increased up to 22.1 [9]. This raises once again the issue of harms that can occur from heavy alcohol consumption and smoking.

Moreover, according to many scholars this relationship is "complementary" rather than "substitutive". Thus, a decrease of prices for alcohol beverages or tobacco products or increase in the availability of one of them is associated with an increase in the use of both products, against a "substitutive" relationship, where the use of the second product reduces when the first product becomes more available.

As results show, the interrelation between smoking and binge drinking is strong (table 8). Young people smoking daily are four times more likely (Exp(B)= 4,211) to drink frequently (two or more times per week), while in case of regularly heavy drinking the relationship is more obvious. Thus, those who are heavy smokers are almost eight times more likely (Exp(B)= 7,952) to be heavy drinkers. In this context, it may be argued that each of this health-risk practice become a risk factor for the other practice.

Table 8

Smoking daily and alcohol use determinants

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Drinking once a month and rarely			21,525	2	,000			
Drinking 2 or 4 times per month	,748	,232	10,441	1	,001	2,113	1,342	3,327
Drinking 2 or more times per week	1,438	,324	19,707	1	,000	4,211	2,232	7,946
Never binge drinking			14,671	3	,002			
Binge drinking less than once a month	,573	,240	5,713	1	,017	1,773	1,109	2,836
Binge drinking each month	,865	,341	6,423	1	,011	2,376	1,217	4,638
Binge drinking at least once a week and more	2,073	,596	12,109	1	,001	7,952	2,473	25,566
Constant	-2,201	,198	123,215	1	,000	,111		
-2 log likelihood: 642,805[a]; Nagelkerke R Square: , 178; df: 4								

Source: Survey "Problems, values and aspiration of young people in Moldova", OECD and Ministry of Education, Culture and Research, 2016.

Conclusions

The results of this study provide new information on the prevalence and socio-demographic determinants of smoking and drinking among young population in the Republic of Moldova. The data on these health-risk behaviours were obtained based on self-reported information, thus prone to some reporting bias, especially in case of young women.

The study highlighted major between-gender differences in smoking and drinking correlates in the targeted population. Gender and age was a strong determinant, and the observed lower likelihood of smoking and drinking at earlier ages is consistent with other surveys data. As well, young people with a lower education level were particularly likely to smoke and drink alcohol. The study revealed also a strong interrelation between these health-risk practices, while one of them may become a risk factor for other health-risk practices.

It may be argued that high prevalence of smoking and drinking in male in young adulthood reflect a normative structure for male socializing. As it was mentioned, these normative drinking dispositions become routine and internalized by the habitus, and they may be reproduced over generations by being constantly acted out, as Bourdieu (1984) explains in his work. Even that we make talk that a person always have a choice, group norms can take precedence. In his work, Bourdieu argues that people may have control over their lifestyle choices, but not necessarily over the social

and psychological conditions channeling those choices in a certain direction as opposed to others they might take.

The study has also revealed that smoking is more prevalent among young men with low education level and NEET, which might indicate to the growing concentration of health-risk behaviours among socially and economically marginalized groups. This is especially true when the data are correlated with heavy drinking. It can be also explained by the fact that these categories are less responsive to tobacco and alcohol control policies.

Taking into consideration that the strongest predictor variable overall was gender (male) and strong relationship between heavy drinking and smoking, we may argue that these factors are responsible for the increasing in premature deaths among males in the middle age.

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OTHER COMPARTIMENTS

REVIEW[1]
of the monograph "Ensuring financial stability of the state: theoretical approaches" of Irina Vilievna TOLMACHEVA, docent at the "Finance and Credit" Chair of the Taras Shevchenko Transnistria State University

Reviewer:
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Толмачева, Ирина.
Обеспечение финансовой стабильности государства: теоретические подходы: Научная монография / Толмачева Ирина; науч. ред.: Цырля Мариана Родика; Нац. Ин-т Экон. Исследований. – Кишинэу: INCE, 2019. – 170 p.
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Modern states face one of the most important tasks, which is to preserve and strengthen their economic potential, which depends, inter alia, on the financial stability of the ongoing economic processes. What is meant by such economic categories as "security", "economic security of the state"? What are the laws governing the formation of financial and economic crises? Under what conditions can the financial stability of the state be ensured? These and other issues are discussed within the review.

Key words: *economic security of the state, financial and economic crises, financial stability, index of financial conditions.*

In the current crisis conditions of the development of the world economy, the level of financial stability of individual states determines the general state, trends and priorities of the globalization processes of the world economy. In such a situation, the leaders of states are faced with the task of preventing crises and threats that can reduce their economic potential. Failure to fulfil this task creates a threat to national security and necessitates a quick response to its consequences by increasing the effectiveness of using the existing financial reserves.

Ensuring financial stability in any conditions is a priority for the financial policy of any state. This is due to the fact that the ability to constantly maintain the state's economy at a high level is possible only in the absence of a crisis and threats of its occurrence. At the same time, in crisis and post-crisis periods, when, under the influence of negative factors of the internal and external environment appear risks of insufficient state financing of socio-economic programs, this component of the state's financial policy acquires special relevance and significance. In such circumstances, issues of ensuring financial stability acquire the status of ensuring the sovereignty of the state.

Such a status and significance are also due to the key role of public finance, which is especially manifested in increasing the impact on macro and microeconomic processes and their results in the period of large-scale structural state reforms, as well as on the qualitative transformation of the social sphere, on financial stability, as a necessary condition for the development of any state.

The constant growth in recent decades of the number of challenges and preservation of the unstable geopolitical and economic situation in the world reinforces the importance of theoretical developments in the field of public finance. In this context, research, along with practical and

[1] ***Date received: January 2019.***

theoretical problems of ensuring the financial stability of the state, acquire a particular relevance and significance. This is the reason for the author's research in this area and the presentation of a monograph devoted to these issues.

The monograph submitted for publication structurally consists of four chapters. In the first chapter "Theoretical approaches to the definition of the state's economic security", the author, on the basis of numerous scientific publications devoted to this problem, examines in detail the general definition of security, conducts a detailed analysis of the concepts "security" and "economic security" formulated by various scientists and presents its own definition of economic security of the state, based, inter alia, on the key provisions contained in the "Concept of the National Security of the Republic Moldova", approved by the Law of the Republic of Moldova No. 112-XVI of May 22, 2008. The diagrams and pictures presented in the monograph increase the clarity of perception of the conceptual apparatus proposed by the author and increase its significance for theory and practice.

The second chapter "Analysis of elements of economic security" is devoted to an in-depth analysis of the main components of the system of economic security of the state. Based on the results of the study, the author offers her own formulation of the concept of economic security, thus highlighting several levels.

Along with this, this chapter also analyzes the positions of a number of scientists regarding the relationship between the national interests and the economic security of the state, as well as the impact of economic threats on it. At the same time, the author proposes her own definition of the concept "threat", analyzes the factors causing threats to the economy of the Republic of Moldova, proposes and systematizes measures to eliminate them.

In the third chapter, "The application of economic and mathematical modelling to the study of the economic sustainability of the financial system of the state", the author analyzes the past financial and economic crises and assesses their role in the instability of the economies of states, as well as searches for the causes of the emerging economic reasons. To establish the patterns of occurrence of crises, the author proposes to apply economic and mathematical modelling, and also describes possible assessment models, by characterizing their advantages and disadvantages.

In the fourth chapter, "Some possibilities for ensuring the financial stability of the state: theoretical approaches," the author considers the possible conditions for the financial stability of the state. Analyzing different positions of scientists presented in the published works, the author suggests to use the financial condition index as one of the crisis indicators of the country's economy; in order to assess the financial stability of the Republic of Moldova, she chose the model of E. A. Fedorova. In addition, the author offers an algorithm for managing the socio-economic development and achieving financial stability in the country.

In general, the results of the research presented by the author in the monograph have both theoretical and applied significance.

РЕЦЕНЗИЯ[1]
на монографию «Обеспечение финансовой стабильности государства: теоретические подходы» Ирины Вильевны ТОЛМАЧЕВОЙ, доцента кафедры «Финансы и кредит» Приднестровского государственного университета имени Т.Г.Шевченко

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Перед современными государствами стоит одна из важнейших задач, заключающаяся в сохранении и усилении экономического их потенциала, зависящего в том числе и от финансовой стабильности протекающих экономических процессов. Что понимается под такими экономическими категориями как «безопасность», «экономическая безопасность государства»? Каковы закономерности образования финансовых и экономических кризисов? При каких условиях может быть обеспечена финансовая стабильность государства? Эти и другие вопросы обсуждаются в рецензии.

Ключевые слова: *экономическая безопасность государства, финансовые и экономические кризисы, финансовая стабильность, индекс финансовых условий.*

В современных кризисных условиях развития мировой экономики уровень финансовой стабильности отдельных государства определяют общее состояние, тенденции и приоритетные направления глобализационных процессов мирового хозяйства. В такой ситуации, перед руководителями государств, ставится задача недопущения кризисных явлений и угроз, способных снизить их экономический потенциал. Невыполнение данной задачи создает угрозу национальной безопасности и обусловливает необходимость быстрого противодействия ее последствиям за счет повышения эффективности использования имеющихся финансовых резервов.

Обеспечение финансовой стабильности в любых условиях выступает приоритетным направлением финансовой политики любого государства. Это обусловлено тем, что способность поддерживать постоянно экономику государства на высоком уровне возможно только в случае отсутствия кризиса и угроз его возникновения. В то же время, в кризисные и посткризисные периоды, когда, под воздействием негативных факторов внутренней и внешней среды, возникают риски недостаточного финансирования государством социально-экономических программ, данная составляющая финансовой политики государства приобретает особую актуальность и значимость. В таких условиях вопросы обеспечения финансовой стабильности приобретают статус обеспечения суверенитета государства.

[1] Рецензия поступила в редакцию в январе 2019 г.

Такой статус и значимость обусловлены также ключевой ролью публичных финансов, которая особо проявляется в усилении воздействия на макро- и микроэкономические процессы и их результаты в период масштабных структурных государственных реформ, а также на качественное преобразование социальной сферы, на финансовую стабильность, в качестве необходимого условия поступательного развития любого государства.

Постоянный рост, в последние десятилетия, количества вызовов, сохранение нестабильной геополитической и экономической ситуации в мире, усиливает значимость теоретических разработок в сфере публичных финансов. В данном контексте, исследования, наряду с практическими, теоретических проблем обеспечения финансовой стабильности государства, приобретают особую актуальность и значимость. Этим обусловлено проведение автором научных исследований в рассматриваемой области и представлением к публикации монографии, посвященной этим проблемам.

Представленная к публикации монография структурно состоит из четырех глав. В первой главе «Теоретические подходы к определению экономической безопасности государства» автор, на основе многочисленных научных публикаций, посвященных данной проблеме, детально рассматривает общее определение безопасности, проводит подробный анализ понятий «безопасность», «экономическая безопасность», сформулированных разными учеными и представляет собственное определение экономической безопасности государства, основанное, в том числе, на ключевых положениях, содержащихся в «Концепции национальной безопасности Республики Молдова», утвержденной Законом Республики Молдова № 112-XVI от 22 мая 2008 года. Представленные в монографии схемы и рисунки, повышают наглядность восприятия предложенного автором понятийного аппарата и усиливает его значимость для теории и практики.

Вторая глава «Анализ элементов экономической безопасности» посвящена глубокому анализу основных составляющих системы экономической безопасности государства. Основываясь на результатах проведенного исследования, автор предлагает собственную формулировку понятия экономической безопасности, выделяя, при этом, несколько уровней.

Наряду с этим, в данной главе анализируются также позиции ряда ученых относительно взаимосвязи национальных интересов и экономической безопасности государства, а также оценки влияния на нее экономических угроз. При этом, автор предлагает собственное определение понятия «угроза», анализирует факторы, вызывающие угрозы экономики Республики Молдова, предлагает и систематизирует меры по их устранению.

В третьей главе «Применение экономико-математического моделирования к исследованию экономической устойчивости финансовой системы государства» автор проводит анализ прошедших финансовых и экономических кризисов и дает оценку их роли в нестабильности экономики государств, осуществляет поиск причин, возникающих экономических. Для установления закономерностей возникновения кризисов, автор предлагает применить экономико-математическое моделирование, а также описывает возможные модели оценки, характеризуя их преимущества и недостатки.

В четвертой главе «Некоторые возможности обеспечения финансовой стабильности государства: теоретические подходы» автор рассматривает возможные условия финансовой стабильности государства. Анализируя разные позиции ученых, представленные в опубликованных трудах, автор предлагает использовать индекс финансовых условий, в качестве одного из кризисных индикаторов экономики страны, а для оценки финансовой стабильности Республики Молдова выбрал модель Е.А.Федоровой. Кроме того, автор предлагает алгоритм управления социально-экономическим развитием и достижения финансовой стабильности в стране. В целом, представленные автором в монографии результаты своего исследования, имеют как теоретическую, так и практическую значимость.

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