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THE ROLE OF PROFESSIONAL JUDGEMENT OF AN ACCOUNTANT IN THE RATIONAL ORGANIZATION OF ACCOUNTING AND FINANCIAL REPORTING

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Abstract

The accounting system and the problems of its organization are largely due to the situation of international and national standardization in a market economy. National accounting standards provide a large variety of methods and techniques for recognizing and evaluating such elements as assets, equity, liabilities, income, expenses. The search for the most rational approaches in organizing the accounting is determined by the state of accounting policies, the content of which depends on the professional judgement of the accountant, i.e. on his creative and scientific level of implementing the issues for an economic entity's accounting.

In this article, the author focuses on the development of the professional judgement of an accountant, as a piece of intellectual matter, which, as regards to his professional skills, is able to solve complex problems in organizing preparatory accounting work, in accounting and in drafting financial reporting.

A sufficient level of excellence in accountant's professional judgement is determined by the author through the ability to develop and use primary documents and registers of synthetic and analytical accounting, setting significance thresholds in the preparation of accounting policies, in terms of recognizing and evaluating the accounting elements, using provisions (estimated reserves) in the time-based distribution of expenses (current and future periods), as well as on organizing item-by-item the analytical accounting of costs and expenses at the enterprise.

Keywords*: professional judgement of an accountant, rational organization of accounting, significance thresholds, accounting policies, recognition and evaluation of accounting elements*

1. Introduction

The globalization and standardization of accounting at the world's level requires the reforming of the system, making significant changes in the organization and maintenance of accounting in economic entities of the Republic of Moldova. The development and implementation of the Law on Accounting and Financial Reporting, the National Accounting Standards (NAS) and other legislative and regulatory acts in the Republic put forward new increased requirements for accounting and control specialists, that, as a result, leads to an increase role of an accountant in the process of generating current accounting and financial reporting information.

The level of professional judgement of an accountant is measured by the additional baggage of accumulated professional wisdom and practical experience, expressed in his competence in taking rational and effective decisions. The formation and improvement of professional level seems to be a diverse and complex process, because its content is influenced by various factors, starting with the level of acquired professional knowledge in an educational institution, then using the official positions in the field of accounting and auditing and further improve the self-education and professional development by studying new and changing laws and regulations on accounting and financial reporting.

The Dutch philosopher-materialist Benedict Spinoza (1633-1677) in his work "Ethics" proved the existence of the matter as something created by nature or God. The man, as a particle of this matter, is able to think, create ideas by developing his mind, to find the essential properties of general ideas, which constitute the foundations for science. Theoretical research in accounting, displayed by professional rationality of an accountant, borders on a rational, a perfect understanding, scientific approach to reality.

Science and practice in different areas of human life, including accounting, go side by side, complement each other and complete each other's content. It has long been proven that practice without theory (science) is blind, and science without practice is dead. Both in one and in the other content, there is that rational grain, which in accounting is measured by professional rationality, considered, according to the scientists of Moldova L. Grabarovskaya and G. Bezhan, as the driving force for the development and further improvement of accounting regulation and reform [4, p. 20].

Based on the views of the philosopher Spinoza, we believe that in professional judgement, through rationalism, in accounting there appears a piece of intellectual significance which is manifested through a rational, intelligent organization of accounting and economic analysis in order to make correct and reasonable, from the point of view of science and practice, managerial decisions in the activities of business entities. From the economic point of view, a rational decision is an action based on selection, comparison of many expedient factors by minimizing the use of funds and time and obtaining maximum effective results. In the entire chain of accounting operations, the rationality of their reflection is pursued through a high level of professional judgement of the accountant.

2. The level of researched problems and the purpose of scientific research

The legislative and normative acts constitute the basis for the regulation and organization of accounting at enterprises. The fundamental document for meeting the requirements of national accounting standards are accounting policies which are drawn up annually, taking into the account the independent interest and rationality of applying the methods and options for recognizing and evaluating the relevant elements of accounting. The level of organization's rationality and accounting in the conditions of the requirements imposed on it, is determined by the quality of accountants' training.

The root content of skills and professionalism is the professional judgment of an accountant, which expresses itself through the ability of an accountant to achieve a high level of intelligent organization of accounting and reporting in the interests of the effective operation of an economic entity.

The measurement of professional judgement level can be manifested through the quality of putting together the accounting policies. They reflect various components based on the requirements of the Law on Accounting and Financial Reporting, NAS and other regulations in this area.

A significant role at the level of accounting judgement is played by the quality of the professional judgement of an accountant. This article reflects the various parts of the accounting system that need constant professional judgement of an accountant. The main ones are: the development of accounting information carriers (primary documents, accounting registers, workflow), financial reporting, the definition and analysis of accounting techniques, methods and principles disclosed in accounting policies, as well as the use of significance thresholds, valuation reserves, organizing the analytical accounting of costs and expenses, etc. The above aspects of the study express the purpose of this article.

It should be noted that some issues of professional judgement are being considered by well-known scientists from the Republic of Moldova and Ukraine. The main ones are the publications of Professor A. Nederitsa in the journal “Accounting and Audit” ("Contabilitate și audit"), associate professors L. Grabarovskaya and G. Bezhan in the article "Formation of information on receivables in financial statements: professional judgement of an accountant", published in the materials of the international scientific and practical conference "Perspectives for the accounting development, analysis and audit in the context of European integration" of the Odessa National Economic University dated May 20, 2022, and I. Melnichuk and O. Lopatovskaya "Professional judgement of an accountant in the minds of non-deprivation" in the journal "Economic Space" Nr. 168 from 2021 and others.

The problems which are analyzed by the above-mentioned authors regarding the role of the professional judgement of an accountant mainly relate to certain narrow aspects of organizing the accounting and reporting.

We believe that the problem of developing and improving professional judgement deserves more attention under the influence of multifaceted aspects of the entire system of accounting rationalization in organizational terms, including the quality of the accountant's work and his performance indicators at the enterprise.

3. Research methods and applied materials

In any scientific research, including in the field of accounting, there it is used a dialectical method of matter cognition, consisting of its fundamental components: synthesis and analysis, induction and deduction, grouping and classification, observation and comparison of research objects, as well as modeling and designing individual processes, suitable for their economic, legal, social and technical content.

In this article, the author uses the basic elements of cognition in research on the content of an accountant's professional judgement, such as grouping and classifying the rationalization factors, organizing the accounting. It is also investigated, the factors of knowing the accounting elements through their recognition and valuation, taking into account the utility of their use. A particular attention in the study is drawn to the methods of observation and comparison in the selection of rational methods and techniques in the preparation of accounting policies, the use of significance thresholds in the recognition and valuation of the main elements of accounting, the use of valuation reserves in the recognition of costs and expenses in space and time of the economic entity’s activity.

In methodological studies there are used some philosophical views on the development of fundamental and specific conceptual phenomena, such as professional rationality, judgment, the significance threshold, the norm and regulation of accounting operations, and others. Synthesis and analysis, as cognition methods, are widely used in organizing the accounting on the synthetic and analytical accounts, structural construction of accounting for operating expenses in their itemized content.

The material basis for these studies constituted the main requirements of the Law on Accounting and Financial Reporting, the National Accounting Standards and other legislative and regulatory acts related to the issues under study, as well as the scientific developments and practical recommendations published in the journal “Accounting and audit” (“Contabilitate și audit”), “Accounting and tax consultations” (“Бухгалтерские и налоговые консультации”) and other sources.

4. Results and discussions

The qualitative level of an accountant's professional judgement is largely related to the processes of recognition and evaluation of various elements of accounting, such as long and short-term assets, receivables and payables, equity, investments, income, expenses, as well as the analysis of economic operations of business entities. Professional judgement is also associated with the choice of the system and form of organizing the accounting and financial reporting, depending on the categorization of the entity (micro, small, medium, large) and, as a result, the corresponding positions of legitimacy (double entry, simple system, NAS entries, IFRS) for the corresponding subject.

To a large extent, the level of professional judgement of an accountant is manifested in the choice of the most rational and effective techniques and accounting methods when compiling and changing the accounting policies. In this case, competence and his professionalism are manifested through the analysis of the most favorable factors affecting the financial result in order to ensure the stable activity of an economic entity. Wherein the accounting policy, like the whole financial policy, is the art of the possibility [9, p. 24]. And, therefore, this possibility is manifested through a rational choice of methodological techniques and options, recommended by the National Accounting Standards and other regulations regarding the identification and classification of accounting elements, as well as their recognition and evaluation, taking into account the time and space factors of the financial and economic activities of the enterprise.

As a rule, the professional judgement of an accountant begins to manifest itself from the moment of preparatory work on organizing the accounting, that is, in the development and provision of primary documents and accounting registers, drawing up a working plan of an economic entity’s accounts, distributing functional responsibilities between employees of the accounting department and compiling for each of them the functional characteristics of accounting work depending on their level of education, knowledge, experience, competence in the field of accounting.

At the same time, it should be borne in mind that the professionalism of the chief accountant and his multifaceted and deep judgement are associated with an understanding of the definition of norms and the regulation of accounting processes, the technology of accounting operations and the measurement of labor productivity of the employees from the accounting department. The norm is a certain limit of any amount of time, expenses, volumes, events or actions that show that for the society, as a whole, human life and enterprise, exceeding this limit, is favorable, timely or, conversely, unfavorable. For example, if the rate of work production per unit of time is overfulfilled, then obtaining additional products will have a favorable and effective state for the business entity; and if the consumption rate of raw materials used per unit of output is exceeding, then it will have a negative, financial situation in creating this product.

There are various types of norms and normalization processes [10, p. 44]: the norm of time, the norm of production, the norms of service, the norms of management, and others that the accountant must manage in the process of planning accounting work, taking into account the simplicity and complexity of accounting operations with a rational organization of accounting and presentation of financial statements. Rationing the accounting work allows you to calculate the required number of accounting workers, rationally distribute the functions between them, require compliance with the schedules, perform accounting operations prudently, avoiding errors and violations, without overloading work and without loss of working time. An essential element in professional judgement should also be considered the issues of preliminary work on the preparation and presentation of financial statements. Such work includes the mandatory inventory of values, cash, reconciliation of receivables and payables, as well as the preparation of accounting operations for closing the accounts of income and expenses of the current year, the transfer of the corresponding shares of long-term income and expenses for future periods by the upcoming reporting time, closing management accounts and more.

Of no small importance for fulfilling the professional judgement is the correction of possible errors and violations in the accounting of past and current accounting periods in accordance with the requirement of NAS "Accounting Policies, Changes in Accounting Estimates, Errors and Subsequent Events" [2, pp. 18-43].

Actual issues in the recognition and evaluation of accounting elements are established and applied in accounting policies of various significance thresholds for the intelligent organization of accounting and reporting. At the same time, the choice and application of the appropriate thresholds (limits) is measured by benefits indicators, the effectiveness of the corresponding impact on the final result (profit).

The main types of significance thresholds include the following:

– Establishment of an estimated reserve for uncollectible receivables. The establishment of this threshold can be expressed in different ways: in a determined percentage of accounts receivable, from the number of sales and other indicators, or in a determined amount;
– in case of maintenance and repair of long-term tangible assets with subsequent attribution of expenses to the current period or future periods, depending on the time of receiving economic benefits from repair expenses, possible attribution of expenses

for current repairs to an increase in the cost of the object under repair if an additional effect is obtained, economic benefit with further use;
- when determining investment property under conditions of partial transfer of buildings and land plots to operational leasing, moreover, that some of them remain under the use of an economic entity. The interest rate of the significance threshold is determined depending on the shares of transfer to leasing, their areas and the area used by the entity, reflected in the accounting accounts 123 "Fixed assets", 122 "Land plots", or the account 151 "Investment property" [8];
- when establishing a limit (threshold) of value to distinguish between low-value and wearing items from fixed assets. The Tax Code establishes this threshold in the amount of 6000 lei for each item, but the company has the right, according to the NAS “Long-term intangible and tangible assets”, to set a different significance threshold (more or less than the amount of 6000 lei), depending on the interests of the relevant economic benefit received upon their recognition;
- when recognizing current expenses or deferred income from the tenant and the landlord in accordance with the financial or operating leasing contracts on the basis of NAS “Leasing Agreements”;
- when attributing the difference between the book value and fair value minus the costs of selling in case of impairment of long-term assets to current or future expenses, depending on the established significance threshold in accordance with NAS “Impairment of Assets”;
- when accounting for recognized material damage as current income or deferred income, according to the established materiality threshold based on NAS “Accounts receivable and financial investments”, using the account 612 “Other income from operating activities” or the account 424 “Deferred long-term income”, the sub-account 4242 “Other long-term income of future periods” and the account 535 “Current income of future periods”, the subaccount 5353 “Other current income of future periods”.

The essential elements in the content of the professional judgement of an accountant include the creation and accounting of valuation reserves for reimbursement of expenses and losses associated with such phenomena as disputes, fines, penalties, damages and other uncertain obligations. They also include repair and maintenance expenses of the sold inventory assets during the warranty period, expenses for the payment of vacation benefits, for remuneration for the year-end employees of the enterprise, and others. In these situations, intelligence in organizing the accounting is manifested through a reliable determination of the amounts of estimated reserves, as well as their timely and correct use for the purpose of real and commensurate reflection on the basis of relevant events in time and space affecting the income and expenses of an economic entity.

In modern conditions when we look for rationalism in the professional activity of an accountant, a significant role is played by the scientific organization of labor in accounting. The basics of the scientific organization of labor involve the regulation of duties, competences and responsibilities of each accountant; elimination of duplication and parallelism in work; study and constant filling of knowledge related to accounting and method; carrying out integrated solutions and planning processes for organizing the accountants’ work; study and research of novelty in reforming and scientific achievements in theory and practice in the country and abroad, as well as the other factors of a favorable influence on the perfection of accounting organization.

It is advisable to correlate the process of organizing analytical accounting of expenses with their subsequent economic analysis to the significant role of professional judgment. In most cases, cost accounting is built in the context of sub-accounts, which, in our opinion, does not provide complete information about their detailed content recommended in NAS “Expenses”. In this case, for example, according to the account 712 “Sales Expenses” by the General Chart of Accounts, it is recommended to organize analytical accounting only on 9 sub-accounts, however, according to NAS “Expenses”, it is recommended to provide information on 16 items, and according to the account 713 “Administrative expenses”, respectively, on 8 sub-accounts, although in the reporting information under this standard it is recommended to ensure accounting for 30 items. We believe that the current accounting of various expenses of the subject is fair and rational, from an economic point of view, to build accounting for items of expenditure on an accrual basis by months and quarters throughout the reporting period, than to ensure their comparative analysis in dynamics and in a planned manner.

To the problems of the content of the professional judgement of an accountant, we consider it appropriate to also correlate the issues we are studying in the work “Organization of accounting at an enterprise”, Chisinau, 2009, where in the chapter “Scientific organization of labor in accounting” there are proposed a number of recommendations in the field of planning the accountants’ work, taking into account favorable factors and conditions to ensure the rational organization of accounting, as well as the use of rational scientific tools in the organization of accounting and control over the costs and expenses of subjects from various sectors of the national economy of the Republic of Moldova.

5. Conclusions

The internationalization of accounting and financial reporting, the approval of a new law on accounting and reporting, the development of national accounting standards and other guidelines and regulations put forward new increased requirements for the accounting. There is a need to improve the professionalism in the process of performing the duties.

The growth of professionalism fits into a new higher quality category of an accountant, called the professional judgement of an accountant.

The science and practice of organizing accounting and reporting raises two tasks for economic entities in the development of the economy in market conditions:

- determination of the level of theoretical knowledge and practical experience for solving functional accounting problems through the professional judgement of an accountant;
- determination of a function list for the rational organization of accounting, including all its stages, starting with primary documents, and ending with the preparation and presentation of financial statements, including the implementation of an economic analysis of indicators of financial and economic activity of an economic entity.

In connection with the increasing professional requirements and the role of accounting in the management of an entity, we consider it appropriate to reveal more professionally the rights, duties and responsibilities of the chief accountant, highlighting the content, characteristics and categories of professional judgement of an accountant. It is also appropriate, in our opinion, to disclose a list of functions for the level of professional judgement of a specialist that fall under the issues of rationalism in accounting organizations, for which it is advisable and should be reflected in a separate section of the annual accounting policies of an economic entity.

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Rezumat

În condițiile economiei de piață sistemul contabilității și problemele organizării acestuia este mult afectat de starea standardizării internaționale și naționale. Standardele naționale de contabilitate prevăd o mare varietate de metode și procedee de recunoaștere și evaluare a elementelor contabile cum ar fi: activele, capitalul propriu, datoriile, veniturile, cheltuielile. Selectarea celor mai raționale abordări privind organizarea contabilității poate fi determinată prin calitatea și plenitudinea politicilor contabile, al căror conținut depinde de raționamentul profesional contabil, respectiv de nivelul său creativ și științific în soluționarea problemelor contabile pentru o entitate economică.

În articol, autorul pune accent pe dezvoltarea raționamentului profesional contabil, identificat ca o particulă de substanță intelectuală, care, prin prisma competențelor sale de măiestrie profesională, este capabilă să realizeze cele mai complicate obiective aferente organizării premergătoare, ținerii contabilității și prezentării situațiilor financiare.

Nivelul suficient de perfecționare a raționamentului profesional contabil este determinat de autor prin capacitatea de a elabora și utiliza documente primare și registre de evidență sintetică și analitică, de a stabili praguri de semnificație în elaborarea politicilor contabile, în prisma recunoașterii și evaluării elementelor *contabile, folosirea provizioanelor la repartizarea cheltuielilor (perioadelor curente și viitoare) în timp și spațiu, precum și organizarea la entitate a contabilității analitice a costurilor și cheltuielilor pe articole aparte.*

***Cuvinte-cheie**: raționamentul profesional contabil, organizarea rațională a contabilității, pragurile de semnificație, politicile contabile, recunoașterea și evaluarea elementelor contabile*

Аннотация

Система бухгалтерского учета и проблемы его организации во многом обусловлены ситуацией международной и национальной стандартизации в условиях рыночной экономики. Национальные стандарты бухгалтерского учета предусматривают самые разнообразные методы и приемы признания и оценки таких элементов как активы, собственный капитал, обязательства, доходы, расходы. Поиск наиболее рациональных подходов в организации бухгалтерского учета определяется состоянием учетных политик, содержание которых зависит от профессионального суждения бухгалтера, т.е. от его творческого и научного уровня реализуемых учетных проблем для хозяйствующего субъекта.

В статье автор основное внимание нацеливает на развитие профессионального суждения бухгалтера, как частички интеллектуальной субстанции, которая через призму своего профессионального мастерства, способна решать сложные задачи по организации подготовительных учётных работ, по ведению бухгалтерского учета, составлению финансовой отчетности.

Достаточный уровень совершенства профессионального суждения бухгалтера определяется автором посредством способности разработки и использования первичных документов и регистров синтетического и аналитического учета, установлением порогов существенности при составлении учетных политик, в части признания и оценки элементов бухгалтерского учета, использованием оценочных резервов при повременном распределении расходов (текущего и будущих периодов), а также по организации постатейного аналитического учета затрат и расходов на предприятии.

***Ключевые слова:** профессиональное суждение бухгалтера, рациональная организация бухгалтерского учета, пороги существенности, учетные политики, признание и оценка элементов бухгалтерского учета*

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COMPARATIVE ANALYSIS OF THE MAIN TRENDS OF GENDER EQUALITY IN SOCIO-ECONOMIC SPHERE IN MOLDOVA AND UKRAINE

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Abstract

This research paper analyzes gender equality in the socioeconomic sphere with a focus on the labor market in two countries - the Republic of Moldova and Ukraine. These two countries were chosen for the research because, in addition to their close geographic location, they also share common historical and mental backgrounds and are both candidates for EU membership. In this regard, gender issues are one of the most important aspects in the process of joining the EU standards. It is enough to read the questionnaire on entry into the EU, as well as the compliance of the EU countries with various legislative standards and acts. The analysis in this research was based on data from the National Statistical Offices of both countries, as well as data from the report Global Gender Gap 2006-2022 elaborated by World Economic Forum - an independent international organization committed to improving the state of the world by engaging business and politics and that has been trusted with its data around the world for many years. While progress has been made in the socioeconomic sphere of gender equality in the two countries, significant gaps especially gender pay gaps remain to be eliminated. For this purpose, countries need to reconsider their domestic policies and strengthen them by applying new innovative measures oriented to the main policy of the EU countries and using their rich experience in this direction.

***Keywords**: gender equality, gender pay gap, labor market, Ukraine, Republic of Moldova, EU*

1. Introduction

Gender equality is an important factor in the effectiveness of the functioning of both society and the economy. Gender equality in society is actually at the international level, which is reflected in a number of international documents. The General Assembly of the United Nations has adopted a number of documents regulating the achievement of equality between men and women in society. In particular, in the Convention "on the Elimination of All Forms of Discrimination against Women", the issue of equal rights and opportunities for men and women has been highlighted as a separate theme. It emphasizes that "in order to achieve full equality between men and women, it is necessary to change the traditional role of both men and women in the family and society...".

Also, the EU has its current documents in this area and one of the important documents is

Gender Equality Strategy for the period 2020-2025 and many other [3].

As the authors rightly say in the Global Gender Gap report: "Gender-based inequality is a phenomenon that transcends the majority of the world's cultures, religions, nations and income groups. In most societies, the differences and inequalities between women and men are manifest in the responsibilities each are assigned, in the activities they undertake, in their access to and control over resources and in decision-making opportunities. In recent history, however, there has been increased recognition that gender-based discrimination prevents societies as a whole, women and men, from reaching their full potential" [1, p. 3].

2. Degree of investigation of the problem at present, purpose of the research

Gender equality is increasingly recognized as a necessary condition for sustainable development and effective national development policies and programs in all developed countries of the world. Over the years, the need for gender studies has increased in all countries due to the adoption of international conventions and gender mainstreaming policies, especially in the two studied countries given their EU integration course.

The authors of this work were interested in researching gender equality trends in the two neighboring countries of Ukraine and the Republic of Moldova and conducting a comparative analysis of the main indicators in these countries, in order to identify which indicators should be paid attention and strengthen measures to improve them or introduce new innovative measures. Also, the main goal is to synchronize the policies of these countries with EU policies and measures, although they have been following this course for many years.

These two countries were chosen for the research because, in addition to their close geographic location, they also share common historical and mental backgrounds and are both candidates for EU membership. In this regard, gender issues are one of the most important aspects in the process of joining the EU standards. It is enough to read the questionnaire on entry into the EU, as well as the compliance of the EU countries with various legislative standards and acts.

The scientific papers of the modern foreign scientists have great value for methodological and theoretical research of gender aspects in a social-economic sphere and especial in a labour market. Also, it should be noted that both authors have participated in such types of research projects and have experience and many publications in this field [5-11].

3. Methods and techniques applied

For our comparative analysis, we chose multiple case studies based on the similarities that exist between these countries (Moldova and Ukraine) in terms of their progress on gender equality issues in socio-economic sphere in recent decades.

The study is based on two main components:

- ➢ Gender equality in the social sphere:
  - ✓ Economic participation and opportunities
  - ✓ Educational attainment
  - ✓ Political empowerment

- ✓ Health and survival
- ➢ Gender inequality in the labor market:
  - ✓ gender pay gap
  - ✓ sectoral gender segregation
  - ✓ professional gender segregation.

The analysis in this research was based on data from the National Statistical Offices of both countries, as well as data from the report Global Gender Gap 2006-2022 elaborated by World Economic Forum (WEF) - an independent international organization committed to improving the state of the world by engaging business and politics and that has been trusted with its data around the world for many years. This research also used the last data of the Gender Inequality Index from the Human Development Report 2021-2022 published annually by UNDP. The study also paid attention to the legislative acts approved by Moldova and Ukraine in this area.

The following researches methods were used in the presented scientific paper: induction and deduction, synthesis, logical, monographic, comparative, economic analysis of the statistical data, etc. The following application Software was used for practical implementation of the indicated methods: Microsoft Excel – for spreadsheets manipulation, calculation and elaboration of graphs, charts (figures), Microsoft Word – for text processing.

4. Obtained results

Gender equality in the social sphere. In order to carry out an analysis of gender equality in the socio-economic sphere of the two examined countries, we used a series of data from the Global Gender Gap Report regularly published by the World Economic Forum, especially since more recently, this organization published its annual report on gender equality issues in the world for 2022. The Gender Equality Index from Global Gender Gap Report is calculated by comparing opportunities for men and women in four areas: political rights and opportunities, participation in the economy, education, health, and survival. This index has been calculated since 2006 and covers about 150 countries of the world. The Gender Gap Index is the result of collaboration with faculty at Harvard University and London Business School.

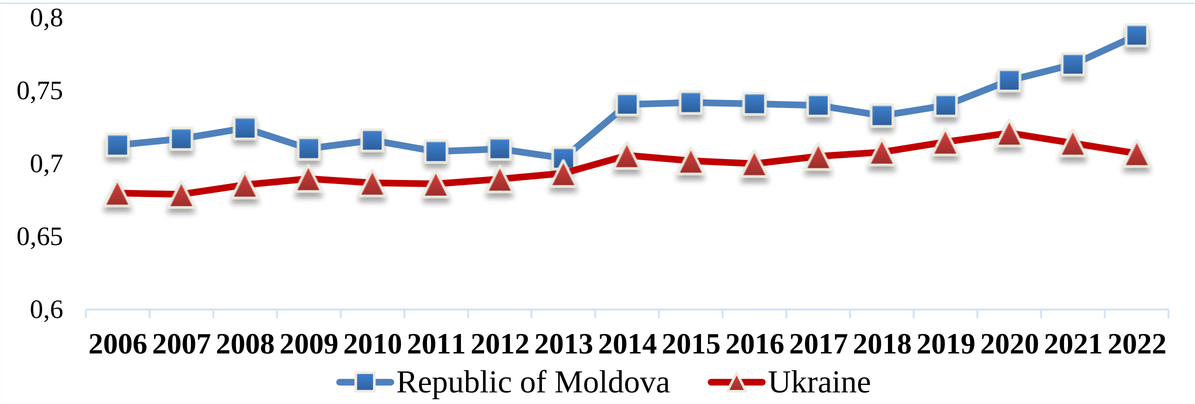

Figure 1. Dynamics of the Global Gender Gap Index for the Republic of Moldova and Ukraine according to the World Economic Forum

Source: elaborated by the authors according to the World Economic Forum "Global Gender Gap 2006-2022"

As is evident from the presented figure (Figure 1), in the period 2006-2022, both Moldova and Ukraine have revealed an upward trend in the score of the Global Gender Gap Index.

However, as for the ranks, the Republic of Moldova moved up to 6th position from 17th in the overall ranking. Thus, in 2006 the Republic of Moldova was ranked 17th in the overall ranking in the Global Gender Gap Index with a score 0.7128 and in 2022 the rank of the Republic of Moldova was 6 with a score 0.7880. Thus, according to this rating for the last 16 years the Republic of Moldova has improved its indicators and has moved by 11 positions.

However, as for the ranks, Ukraine increased from48positionsto81 in the overall ranking. Thus, in 2006 Ukraine was ranked 48 in the overall ranking in the Global Gender Gap Index with a score 0.6797 and in 2022 the rank Ukraine was 81 with a score 0.7070. Thus, according to this rating for the last 16 years, Ukraine has worsened its indicators and has dropped in the rating by 33 positions.

Table 1. The changes in the results of the main indicators by subindexes for Ukraine and the Republic of Moldova, 2006, 2022

	Economic participation and opportunity ranking (score)	Educational attainment ranking (score)	Health and survival ranking (score)	Political empowerment ranking (score)
Moldova				
2006	2 (0.7604)	37 (0.9942)	1 (0.9796)	50 (0.1172)
2022	25 (0.766)	52 (0.996)	1 (0.980)	29 (0.412)
Ukraine				
2006	24 (0.6909)	25 (0.9978)	1 (0.9796)	97 (0.0505)
2022	62 (0.710)	53 (0.995)	37 (0.978)	100 (0.145)

Source: elaborated by the authors according to the World Economic Forum "Global Gender Gap 2006-2022"

The dynamic of indicators for the Republic of Moldova reveals that the value of the index has increased over the 16 years of research due to the improvement of the situation in such areas as Economic participation and opportunities where the index increased 12.5 times or from 2% to 25%, i.e. by 23 p.p. and in the area of Educational attainment where the index increased from 37% to 52%, i.e. by 15 p.p. In the area of Political empowerment, the index decreased 12.5 times from 50% to 29%, i.e. by 21 p.p. In a such areas as Health and survival - the situation has not changed.

The dynamic of indicators for Ukraine reveals that the value of the index has increased over the 16 years of research due to the improvement of the situation in such areas as Economic participation and opportunities where the index increased 2.6 times or from 24% to 62%, i.e. by 38 p.p., in the area of Educational attainment where the index increased from 25% to 53%, i.e. by 28 p.p. and in the area of Political empowerment where the index increased from 97% to 100%, i.e. by 3 p.p., in the area of Health and survival the index increased from 1% to 37%, i.e. by 36 p.p.

As can be seen from Figure 2, on the Gender Inequality Index from Human Development Report 2021/2022 - the Republic of Moldova 2021 ranked 51st and Ukraine 49th out of 191 countries in the world [4].

HDI RANK		Gender Inequality Index		SDG 3.1 Maternal mortality ratio	SDG 3.7 Adolescent birth rate	SDG 5.5 Share of seats in parliament	SDG 4.4 Population with at least some secondary education (% ages 25 and older)		Labour force participation rate[a] (% ages 15 and older)	
		Value	Rank	(deaths per 100,000 live births)	(births per 1,000 women ages 15–19)	(% held by women)	Female	Male	Female	Male
		2021	2021	2017	2021	2021	2021[b]	2021[b]	2021	2021
60	Belarus	0.104	29	2	11.9	34.7	97.5	99.0	57.3	71.4
61	Panama	0.392	96	52	69.9	22.5	70.2	68.7	50.4	72.6
62	Malaysia	0.228	57	29	9.3	14.9	75.0	78.4	51.2	77.6
63	Georgia	0.280	66	25	31.7	19.3	97.1	98.3	51.0	68.0
63	Mauritius	0.347	82	61	24.6	20.0	64.4[c]	70.8[c]	43.4	70.4
63	Serbia	0.131	36	12	14.9	39.2	88.6	95.3	46.6	62.3
66	Thailand	0.333	79	37	32.7	13.9	47.6	51.7	59.0	75.0
High human development										
67	Albania	0.144	39	15	14.5	35.7	95.4[f]	93.0[d]	50.7	66.2
68	Bulgaria	0.210	52	10	38.6	23.8	94.9	96.5	49.1	62.6
68	Grenada	..	..	25	32.7	32.1	..	..	..	..
70	Barbados	0.268	64	27	42.3	29.4	95.4[d]	86.0[d]	56.1	63.7
71	Antigua and Barbuda	..	..	42	33.1	31.4	..	..	..	..
72	Seychelles	..	..	53	53.4	22.9	..	..	..	..
73	Sri Lanka	0.383	92	36	15.7	5.4	84.0	84.2	30.9	68.5
74	Bosnia and Herzegovina	0.136	38	10	9.9	24.6	82.7	94.0	32.3	52.4
75	Saint Kitts and Nevis	..	..	..	38.2	25.0	..	..	..	..
76	Iran (Islamic Republic of)	0.459	115	16	30.2	5.6	71.6[c]	76.0[c]	14.4	68.1
77	Ukraine	0.200	49	19	15.6	20.8	96.2[d]	95.8[f]	48.1	63.6
78	North Macedonia	0.134	37	7	16.4	41.7	61.9	75.1	42.4	63.4
79	China	0.192	48	29	11.0	24.9	78.3[d]	85.4[d]	61.6	74.3
80	Dominican Republic	0.429	106	95	65.6	25.7	77.4[c]	76.9[c]	49.6	75.2
80	Moldova (Republic of)	0.205	51	19	27.8	39.6	96.1	98.0	33.9	43.9
80	Palau	..	..	..	42.5	6.9	96.9	97.3	..	..
83	Cuba	0.303	73	36	48.8	53.4	89.5[c]	91.9[c]	40.3	68.5

Figure 2. The position of the two countries on the Gender Inequality Index from Human Development Report 2021/2022

Source: The screenshot from Human Development Report 2021/2022: Uncertain Times, Unsettled Lives: Shaping our Future in a Transforming World. UNDP.

Gender inequality in the labor market. Formally, men and women have received equal rights, but there are gender specificities in the structure of employment. Gender inequality in the labor market has a different nature. The problem of ensuring the equality of men and women in labor relations is the most urgent, since in no other field is this kind of discrimination perceived as acutely as in the field of work. The problems of gender inequality are most clearly manifested in the part of remuneration.

One of the basic values of the European Union, enshrined in the EU Treaties and the Charter of Human Rights, is the provision of equal pay for work of equal value, regardless of the employee's gender. Currently, this is enshrined in Article 157 of the Agreement on the Functioning of the European Union and Directive 2006/54/EC on ensuring the principle of equal opportunities and the equal position of women and men in the field of work, which proves the priority of reducing the gender pay gap.

Monitoring and evaluation of the progress of ensuring equal pay for work of equal value are carried out using the indicator of the unadjusted gap in the pay of men and women, which is included in the table of social indicators of the European component of social rights (Table 2).

Table 2. The dynamics of the gender pay gap per European Union countries

Years	2006	2008	2010	2015	2016	2017	2018	2019	2020
Gender pay gap EU-27	17.7	17.1	17.1	15.5	15.1	14.6	14.4	14.1	13.0

Source: elaborated by the authors used https://ec.europa.eu/eurostat/databrowser/view/EARN_GR_GPG/default/table?lang=en

According to the Eurostat data, the dynamics of the gender pay gap show a gradual decrease in the overall gap in 27 European countries. In 2020 the gender pay gap in the EU was 13%.

The gender pay gap decreased by only 4.1 p.p. in 10 years. Women on average earn 0.87 euros for every 1 euro earned by men.

The gender pay gap (not adjusted) - GPG - is the difference between the wages of women and men in the form of a percentage share of the earnings of men. Currently, there is no internationally recognized standard for measuring the gender gap, which significantly complicates international comparisons. The calculation of GPG for EU countries uses the average gross hourly wages of employees by gender who are employed at enterprises with more than ten employees.

Gender-oriented employment and salary policies in most countries of the European Union have positive consequences, manifested in the reduction of the gender gap. During 2006-2020, the most significant decrease in the gender pay gap has been recorded in Greece (-10.3 percentage points); Luxembourg (-10.0 percentage points); the Netherlands (-9.4 percentage points); Estonia (-8.1 percentage points), Spain (-8.5 percentage points); Czech Republic (-7.0 percentage points), Finland (-4.6 percentage points), Germany (-4.4 percentage points). On the other hand, a significant increase in the gender pay gap has been recorded in Poland (+3.0 percentage points), Bulgaria (+0.3 percentage points), Portugal (+3.0 percentage points), Hungary (+2.8 percentage points) and France (+0.4 percentage points) (Table 3).

Table 3. Gender pay gap (not adjusted) in the countries of the EU

	2006	2008	2010	2015	2018	2019	2020
EU-27	17.7	17.1	17.1	15.5	13.9	14.1	13.0
Luxembourg	10.7	9.7	8.7	4.7	1.4	1.3	0.7
Romania	7.8	8.5	8.8	5.6	2.2	3.3	2.4
Italy	4.4	4.9	5.3	5.5	3.9	4.7	4.2
Belgium	9.5	10.2	10.2	6.4	5.8	5.8	5.3
Greece	20.7	22.0	15.0	12.5	10.4	10.4	10.4
Poland	7.5	11.4	4.5	7.3	8.5	8.5	4.5
Portugal	8.4	9.2	12.8	16.0	8.9	9.6	11.4
Spain	17.9	16.1	16.2	14.1	11.9	11.9	9.4
Hungary	14.4	17.5	17.6	14.0	12.2	18.2	17.2
Bulgaria	12.4	12.3	13.0	15.5	14.4	14.1	12.7
Netherlands	23.6	18.9	17.8	16.1	14.7	14.6	14.2
France	15.4	16.9	15.6	15.6	16.7	16.5	15.8
Finland	21.3	20.5	20.3	17.5	16.9	16.6	16.7
Czechia	23.4	26.2	21.6	22.5	20.1	18.9	16.4
Germany	22.7	22.8	22.3	21.8	20.1	19.2	18.3
Estonia	29.8	27.6	27.7	26.7	21.8	21.7	21.1

Source: elaborated by the authors used https://ec.europa.eu/eurostat/databrowser/view/sdg_05_20/default/table?lang=en

Several approaches can be used to compare gender pay gaps between countries. First, the difference between the median salary of men and women, divided by the median salary of full-time and self-employed men, is used. According to the ILO methodology, the wage gap can be calculated based on the average and median wages by gender. Either monthly or hourly wages can be taken into account, although preference should be given to hourly earnings, as it provides the most objective data since it is women who are at risk of underemployment. The gender gap in receiving bonuses (premiums) by men and women is calculated separately. Usually, the national statistics usually operate with indicators of the average monthly salary, which is the average indicator of the nominal salary and is determined by dividing the amount of the salary fund of full-time employees calculated for the reporting year by the number of these employees and by 12.

The calculated indicators of gender wage gaps in the economy of Ukraine and the Republic of Moldova based on the monthly average indicate the existence of a clear tendency to decrease this indicator with individual peaks that can be explained by changes in economic development (Figure 3).

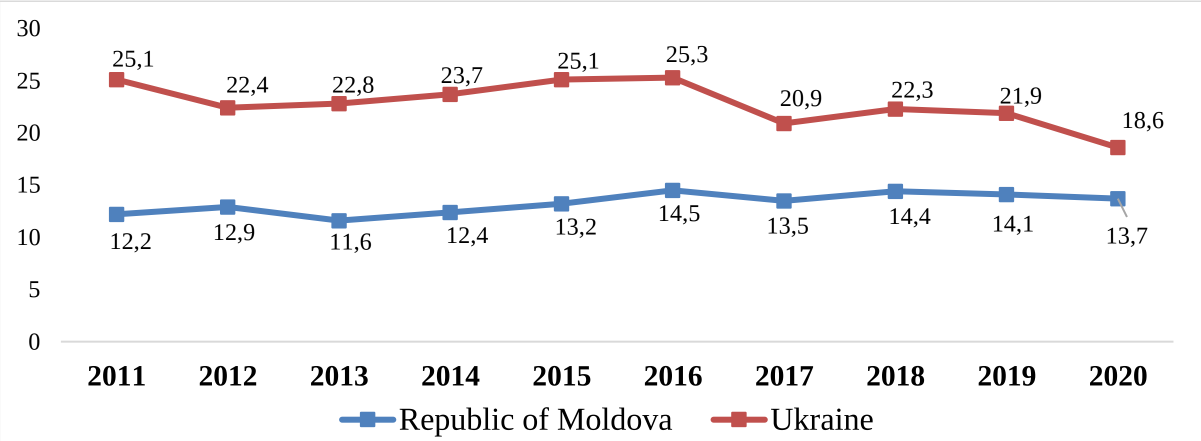

Figure 3. Dynamics of the unadjusted gender pay gap in the Republic of Moldova and Ukraine (%)

Source: elaborated according to the Moldovan National Bureau of Statistics and the State Statistics Service of Ukraine

The unadjusted gender pay gap provides the analyst with a general picture of the differences in pay between men and women. It measures a concept that is inherently broader than "equal pay for equal work or work of equal value." Part of the differences between the incomes of women and men can be explained by the existing differences in the average characteristics of men and women, which is due to such factors as the concentration of workers of one or another gender in the sectors of the economy (sectoral gender segregation) or profession (professional gender segregation).

Nevertheless, according to the latest official data from both countries, the largest gender pay gaps in both countries were recorded in financial activities, information and communications, and health and social work. For example, according to Moldovan NBS data, in 2021, the largest differences were recorded in activities:

- financial and insurance - 44.6% (8807.6 MDL) below;
- information and communication - 38.0% (8136.5 MDL) below;
- health and social work - 23.3% (2486.0 MDL) below;
- industry - 19.8% (1652.4 MDL) below;
- real estate transactions - 18.6% (1271.9 MDL) below.

At the same time, women earn higher wages than men in activities:

- administrative service activities and support service activities - by 8.1% (487.4 MDL) higher;

- education - 1.8% (127.5 MDL) higher;
- other service activities - 1.3% (120.2 MDL) higher.

According to official data from Ukraine, the situation is similar.

Occupational segregation based on gender is also partially explained by the fact that men are more often appointed to management positions than women due to discrimination or career breaks or the combination of family and work responsibilities (the so-called "glass ceiling"). Within the framework of neoclassical economic theory, the existence of gender segregation is explained by the propensity of women to work in those professions that allow them to combine work with domestic duties. And the choice of occupation or profession has a direct dependence on the individual return from it during life. All this justifies the choice of women in favor of flexible employment, working either in reduced mode or in combination with free working days. A high degree of gender segregation is a significant factor in disparities in the level of wages, career prospects, and, as a result, in the inequality of opportunities for men and women in the field of employment as a whole, and subsequently in differences in the amount of pension provision.

As mentioned earlier, the authors of this article have been engaged in research in this field for many years, and therefore many of their experiments, calculations, and conclusions can be found in their already-published scientific papers [5-11].

5. Conclusions and recommendations

While progress has been made in the socioeconomic sphere of gender equality in the two countries, significant gaps especially gender pay gaps remain to be eliminated. For this purpose, the two countries need to reconsider their domestic policies and strengthen them by applying new innovative measures oriented to the main policy of the EU countries and using their rich experience in this direction if they have the intention of joining the EU as soon as possible. Currently, the EU has the active strategy “The EU Gender Equality Strategy 2020-2025”. The EU Gender Equality Strategy contains policy objectives and actions that could lead to great progress. By 2025, Europe could come a long way toward becoming a continent where women are equal to men. The idea is that all Europeans - women or men, girls or boys - should enjoy the freedom to follow their own path, have equal opportunities to prosper, be equal members of society, and become leaders if they deserve it.

Although inequalities still exist, the EU has made great strides in recent decades toward ensuring equality between women and men. Here are the measures that have worked:

- ✓ equal treatment legislation
- ✓ gender mainstreaming in all other policies
- ✓ specific measures to promote women.

The signs are encouraging: more women in UE are working and getting better qualifications. But disparities remain. Women are still largely working in lower-paid sectors and in fewer decision-making positions.

It can be stated that the labor legislation in both countries is gender neutral, there are no negative discriminatory provisions against women or men, and it provides for all basic types of equality and social protection. However, the low level of implementation of legislation with the simultaneous existence of legislative norms aimed at overcoming gender disparities and giving certain preferences to women leads to the opposite trends, namely, they do not reduce gender segregation, but contribute to the asymmetric distribution of men and women between types of work.

It is necessary to introduce a gender approach to state and regional programs, plans and strategies, as well as to spread knowledge about gender relations. At the same time, monitoring and evaluation of relevant measures should be provided on the basis of a system of gender indicators characterizing the situation in the field of gender equality in the labor market.

The minimization of gender disparities and professional segregation requires the introduction of measures that will contribute to the elimination of discriminatory social norms and the encouragement of equal participation of women in the spheres of work, education and professional training, as well as to encourage women to diversify their choice of profession and occupy jobs in new professions.

In both countries, an effective control procedure should be established regarding cases of violation of equality and discrimination against women by employers. In order to eliminate gender problems in society, special information campaigns should be implemented among the population to highlight the importance of gender issues, and a special subject on the basics of gender knowledge must be introduced into the educational programs of educational institutions of all levels of accreditation. Cultivating a culture of gender parity in society will significantly improve gender parity and form a culture of egalitarian relations.

There are many questions that both research countries need to answer in order to properly and quickly adjust their policies on this issue. In this regard, for Ukraine and the Republic of Moldova it is recommended that they once again carefully consider the answers to the following important questions: What legal documents exist to eliminate discrimination against women in the labor market? How are these documents applied in practice? Are women targeted for more or less paid jobs? What are the implications for women? Are there professions in which, according to legislation or tradition, women/men are predominantly employed? Does the lack of childcare facilities and services have a negative impact on women's representation in the labor market? Is there really equal access to education? If not, what factors determine the differences in access to education for women and men? If there is discrimination, how can this be changed and how can women and men participate in the process of change? Are women and men discriminated against in the labour market? If so, why and how can this discrimination be addressed? What are the barriers preventing women from attaining leadership positions in government or public administration? What are the barriers that prevent women from attaining leadership positions in the justice system, the police, and the military?

By answering all of these questions, the main directions for improving the situation on this issue in these countries will be elaborated.

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Rezumat

Această lucrare de cercetare analizează egalitatea de gen în sfera socio-economică, cu accent pe piața muncii în două țări - Ucraina și Republica Moldova. Aceste două țări au fost alese pentru cercetare deoarece, pe lângă faptul că se află în apropiere geografică, ele împărtășesc, de asemenea, medii istorice și mentale comune și sunt ambele candidate la aderarea la UE. În acest sens, problemele de gen reprezintă unul dintre cele mai importante aspecte în procesul de aderare la standardele UE. Este suficient să citim chestionarul privind intrarea în UE, precum și respectarea de către țările UE a diferitelor standarde și acte legislative. Analiza din cadrul acestei cercetări s-a bazat pe datele de la Oficiile Naționale de Statistică ale celor două țări, precum și pe datele din raportul Global Gender Gap 2006-2022 elaborat de Forumul Economic Mondial - o organizație internațională independentă care se angajează să îmbunătățească starea lumii prin implicarea mediului de afaceri și a celui politic și căreia i se acordă încredere cu datele sale în întreaga lume de mulți ani. Deși s-au înregistrat progrese în sfera socio-economică a egalității de gen în cele două țări, rămân de eliminat decalaje semnificative, în special diferențele de remunerare între femei și bărbați. În acest scop, țările trebuie să își revizuiască politicile interne și să le consolideze prin aplicarea de noi măsuri inovatoare orientate spre politica principală a țărilor UE și prin utilizarea experienței bogate a acestora în această direcție.

Cuvinte-cheie*: egalitate de gen, diferență de remunerare între femei și bărbați, piața muncii, Ucraina, Republica Moldova, UE*

Аннотация

В данной исследовательской работе анализируется гендерное равенство в социально-экономической сфере с акцентом на рынок труда в двух странах - Украине и Республике Молдова. Эти две страны были выбраны для исследования, поскольку, помимо близкого географического расположения, они также имеют общие исторические и ментальные корни и обе являются кандидатами на вступление в ЕС. В связи с этим, гендерные вопросы являются одними из наиболее важных аспектов в процессе присоединения к стандартам ЕС. Достаточно ознакомиться с анкетой на вступление в ЕС, а также с соблюдением странами ЕС различных законодательных норм и актов. Анализ в данном исследовании был основан на данных Национальных статистических управлений обеих стран, а также на данных отчета "Глобальный гендерный разрыв 2006-2022", разработанного Всемирным экономическим форумом - независимой международной организацией, которая стремится улучшить состояние мира путем привлечения бизнеса и политики и данным которой уже много лет доверяют во всем мире. Несмотря на прогресс, достигнутый в социально-экономической сфере гендерного равенства в двух странах, значительные разрывы, особенно разрыв в оплате труда мужчин и женщин, еще предстоит устранить. Для этого странам необходимо пересмотреть свою внутреннюю политику и укрепить ее, применяя новые инновационные меры, ориентированные на основную политику стран ЕС и используя их богатый опыт в этом направлении.

Ключевые слова: *гендерное равенство, гендерный разрыв в оплате труда, рынок труда, Украина, Республика Молдова, ЕС*

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ROAD INFRASTRUCTURE MANAGEMENT SYSTEM IN THE REPUBLIC OF MOLDOVA: THE CORRELATION BETWEEN ALLOCATED FINANCIAL RESOURCES AND ROAD QUALITY

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Abstract

The scientific work represents a research regarding the significant importance of performance-based road management in economic activity. In this sense, the authors have carried out a concrete estimation of some indicators that influence development and economic growth by ensuring the implementation of road management, carried out with the identification of elements of progress in order to review the way of efficient use of resources. Investments in transport networks ensure the increase of invested capital compared to that achieved in other fields of activity, based on direct and indirect effects, resulting from cost savings by attracting the necessary resources for the creation of modern road infrastructures. The progressive management of road is based on performance, both programming and the implementation of their maintenance and operational activities, determined in accordance with the defined performance indicators. The scientific methods used are: analysis and synthesis, induction and deduction, critical analysis of materials, etc. The main results obtained from the investigations refer to the assessment of the indicators regarding the effective management of road by applying the performance of progress in view of user access to qualitative public roads.

***Keywords**: management, transport networks, public roads, quality, modern infrastructure, performance*

1. Introduction

The generating factor for growth and economic emancipation for the development of a society is the existence of modern and qualitative road networks, capable of ensuring commercial links at national level between various regions, but also internationally, thus contributing to the intensification of relations between states, connecting localities to the national network transport, thus facilitating the free movement of citizens and increasing mobility. Road management establishes and implements road infrastructure policy through predetermined and systematic activities, so as to ensure a performance and the achievement of the required quality of the road infrastructure.

2. The degree of investigation of the problem at present, the purpose of the research

The importance and topicality of the research topic can also be argued by the fact that roads are part of the national transport system. These are land communication paths that must meet certain conditions, such as:

- maximum safety, especially for passenger transport;
- speed, i.e. high traffic speed;
- mobility and access to all interesting places;
- regularity and punctuality, regardless of atmospheric conditions;
- large transport capacity along the entire route;
- economic, both in terms of initial investment and operating expenses.

With reference to our object of study, 3 determinants are stipulated in the specialized literature:

1. The road infrastructure, which is defined as part of the road construction consisting of earthworks, their consolidation and protection works, including works of art (bridges, viaducts, tunnels, etc.), which support the road superstructure and transmit to the ground requests from traffic and from the forces loading the construction.
2. Infrastructure – all the elements of a construction that support its useful part, connect it to the ground and transmit to it the forces that load the construction
3. Road infrastructure - the set of constructions, installations and equipment that support road traffic [4, 5].

The common definition of the notion of road, according to the DEX, is "land communication path, consisting of a narrow and continuous strip of beaten, cobbled, paved or asphalted land" [5].

From the studied literature, we find that one of the first researchers who analyzed the scientific determinant "road" is Prof. S. Tripp. in his work "Road traffic and its control". Tripp mentions that there are 2 major missions of roads: first, roads are the main conduit of traffic and second - roads serve the everyday activity of communities. He classifies roads into 3 categories: *arterial, sub-arterial and local or minor roads* [11].

Arterial roads are "roads in which everything but non-motorized traffic is included", sub-arterial roads are "roads open to all types of traffic and motor traffic must predominate"; local or minor roads are "roads intended for local traffic only, roads will be predominantly intended for the needs of passengers and pedestrians" [4].

At the same time, Stephen Marshall, a professor at the University of Westminster, in his publication A First Theoretical Approach to Classification of Arterial Streets, mentions that „There are countless ways to describe and classify roads. We can classify by form, by function, by use or provision, by their significance” [8].

Thus, from examining the diversity of classification systems found in the literature, it is evident that there is no single classification of road types. For example, roads can be classified as:

- by the type of property and the subjects that ensure their management,
- depending on the traffic (volume, composition),

- by network role (location and connectivity),
- by physical form – dimensions, alignment, etc.,
- as an urban function,
- according to people's activities on the roads.

Efficient road management must be regarded as a system, which is extremely important for the development of quality transport networks and represents a process of maintaining and modernizing road networks that allows their continuous use by traffic, efficiently and safe. From the analysis of specialized literature, we identify that the notion of *system represents a scientific determinant used over time*. Thus, the DEX defines the system as "an ensemble of elements (principles, rules, forces, etc.) dependent on each other and forming an organized whole, which puts order in a field of theoretical thinking, regulates the classification of material in a field of natural sciences or makes a practical activity work for its intended purpose [5].

Alexandru Surdu in his work *General theory of systems* makes a detailed analysis of the evolution of the notion of system. In this paper, the author mentions that "although it seems difficult to argue that there are historical elements worth mentioning in a general systems theory, there are nevertheless interesting issues that have been debated since antiquity and that are directly related to the topic under discussion" [10]. From this work there is evidence that the evolution of the notion of system begins in the works of the Greek philosophers Aristotle, Plato, etc. But still, we consider this scientific determinant to be relatively new. The founder of the general systems theory is the biologist Ludwig von Berthalanffy, who in 1968 proposed this theory as "a tool that could be shared by many different sciences" [7]. Starting with this theory, the notion of system also began to be used in management.

Thus, with the development of the management concept, the system is initially treated as a working method, a way of organizing a process, an operation. Currently, it is known that the management system represents that ensemble, all interconnected elements, through which the actual management process is executed, in order to achieve the defined goals.

Respectively, in order to define a system in any field, we must determine the elements that are a component part of the type of activity, and at the same time, we must determine those links or rather those existing connections between the elements of the process and at the same time, let's not forget to determine its objectives.

The purpose of the research: Following these investigations, the authors propose in this study to carry out an analysis on the management of road infrastructure, based on the combination of result indicators (quality) and inputs (allocation of financial resources) by the nature of the influence of the model parameters, which describe the dependence between effort and effect.

3. Applied methods and materials

The authors in their research used methods of empirical synthesis approached from the economic perspective of road infrastructure development with the set of processed qualitative data, centred on comparative analysis of econometric regression models. Using in this sense the observation and case study for the evaluation of public roads in correlation with the resources intended for the development of this field.

4. The obtained results and discussions

4.1. Implementation of performance-based management

In the new European approaches regarding the realization of constructions/rehabilitation of public roads, economic operators in construction must adopt, implement and maintain a high-performing Quality Management System, as a component part of the unit's general management system, through which they orient themselves and coordinates the unit's activity in terms of quality.

Quality assurance management is a main component of the quality system in the construction of public roads and represents a significant side of the management system of economic operators in construction. Quality management establishes and in fact transposes the quality policy through pre-established and systematic activities, thus still preventing non-quality, ensuring the achievement of the required quality and providing confidence in the capacity of the unit.

Within the new European approaches to construction / rehabilitation of public roads, economic operators in construction must adopt, implement and maintain an efficient Quality Management System, as a component part of the overall management system of the unit, which guides and coordinates the activity of the unit in terms of quality.

Quality is a notion with a very wide use, which makes it extremely difficult to make its definition from a scientific point of view. An older definition states - the set of properties of a product or service that gives it the ability to meet expressed or implied needs. Other informal definitions mention: - prevention is cheaper than repair; - or it is cheaper to do everything right from the beginning; - quality is the minimum cost that a product imposes on society.

The construction quality of roads is defined and regulated by law no. 721 of 02.02.1996 entitled “Law on quality in constructions”. The provisions of this law apply to constructions of any category and their related installations, regardless of the type of property or destination, including rehabilitation, capital repair of public roads, hereinafter referred to as constructions, as well as their modernization, modification, transformation and consolidation works.

Construction quality means a set of properties that must be possessed by an object to be put into operation, which meets the modern requirements for its construction, operation and economy.

The quality of the construction of the installation, of the infrastructure network, depends on the quality of the project, the quality of the construction materials, constructions, semi-finished products, parts and the quality of the construction and installation works.

Results-based or performance-based resource management was actually recommended by the Hoover Commission of the United States in 1949. In the 1950s and 1960s, many countries, including the United States, began evaluating institutions with the help of performance indicators not on how much they spent, but on what they actually produced. In the end, these systems did not deliver the expected results because they were too rigid to account for uncertainty and unpredictability and because they failed to identify the limits of formal systems that influence people's behaviour.

As a result, performance measurement declined in popularity in the late 1970s and mid-1980s, but has seen a renaissance in the last 30 years as a result of changing economic environments as well as citizens' ever-increasing demands for quality infrastructure. Thus, the strongest trend to improve performance is to use resources through performance-based management and reporting. Australia and New Zealand were the first countries to implement performance management based on performance indicators in the late 1980s, followed by Canada Denmark, Finland, France, Sweden, the United Kingdom and the United States in the early 1990s. In the late 1990s - in the early 2000s we find Austria, Germany and Switzerland.

Governments have introduced performance-based management for four main reasons:

– to improve efficiency;
– to improve decision-making;
– to transparently improve accountability;
– to make savings.

Some countries have focused on only one or two of these goals, while others have embraced all four, with the aim of introducing performance-based financial resource management and the responsibility of the legislature and citizens. Australia, Denmark, the Netherlands, New Zealand, the United Kingdom and the United States are pursuing this approach.

In countries such as the United States, ministries have developed strategic plans that include performance targets. Others have adopted performance contracts, for example, between a ministry and a subordinate institution. The purpose of these contracts or agreements is to facilitate a greater understanding and strengthen bargaining power within the public sector.

This approach has the advantage that it tends to clarify the responsibility of each party to the contract or agreement, informally particularly on the performance in the allocation of resources as well as the specification of sanctions and rewards.

There have been different approaches to implementing performance management. Some countries - for example Australia, the Netherlands, New Zealand, and the United Kingdom have implemented the top-down approach, others, such as Finland, have adopted a bottom-up and ad hoc approach in which institutions are free to develop their own methods based on performance and with little interventions on behalf of top bodies.

The main goal is to move from an input-based system to a results-based system. This can be achieved by a clear definition of the objectives and methods to be followed.

Therefore, there are higher demands for results but at the same time a greater freedom is granted regarding the methods used to obtain them. But the central point is responsibility, who and how is responsible for the results.

O a stronger emphasis on accountability allows the limitation, even the exclusion, of the daily controls of the superior organs. It is therefore important to develop appropriate means of measurement that fully ensure the obligation to be accountable, with the aim of both promoting greater operational freedom and effective strategic control.

In the Republic of Moldova, the management of resources in the field of road management focuses on the results to be obtained from the activities planned / carried out by the authorities / institutions, by establishing performance indicators in program budgeting.

Program performance is a method of presenting and substantiating budgets, based on programs with goals, objectives and indicators to evaluate their performance at all stages of management. Also, efficient program management is an efficient road management tool, which ensures the setting of priorities and decision-making on the allocation of resources necessary for the rehabilitation and modernization of roads. It is also based on the allocation of resources in programs according to the planning and setting of priorities, emphasizing the connections between the allocated budgetary resources and the results to be achieved, through the activities financed by these resources. It is a tool to strengthen the increased responsibility of public authorities / institutions in the process of spending the resources allocated to the maintenance and rehabilitation of road infrastructure and achieving progressive performance.

For the field of roads, financial means were used for the implementation of the Program "Development of transport and road management", Subprogram "Development of roads". The sub-program included maintenance, repair and rehabilitation activities of national and local public roads, road condition monitoring, as well as actions to increase road safety. The objectives of the subprogram were implemented by the State Enterprise "State Road Administration", the total length of national roads being 3336 km, and local roads - 5475 km.

4.2. Analysis of the multiple regression model

Next we will make a case study of a multiple regression model, so that we can observe the connection and dependence of financial resources used for maintenance and rehabilitation of roads in Moldova depending on the four road conditions, namely: good, mediocre, bad and very bad.

Table 1. Initial data

Year	Resources used for road maintenance and rehabilitation, mil. lei	Good condition IRI (2 - 4), %	Mediocre condition IRI (4 - 6), %	Bad condition IRI (6 - 8), %	Very bad condition (IRI > 8), %
	y	x_1	x_2	x_3	x_4
2009	416.4	9.8	29.6	40.7	19.9
2010	421.8	19.7	36.7	27.1	16.5
2012	1137.5	31.8	41.1	19.3	7.8
2013	1162.7	41.26	37.99	14.93	5.82
2014	2044.4	35.87	77.51	17.05	8.32
2015	1153.1	25.19	37.81	16.89	8.54
2016	1120.3	15.8	31.67	24.93	15.2
2017	1104.5	17.65	30.43	23.21	12.39
2018	874.3	16.83	29.3	23.98	14.63
2019	1597.1	14.75	25.7	25.8	21.23
2020	2100.9	17.81	23.09	25.88	20.92
2021	1977.8	42.72	24.59	18.8	13.86

Identification of variables

The multifactorial model for our problem is defined by the following relation:

$$y = f(x_1, x_2, x_3, , x_4) + \varepsilon \text{ , (1)}$$

where:

x_1, x_2, x_3, x_4 are exogenous, independent or cause variables;

y is the endogenous, dependent, or effect variable;

$\varepsilon(\varepsilon_1, \varepsilon_2, \varepsilon_3, \varepsilon_4)$ is the residual, ally, disruptive, or error variable;

$f(x_1, x_2, x_3, x_4)$ is the regression function with which the values of the variable *y* will be estimated.

The general form of the multifactorial model for the given problem is presented as follows:

$$y_t = c_1 + c_2 x_{1t} + c_3 x_{2t} + c_4 x_{3t} + c_5 x_{4t} \text{ , (2)}$$

where $= \overline{1{,}12}$; 12 is the number of terms of the statistical series, in our case the number of years for which the data were collected.

In this study we have the following variables:

y - Resources used for road maintenance and rehabilitation, unit of measurement - million lei;

x_1 – *Good road condition IRI (2 - 4)*, unit of measurement - % from the road length;

x_2 - *Mediocre condition of the roads IRI (4 - 6)*, unit of measurement - % from the road length;

x_3 - *Bad condition of the roads IRI (6 - 8)*, unit of measurement - % from the road length;

x_4 – *Very bad condition of the roads IRI (> 8)*, unit of measurement - % from the road length.

Regression coefficients c_1, c_2, c_3 and c_4 measure the influence of each of the 12 factorial characteristics on the result *y*.

The system of equations is obtained:

$$\begin{cases} c_1 + c_2 x_{11} + c_3 x_{12} + c_4 x_{13} + \varepsilon_1 = y_1 \\ c_1 + c_2 x_{21} + c_3 x_{22} + c_4 x_{23} + \varepsilon_2 = y_2 \\ c_1 + c_2 x_{31} + c_3 x_{32} + c_4 x_{33} + \varepsilon_3 = y_3 \\ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \\ c_1 + c_2 x_{12,1} + c_3 x_{12,2} + c_4 x_{12,3} + \varepsilon_{12} = y_{12} \end{cases}$$

Estimation of the c_1 free term shows the level of the endogenous variable when all the influence variables x_1, x_2, x_3, x_4 have a zero value. Estimation of parameters c_1, c_2, c_3 and c_4 shows how much the endogenous variable varies when the exogenous variable corresponding to that parameter varies by one unit, provided that all other variables are constant.

The sign and value of the parameters c_1, c_2, c_3 and c_4 are used to describe the interdependence between the dependent variable y and the independent ones x_1, x_2, x_3 și x_4 and x_4.

Econometric description

The econometric description of the connection between the four variables y, x_1, x_2, x_3, x_4 can be made with the help of five models:

I. The unifactorial model: $\boldsymbol{y = f(x_1) + \varepsilon_1}$ explains the variation of *y* on the variable x_1, or the variation of the *Financial resources used for road maintenance and rehabilitation* depending on the *Percentage of the length of roads in good condition.*

II. The unifactorial model: $\boldsymbol{y = f(x_2) + \varepsilon_2}$ explains the variation of *y* on the variable x_2, or the variation of the *Financial resources used for road maintenance and rehabilitation* depending on the *Percentage of the length of roads in mediocre condition.*

III. The unifactorial model: $\boldsymbol{y = f(x_3) + \varepsilon_3}$ explains the variation of *y* on the variable x_3, or the variation of the *Financial resources used for road maintenance and rehabilitation* depending on the *Percentage of the length of roads in bad condition*.

IV. The unifactorial model: $\boldsymbol{y = f(x_4) + \varepsilon_4}$ explains the variation of *y* on the variable x_4, or the variation of the *Financial resources used for road maintenance and rehabilitation* depending on the *Percentage of the length of roads in a very bad condition*.

V. The unifactorial model: $\boldsymbol{y = f(x_1, x_2, x_3, x_4) + \varepsilon_5}$ explains the variation of *y* on the variable x_1, x_2, x_3, x_4, or the variation of the *Financial resources used for road maintenance and rehabilitation* depending on the *Total length of roads regardless of their condition.*

The identification of regression functions for unifactorial models is done using the graphical representation of the endogenous variable according to the exogenous variables (correlation graphs - Figures 1, 3, 5 and 7) performed in Excel and ANOVA tests performed in EViews (Figures 2, 4, and 6):

The unifactorial model: $\boldsymbol{y = f(x_1) + \varepsilon_1}$

or

$$\boldsymbol{Resources} = \boldsymbol{f}\ (\%\ \boldsymbol{of\ the\ length\ of\ roads\ in\ good\ condition}) + \boldsymbol{other\ influencing\ factors}$$

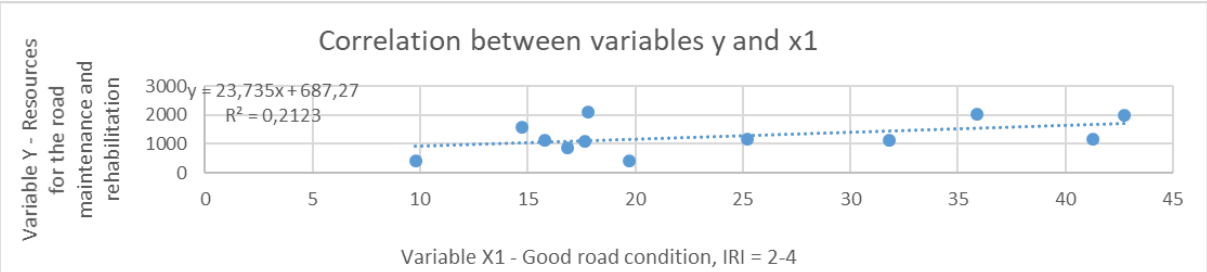


Figure 1. Graph of the correlation between the variable y and x1, or between the *Money resources used for road maintenance and rehabilitation* and % of the *length of roads in good condition*

Interpretation of Figure 1: it is observed that with the increase of the variable x_1 the variable *y* also increases, this means that the connection between them is direct. That is, the higher the percentage of road lengths in good condition, the greater the resources for their maintenance and vice versa, the worse the condition of roads will be, the lower the financial resources for their rehabilitation.

Equation: UNTITLED Workfile: STUDIU DE CAZ MODEL MULTIFACTORIAL::Un...

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: Y
Method: Least Squares
Date: 04/22/22 Time: 08:22
Sample: 2009 2021
Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X1	23.73463	14.45757	1.641675	0.1317
C	687.2682	380.7569	1.805006	0.1012

R-squared	0.212294	Mean dependent var	1259.233
Adjusted R-squared	0.133524	S.D. dependent var	571.5899
S.E. of regression	532.0627	Akaike info criterion	15.54241
Sum squared resid	2830907.	Schwarz criterion	15.62323
Log likelihood	-91.25447	Hannan-Quinn criter.	15.51249
F-statistic	2.695097	Durbin-Watson stat	1.087544
Prob(F-statistic)	0.131690		

Figure 2. ANOVA results for the unifactorial model $\boldsymbol{y = f(x_1) + \varepsilon_1}$

Interpretation of Figure 2: Regression equation is $y = 687{,}268 + 23{,}735 \cdot x_1$, the same as in the graph from Figure 1. If the length of roads in good condition would decrease by 1%, the resources allocated for their maintenance and rehabilitation would decrease by 23.735 million lei. The coefficient R-squared = 0.2123 is very small and close to zero, which indicates a very weak link between these two variables. Only 21.23% of the variation of financial resources is influenced by the percentage of roads in good condition.

Unifactorial model: $\boldsymbol{y = f(x_2) + \varepsilon_2}$

or

$$\boldsymbol{Resources = f(\%\ of\ the\ road\ length\ in\ mediocre\ condition) + other\ influencing\ factors}$$

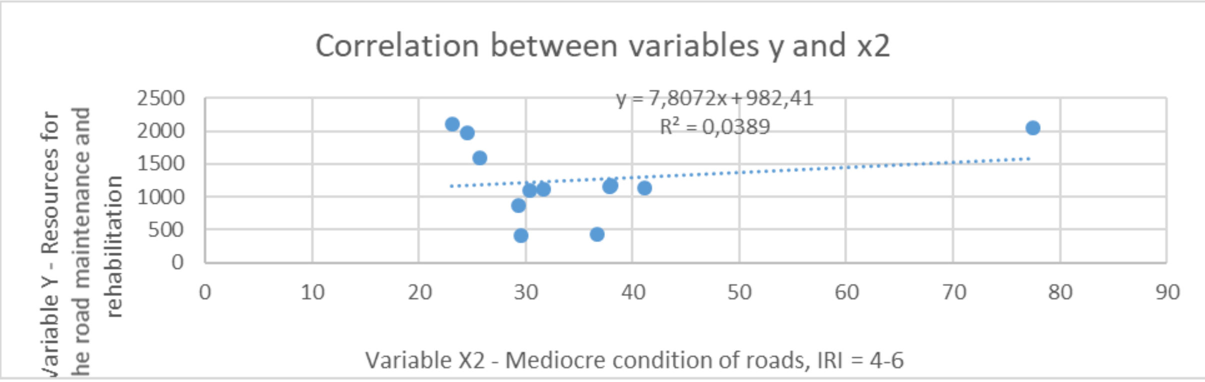
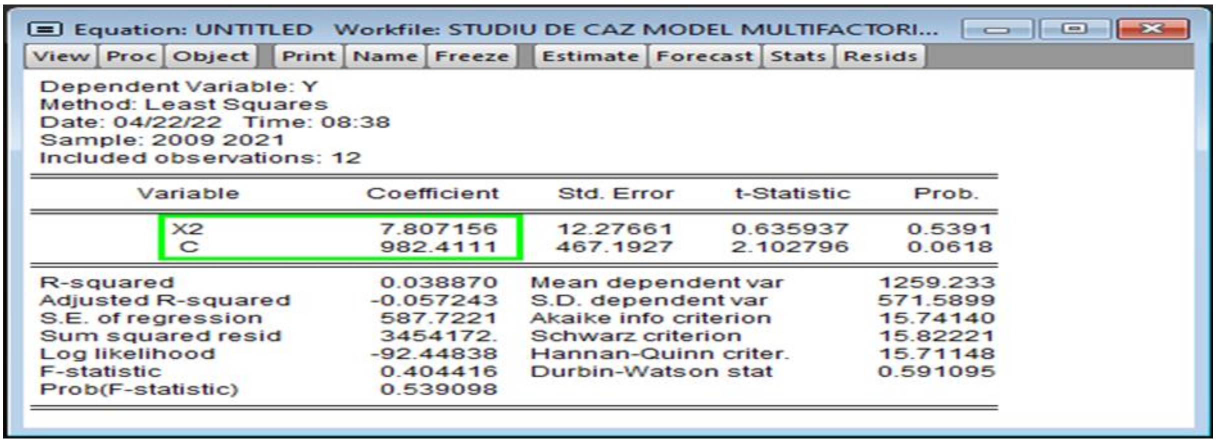


Figure 3. Graph of the correlation between the variable *y* and *x*$_2$, or between the *Money resources used for road maintenance and rehabilitation* and % of the *length of roads in mediocre condition*

Interpretation of Figure 3 it is observed that with the increase of the variable x_2 the variable y also increases, this means that the connection between them is direct. That is, the higher the percentage of the length of roads in mediocre condition, the higher the resources for their maintenance and vice versa, the more the mediocre condition of the roads will deteriorate, the lower the financial resources for their rehabilitation.


Equation: UNTITLED Workfile: STUDIU DE CAZ MODEL MULTIFACTORI...

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: Y
Method: Least Squares
Date: 04/22/22 Time: 08:38
Sample: 2009 2021
Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X2	7.807156	12.27661	0.635937	0.5391
C	982.4111	467.1927	2.102796	0.0618

R-squared	0.038870	Mean dependent var	1259.233
Adjusted R-squared	-0.057243	S.D. dependent var	571.5899
S.E. of regression	587.7221	Akaike info criterion	15.74140
Sum squared resid	3454172.	Schwarz criterion	15.82221
Log likelihood	-92.44838	Hannan-Quinn criter.	15.71148
F-statistic	0.404416	Durbin-Watson stat	0.591095
Prob(F-statistic)	0.539098		

Figure 4. ANOVA results for the unifactorial model $\boldsymbol{y = f(x_2) + \varepsilon_2}$

Interpretation of Figure 4: Regression equation is $y = 982{,}411 + 7{,}807 \cdot x_2$, the same as in the graph from Figure 3. If the length of roads in mediocre condition would decrease by 1%, the resources allocated for their maintenance and rehabilitation would decrease by 7.807

million lei. The coefficient R-squared = 0.0389 is extremely small and close to zero, which indicates a significantly weak link between these two variables. Only 3.89% of the variation of financial resources is influenced by the percentage of mediocre roads.

Unifactorial model: $\boldsymbol{y = f(x_3) + \varepsilon_3}$
or

$$\boldsymbol{Resources = f(\%\ of\ the\ road\ length\ in\ bad\ condition) + other\ influencing\ factors}$$

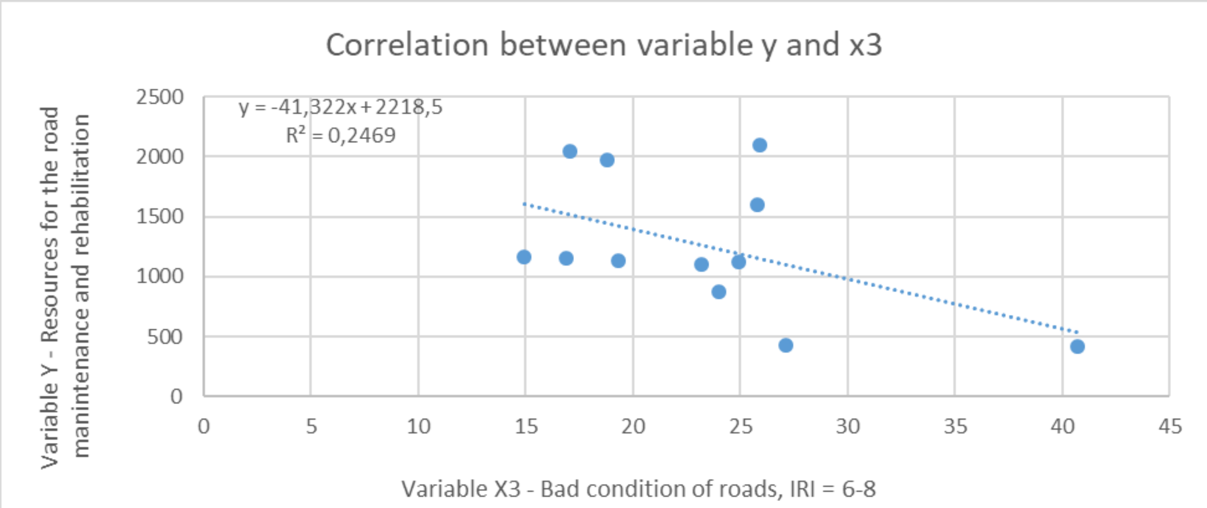
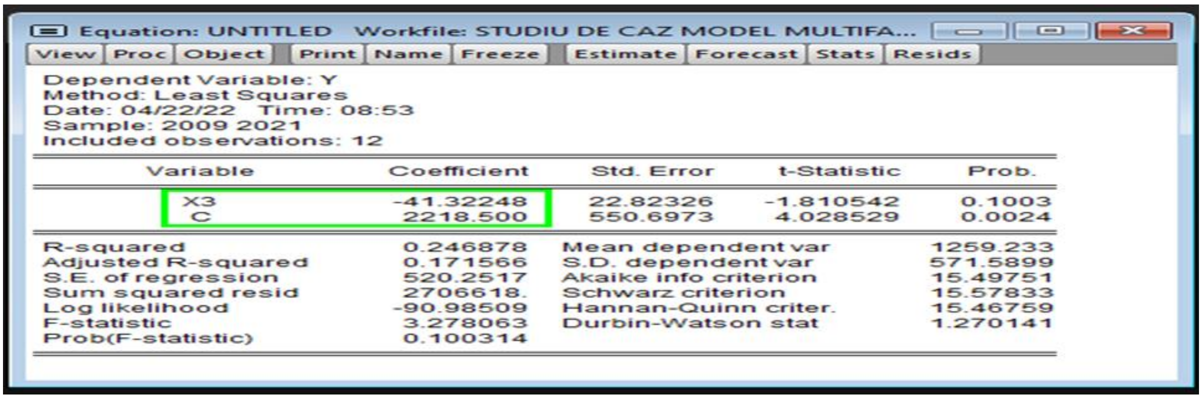


Figure 5. Graph of the correlation between the variable *y* and *x*3, or beteen the *Money resources used for road maintenance and rehabilitation* and % of the *length of roads in bad condition*

Interpretation of Figure 5: it is observed that with the increase of the variable x_3, the variable y decreases, this means that the connection between them is inverse. That is, the lower the percentage of the length of roads in poor condition, the higher the resources for their maintenance and vice versa, the worse the condition of the roads, the lower the financial resources for their rehabilitation.



Variable	Coefficient	Std. Error	t-Statistic	Prob.
X3	-41.32248	22.82326	-1.810542	0.1003
C	2218.500	550.6973	4.028529	0.0024

R-squared	0.246878	Mean dependent var	1259.233
Adjusted R-squared	0.171566	S.D. dependent var	571.5899
S.E. of regression	520.2517	Akaike info criterion	15.49751
Sum squared resid	2706618.	Schwarz criterion	15.57833
Log likelihood	-90.98509	Hannan-Quinn criter.	15.46759
F-statistic	3.278063	Durbin-Watson stat	1.270141
Prob(F-statistic)	0.100314		

Figure 6. ANOVA results for the unifactorial model $\boldsymbol{y = f(x_3) + \varepsilon_3}$

Interpretation of Figure 6: Regression equation is $y = 2218{,}5 - 41{,}322 \cdot x_3$, the same as in the graph from Figure 5. If the length of roads in poor condition would increase by 1%, the resources allocated for their maintenance and rehabilitation would decrease by 41.322 million lei. The coefficient R-squared = 0.2469 is very small and close to zero, which indicates a very weak link between these two variables. Only 24.69% of the variation of financial resources is influenced by the percentage of roads in poor condition.

Unifactorial model: $\boldsymbol{y = f(x_4) + \varepsilon_4}$
or

$$\boldsymbol{Resources = f(\%\ of\ the\ lengh\ of\ roads\ in\ a\ very\ bad\ condition)}$$
$$\boldsymbol{+\ other\ influencing\ factors}$$

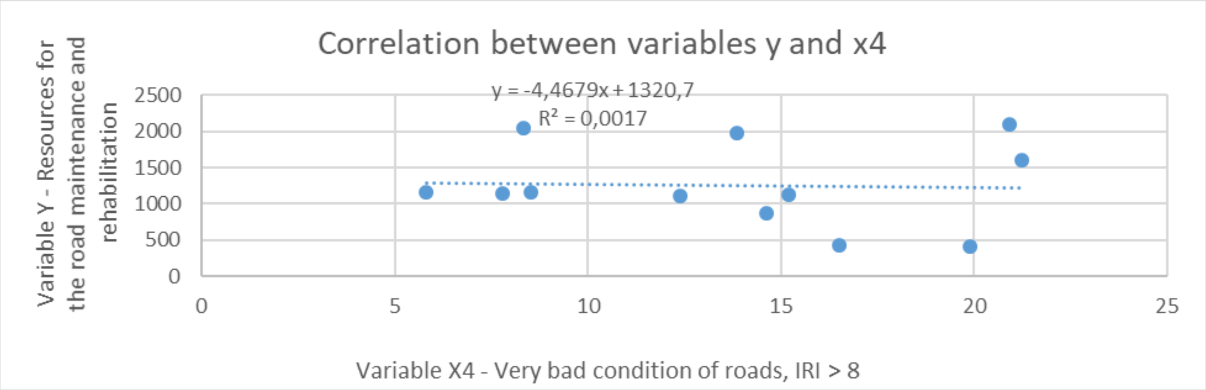


Figure 7. Graph of the correlation between the variable *y* and *x*4, or between the *Money resources used for road maintenance and rehabilitation* and % of the *length of roads in a very bad condition*

Interpretation of Figure 7: it is observed that with the increase of the variable x_4, the variable y decreases slowly, this means that the connection between them is inverse. That is, the lower the percentage of the length of roads in very poor condition, the higher the resources for their maintenance and vice versa, the worse the condition of the roads will be, the lower the financial resources will be in order to rehabilitate them.

Forecast and confidence interval for 2022
We make the punctual forecast, assuming that the condition of the roads will change as follows: the good condition would reach a value of 40% (it will decrease by 2.72% compared to 2021), the mediocre condition - 20% (it will decrease by 4, 59% compared to 2021), poor condition - 23% (will increase by 4.2% compared to 2021), very bad condition - 17% (will increase by 3.14% compared to 2021). In other words, the general condition of the roads will worsen. Let's see how this influences the money reserves for the maintenance and rehabilitation of roads in the Republic of Moldova.

$$y_{2022} = 214{,}495 + 23{,}908 \cdot 40 + 13{,}873 \cdot 20 - 81{,}581 \cdot 23 + 135{,}948 \cdot 17$$
$$= 1883{,}022\ mil.lei$$

Conclusion: In 2021, the financial resources had a value of 1977.8 million lei. Given that, in 2022, the condition of the roads will deteriorate by the percentages assumed above, the monetary resources would reach a value of approximately 1883,022, which means an increase of 94.788 million lei or 4.79% compared to year 2021.

Usually, the prediction of the phenomenon y if the values of the factorial variables x_1, x_2, x_3, x_4 are known for the moment $(n + v)$ is done on the basis of a confidence interval:

$$\hat{y}_{2022} - t_{crit.} \cdot \sigma_y \le y_{2022} \le \hat{y}_{2022} + t_{crit.} \cdot \sigma_y$$

$$t_{crit.} = t_{0,05,12} = 2{,}365 \quad and \quad \sigma_y = 547{,}256$$
$$1883{,}022 - 2{,}365 \cdot 547{,}256 \leq y_{2022} \leq 1883{,}022 - 2{,}365 \cdot 547{,}256$$
$$588{,}762 \leq y_{2022} \leq 3177{,}281$$

Interpretation: If there are negative changes in the condition of roads in the Republic of Moldova, with the values assumed above, in 2022 is expected a value of resources used for road maintenance and rehabilitation between 588.762 and 3177.281 million lei.

Elimination of insignificant variables and the shape of the model obtained after each estimation iteration

A verification of the significance of the obtained parameters can be performed by the following comparisons:

- If $|t_{stat}| \leq 1$ than the coefficient is statistically *insignificant*;
- If $1 < |t_{stat}| \leq 2$, the coefficient is *relatively significant*. In this case it is recommended to use the Student distribution table;
- If $2 < |t_{stat}| \leq 3$, the coefficient is *significant*. This affirmation is guaranteed for (n – p – 1) > 20 and α ≥ 0,05;
- If $|t_{stat}| > 3$, the coefficient is *very significant*. The probability of error in this case, in a sufficient number of observations, does not exceed 0.001.

In this case we can say the following, at a significance threshold of α = 0,05:

Table 2

	Coefficients	***t Stat***	$\boldsymbol{|t_{stat}|}$	***Significance of the coefficient***
Intercept	214.495131	0.189059728	0,19	-
X Variable 1	23.90775121	1.355212566	1,35	relatively significant
X Variable 2	13.87291137	1.405452385	1,41	relatively significant
X Variable 3	-81.58056104	-2.595978242	2,6	significant
X Variable 4	135.9477122	3.367373117	3,37	very significant

But to remove from the model any of the variables, which are insignificant, we will apply the step-by-step elimination method as follows: we first eliminate an insignificant variable that has the lowest value of $|t_{stat}|$, in this case the variable X_1. By removing it from the model, we analyze the newly obtained model. We repeat the steps until we get only significant variables in the model.

Step 1 – elimination of the significant relative variable X_1

Equation: UNTITLED Workfile: STUDIU DE CAZ MODEL MULTIFACTO...

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: Y
Method: Least Squares
Date: 04/22/22 Time: 17:24
Sample: 2009 2021
Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X2	14.58215	10.35948	1.407615	0.1969
X3	-103.5282	28.30456	-3.657653	0.0064
X4	122.8940	41.20517	2.982490	0.0175
C	1454.589	704.9039	2.063528	0.0730

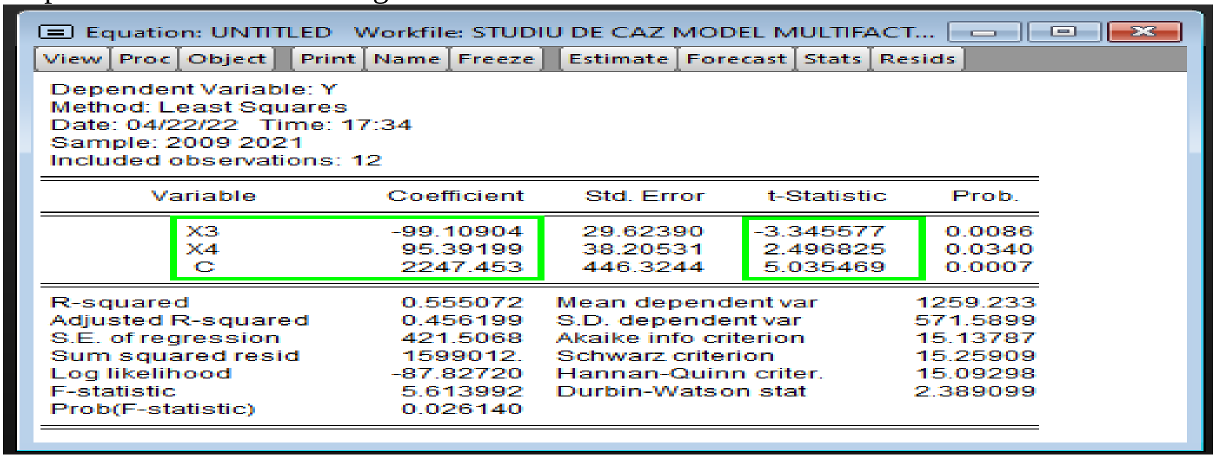
R-squared	0.643393	Mean dependent var	1259.233
Adjusted R-squared	0.509666	S.D. dependent var	571.5899
S.E. of regression	400.2493	Akaike info criterion	15.08325
Sum squared resid	1281596.	Schwarz criterion	15.24489
Log likelihood	-86.49952	Hannan-Quinn criter.	15.02341
F-statistic	4.811228	Durbin-Watson stat	2.170923
Prob(F-statistic)	0.033618		

Figure 8. ANOVA test of model $y = f(x_2, x_3, x_4)$

Table 3

	Coefficients	***t Stat***	$\lvert t_{stat} \rvert$	***Significance of the coefficient***
Intercept	1454.589	2.063528	2,06	-
X Variable 2	14.58215	1.407615	1,41	relatively significant
X Variable 3	-103.5282	-3.657653	3,66	relatively significant
X Variable 4	122.8940	2.982490	2,98	significant

Step 2 – elimination of the significant relative variable X_2


Equation: UNTITLED Workfile: STUDIU DE CAZ MODEL MULTIFACT...
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: Y
Method: Least Squares
Date: 04/22/22 Time: 17:34
Sample: 2009 2021
Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X3	-99.10904	29.62390	-3.345577	0.0086
X4	95.39199	38.20531	2.496825	0.0340
C	2247.453	446.3244	5.035469	0.0007

R-squared	0.555072	Mean dependent var	1259.233
Adjusted R-squared	0.456199	S.D. dependent var	571.5899
S.E. of regression	421.5068	Akaike info criterion	15.13787
Sum squared resid	1599012.	Schwarz criterion	15.25909
Log likelihood	-87.82720	Hannan-Quinn criter.	15.09298
F-statistic	5.613992	Durbin-Watson stat	2.389099
Prob(F-statistic)	0.026140		

Figure 9. ANOVA test of model $y = f(x_3, x_4)$

Table 4

	Coefficients	***t Stat***	$\lvert t_{stat} \rvert$	***Significance of the coefficient***
Intercept	c_1 = 2247.453	5.035469	5,04	-
X Variable 3	c_2 = -99.10904	-3.345577	3,35	very significant
X Variable 4	c_3 = 95.39199	2.496825	2,5	significant

Thus, we obtained the final model in which all parameters are significant.

$$\boldsymbol{y = 2247{,}453 - 99{,}109 \cdot x_3 + 95{,}392 \cdot x_4}$$

Forecast for 2022 *in the light of this model.*

Suppose that the poor condition of the roads will reach a value of 20% (an increase of 1.2% compared to 2021) and respectively the very poor condition will reach 16% (an increase of 2.14% compared to the year 2021).

$$y_{2021} = 2247{,}453 - 99{,}109 \cdot 18{,}8 + 95{,}392 \cdot 13{,}86 = 1706{,}337$$
$$y_{2022} = 2247{,}453 - 99{,}109 \cdot 20 + 95{,}392 \cdot 16 = 1791{,}545$$
$$\boldsymbol{y_{2022} - y_{2021} = 1791{,}545 - 1706{,}337 = 85{,}208}$$

In conclusion, if the bad and very bad roads deteriorated even more, with the values assumed above, this would imply an increase of the monetary resources destined for the rehabilitation of the roads by 85.208 million lei.

We will test the significance of the parameters of this model for a significance threshold α = 0,05 with the help of the Student test ($t_{tab}(0{,}5; 12-2-1) = t_{tab}(0{,}5; 9) = 2{,}262$):

Zero hypothesis H_0: “The parameter estimators do not differ significantly from zero”

The alternative hypothesis H_1: “The parameter estimators differ significantly from zero”

We compare the tabular value with the calculated values and the following situations result:

- ✓ As $\left|t_{calc.}^{c_1}\right| \approx 5{,}04 > t_{tab}(0{,}5;9) = 2{,}262$ the H_0 zero hypothesis is rejected and the H_1 alternative hypothesis is accepted, thus the estimator c_1 differs significantly from zero.
- ✓ As $\left|t_{calc.}^{c_2}\right| \approx 3{,}35 > t_{tab}(0{,}5;9) = 2{,}262$ the H_0 zero hypothesis is rejected and the H_1 alternative hypothesis is accepted, thus the estimator c_2 differs significantly from zero.
- ✓ As $\left|t_{calc.}^{c_2}\right| \approx 2{,}5 > t_{tab}(0{,}5;9) = 2{,}262$ the H_0 zero hypothesis is rejected and the H_1 alternative hypothesis is accepted, thus the estimator c_3 differs significantly from zero.

We will test the significance of this model using the Fischer test (F test), formulating the two hypotheses:
Zero hypothesis H_0 -” The model obtained is not statistically significant”
The alternative hypothesis H_1 -” The model obtained is not statistically significant”
In figure 21 the correlation coefficient is $R^2 = 0{,}5551$.

$$F_{calc} = \frac{R^2}{1-R^2} \cdot \frac{n-k-1}{k} = \frac{0{,}5551}{1-0{,}5551} \cdot \frac{12-2-1}{2} = \frac{4{,}9959}{0{,}4449} = 11{,}23$$

As $F_{calc} = 11{,}23 \geq F_{\alpha,v_1,v_2} = 4{,}26$, the model is considered significant.

Conclusion: This model is suitable for forecasting the financial resources to be allocated in the coming years, depending on the negative change of roads that are in bad and very bad condition.

5. Conclusions

It is concluded that in the Republic of Moldova the challenge is to review the performance of requirements and indicators set by developed countries around the world. In addition, performance-based road maintenance and rehabilitation management is closely linked to the selection of appropriate performance indicators with successful progress, as it is the most modern approach to obtaining sustainable funding for road infrastructure maintenance and operation.

In order to ensure the quality of the road infrastructure, the level of performance of the management of their administration must be high enough. Road degradation causes discomfort, additional costs and waste of time. The correlation of the efficiency criteria with the criteria of capitalization of the economic resources requires a differentiated treatment of the roads and an efficient distribution of the resources.

The quality management system of the pavement of the roadway is the most important part of the management of road maintenance and modernization. The fundamental goal of a road management system is to obtain the best possible solution for the available funds and to provide quality roads to users with a high degree of comfortable and economical satisfaction. This can be achieved by comparing investment alternatives, coordinating design, construction, maintenance and evaluation activities, and the efficient use of existing field practices and knowledge.

The quality management system of the road infrastructure must carry out comparative cost estimates and economic evaluations for different options regarding maintenance, rehabilitation works, for a certain project, a group of road sectors or for the whole network. Improving the road infrastructure management system and safety conditions by efficiently amplifying the implementation of complex reform programs and large-scale investment promotion campaigns intensifies the development of transport networks by providing users with quality roads.

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Rezumat

Lucrarea științifică reprezintă o cercetare privitor la importanța semnificativă a managementului calității drumurilor, bazat pe performanță, în activitatea economică. În acest sens, autorii au efectuat o estimare concretă a unor indicatori care influențează dezvoltarea și creșterea economică prin asigurarea implementării managementului de calitate a drumurilor, realizat cu identificarea elementelor de progres în vederea revizuirii modului de utilizare eficientă a resurselor. Investițiile în rețelele de transport asigură creșterea capitalului investit față de cel realizat în alte domenii de activitate, în baza unor efecte directe și indirecte, care rezultă din economisirea de costuri prin atragerea resurselor necesare pentru realizarea unor infrastructuri moderne de drumuri. Managementul progresiv al calității drumurilor este bazat pe performanță atât programare cât și punerea în aplicare a activităților de întreținere a acestora și operaționale, determinate în mod corespunzător indicatorilor de performanță definiți. Metodele științifice utilizate sânt: analiza și sinteza, inducția și deducția, *analiza critică a materialelor, etc. Principalele rezultate obținute în urma investigațiilor se referă la aprecierea indicatorilor privind managementul eficient al calității drumurilor prin aplicarea performanțelor de progres în vederea accesului utilizatorilor, la drumuri publice calitative.*

Cuvinte-cheie*: sistem, management, drumuri publice, calitate, infrastructură, resurse financiare*

Аннотация

Научная работа представляет собой исследование значимости управления качеством дорог, основанного на эффективности, в экономической деятельности. В этом смысле авторами была проведена конкретная оценка некоторых показателей, влияющих на развитие и экономический рост, путем обеспечения внедрения управления качеством дорог, проведенная с выявлением элементов прогресса с целью пересмотра способа эффективного использования ресурсов. Инвестиции в транспортные сети обеспечивают прирост вложенного капитала по сравнению с достигнутым в других сферах деятельности на основе прямых и косвенных эффектов, возникающих в результате экономии средств за счет привлечения необходимых ресурсов для создания современных дорожных инфраструктур. Прогрессивное управление качеством дорог основано на эффективности, как программирования, так и реализации их содержания и эксплуатационной деятельности, определяемой в соответствии с установленными показателями эффективности. В исследовании использованы научные методы: анализ и синтез, индукция и дедукция, критический анализ материалов и т. д. Основные результаты, полученные в результате исследований, относятся к оценке показателей эффективного управления качеством дорог путем применения показателей прогресса в просмотр доступа пользователей к качественным автомобильным дорогам общего пользования.

Ключевые слова*: система, управление, дороги общего пользования, качество, инфраструктура, финансовые ресурсы*

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ASSESSING CUSTOMER SATISFACTION – REMODELLING PILLAR OF THE MANAGEMENT SYSTEM

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Abstract

The current paper takes a methodological journey based on identifying the opportunities of assessing the increase of customer satisfaction in terms of implementing information technologies. The aim of this research is the assessment of tourist satisfaction, namely Hilton's customers and their use of the Hilton Honors application. To reach the objective of this enterprise, it was run a multidimensional analysis of the possibilities to assess customer satisfaction in view of implementing art-of-the-state information technologies by accommodation units. Therefore, it was performed a quantitative study on assessing customer satisfaction in the tourism business. In the same context, the data were interpreted based on conclusions and relevant recommendations. The methodology of research focused on a series of methods, such as analysis, synthesis, induction, deduction, abduction, comparison, statistical analysis, and modelling. In conclusion, we can state that the evaluation of customer satisfaction is a SMART pillar of relationship management, a factor for gaining customer loyalty, while information technologies are the main factor for increasing tourist satisfaction. Under the circumstances, the accommodation units should remodel their management system by adopting novel information technologies which will help them meet their customers' requests, be competitive and sustainable, gain the loyalty of their customers, and also identify a strategic approach for reaching a high level of competitivity..

***Keywords**: customer satisfaction, management, assessment of customer satisfaction, excellency, information technologies*

1. Introduction

Customer satisfaction has always been a key objective in all sectors of business since it is well-known that happy customers are more likely to become loyal to the product/ service concerned. Currently, the management system of hotel companies is defined by remodelling attempts in the context of integrating novel IT technologies, and improving the tools of the management applied, from the perspective of digital transformation of the companies from the sphere of the tourism and hospitality industry. Accordingly, the majority of such companies settle on identifying new competitive advantages that could bring both notoriety and sustainability [8, p. 790]. One of these advantages is implementing different mobile apps that can help accommodation units make their customers loyal to them, and also draw new clients which might bring them added value on the market. Large hotel chains are constantly trying to identify their customers ’preferences, and adjust their offer appropriately.

In this paper, we will make a retrospective presentation of the opportunities for improving customer satisfaction through implementing new information technologies in the hotel industry, namely the Hilton Hotel in Bucharest city.

2. The current level of investigation of the issue

Customer satisfactionis often defined in the literature as a *“general assessment of customers on their purchase and consumption experience of a certain service or goods”* [7, p. 12]. Customer satisfaction is a crucial topic since it mirrors the assessment made by clients, and it is an emotional response associated with their consumption experience.

Similarly, prof. Richard L. Oliver stated that emotions derived from assessments determine the general response of an individual in the consumption process [16, p. 24].

Emotions' importance in consumer behaviour models has grown significantly in recent years [11, p. 456]. Particularly, it should be emphasised that the cognitive system and emotions play an important part in the satisfaction formation process. The cognitive system presumably completes the superior mental processes, namely understanding and assessment, while emotions are reportedly linked to the individual feelings towards a certain service. Finally, loyalty or “commitment to a brand is perceived as the main consequence of satisfaction” [2, p. 55].

In light of this, it is clear that customer satisfaction depends on the existence of all overlaid elements such as indicators or expectations of a certain service or commodity. This shows the multi-faced nature of customer satisfaction.

Lately, the consumer role has changed from a passive buyer to an active leading actor in creating/ adjusting products/ services [1, p. 122]. The centrality of the “experience” concept has been consolidated by technological innovations in the merchandise field and consumption. The consumer wants to be more involved and become one of the main actors in creating the product/ service. From this perspective, the experience focuses on the affective and emotional features of the consumption process.

The concept of experience is strictly connected to the entertainment feature and implies consumer interaction during the making/ creation of products and/ or services. To build up an experience means to bring to life the product/ service, and underline its identity through the sensorial involvement of the consumer [18, p. 59]. The researchers Pine B. J. and Gilmore H. J. define experience as the main topic of interaction with consumers: it could be regarded as a new type of supply next to tangible products and intangible services [17, p. 31]. The above-mentioned literature shows the importance of customer satisfaction and loyalty to a product/ service which is also connected to the company’s performance values, such as rentability [9, p. 511]. Customer satisfaction reflects “a positive affective state, consequence of the cumulative assessment of the client in relation to the supplier” [10, p. 296]; customer satisfaction is essential in all areas of business due to its impact on future customer intentions and loyalty. Its importance increases especially in those areas where the product/ service to be delivered is intangible, while the main challenge is providing an experience perfectly suited to consumer expectations.

The available literature shows that customer satisfaction may depend on a series of features revolving around the subjective customer sphere and concerning the quality of the experienced product/ service. Some papers in the field focus on the individual components with an impact on satisfaction (customer perspective), while others address inherent features of the product/ service and the delivery path. Accordingly, customer satisfaction is the result of an overlaid perspective.

In the context of tourism, the concept of tourist satisfaction is quite relevant as well as difficult to deal with, since the tourist product is "complex" [20, p. 142]. In this scenario, the competitiveness of the destination can determine the real success and future of the destination itself. According to some authors, certain attributes can contribute to the increase of competitiveness of the real destination. These attributes refer to the variables influencing tourist satisfaction or discontent during their holiday.

Indeed, it can be easily noticed that the modern tourist wishes to live a unique experience, and he/ she is not interested in purchasing a standard product/ service: to satisfy the latest needs of the tourist demand, destinations must prioritize and maximize customer satisfaction.

The literature on this topic is rather limited due to its multiple facets, and consequently, due to the lack of a holistic approach. In other words, tourist satisfaction should be analysed according to an overlaid perspective that addresses both supply and demand, where the former includes a systemic approach. Actually, one of the main shortcomings is that most papers in the field analyse the link between the destination image and tourist satisfaction without lingering on the behavioural consequences of the tourists such as "loyalty and appreciation" about the destination [23, p. 14].

Indeed, "the image of the destination is defined as a concept of attitude consisting of the sum of beliefs, ideas, and impressions concerning a tourist destination" [9, p. 511].

Some current studies on the quality of travel services try to determine the factors affecting the quality perceived by clients and shape the differences between client expectations and the real experience provided by travel services. Additionally, they highlight the need for further research in the field to better understand the quality dimensions of travel services [22, p. 817].

The researcher Al-Ababneh M. confirmed that the quality of services impacted directly tourist satisfaction in terms of destination accessibility, facilities, and destination attractiveness. Destination accessibility includes cost, speed, and comfort of public transportation means in the area of the tourist destination. Accommodation, restaurants, coffee shops, and transport services can be classified as destination facilities which include other facilities such as souvenir shops, info services, etc. The tourist attractions and natural environment of the tourist destination could motivate tourists to visit the place, especially places with modern architecture, historical buildings, etc. [1, p. 85].

Similarly, some researchers used the Analytic Hierarchy Process (AHP) to assess client satisfaction in relation to the quality of hotel services. For instance, researchers Gupta P. and Srivastava R. analysed client satisfaction related to hotel services using a questionnaire that included 4 major variables in the quality of hotel services, namely: general services, the reception hall service, room service, and restaurant service. On the other hand, the researchers pointed out that the dimensions and accessibility of the accommodation place, along with location and its components have a direct contribution to the increase of tourist satisfaction as well as the development of tourist industries in regions otherwise avoided by tourists [4, p. 141].

Other researchers, who used the systemic revision for further studies (Della V. and Sciarelli M.), have measured tourist satisfaction by reviewing the existing field of research and identifying 14 indicators that can be calculated. Among them the following stand out: easy access to various types of transport services, accommodation, street quality and street signs, quality and diversity of restaurants, accessibility of information, local transport, perceived security, friendly infrastructure for disabled persons, cleanness of the place, local hospitality, organisation of cultural events and activities [5, p. 47].

Customer satisfaction is conditional on "general feelings or attitudes one person can have towards a product after it was bought" [21, p. 63]. On the other hand, client satisfaction is often at the heart of marketing activities run by companies since it helps them reach the desired strategy in terms of their objectives [12, p. 99]. A higher level of consumer satisfaction can increase client loyalty, cut down costs, improve the capacity to attract new clients, help develop a powerful image on the market, and has a direct impact on customer loyalty [17, p. 63].

Accordingly, client satisfaction is regarded as an essential indicator of the company's general performance. The basic concepts for determining customer satisfaction are "service quality" and "product/ service value", which are dependent on the price paid for it [13, p. 203].

The studies showed that the higher the quality in relation to the price paid, the higher the value perceived by consumers [6, p. 227]. Furthermore, it is important to highlight the fact that, for the client, satisfaction is a post-consumption evaluation that disappoints, satisfies, or exceeds their expectations and it relies on the experience lived by the client [24, p. 338].

Expectations are defined as "one's individual certitudes about the way a product is likely to perform in the future" [16, p. 28].

The direct effect of expectations can be explained through the assimilation theory: individuals go through a psychological conflict when they perceive the discrepancies between performance and previous certitudes [19, p. 143]

Later, consumers are more prone to adjust the perception to their expectations and thus minimize or remove this tension [19, p. 144]. Therefore, the assimilation effect can be described as a tendency to process new consumption experiences in terms of existing certitudes. Under these circumstances, satisfaction will be led by expectations [3, p. 381], and customer satisfaction is defined in terms of post-purchase evaluation of the service provided and its comparison to clients' expectations and actual experience [6, p. 222].

3. The aim of the research

The general objective of the research is the satisfaction assessment of the Hilton Hotel's customers in terms of using the Hilton Honours application. This scientific endeavour has helped us analyse the common traits of the tourists checked in at the hotel concerned, and also evaluate their satisfaction in terms of using the Hilton Honors app.

The adjacent objectives of this research are the following:

O1: assessment of consumer perception regarding the utility of the Hilton Honours mobile application

O2: assessment of consumer trust, in terms of perceived security and risks, regarding the use of Hilton Honours app

O3: identifying the tourist expectations about Hilton Honours app

O4: identifying the social factors influencing the satisfaction of using Hilton Honours app.

The research hypotheses are as follows:

H0:the use of the Hilton Honours application has a positive influence on tourist satisfaction

H1: the Hilton Honours app is quite useful and satisfies the tourist expectations in due time

H2: the consumers of the Hilton Honours app trust this mobile application

H3: tourists expect Hilton Honours app to respond quickly and satisfy the necessities related to the accommodation services provided by the hotel

H4: the main social factor influencing the tourist satisfaction in terms of Hilton Honours app is the necessity to benefit from prompt and quality services.

4. Methods and Applied Materials

We have chosen to perform a quantitative analysis since it helped our investigation better understand the market, seize consumer motivations and behaviours, grasp consumer satisfaction, assess the efficiency of the methods employed by a company, formulate and focus appropriately on the strategies used by a company to maximize their profit in the internal market.

We have chosen Hilton Hotel from Bucharest as our *research object*, where we performed our research and collected the data. The Hilton Hotel is an accommodation unit that distinguishes itself from other similar units through its good reputation, and customer trust in the quality of its services, which also, throughout the years, has managed to stand out by competency and an attractive quality-price ratio for tourists. One of the competitive advantages used by the Hilton Hotel is the continuous implementation of information technologies which helps them maintain their leadership position in the market. Accordingly, the Hilton hotel chain has the upper hand, adjusting their offer to the necessities of their customers and thus providing high-quality services to increase their customer satisfaction.

During its long activity, the hotel managed to apply efficient measures to build its customers' loyalty. One of these measures has been the Hilton Honours application which was designed and developed by the Hilton network to meet their customers' necessities and demands, and also maximize their customer satisfaction.

The research method employed is inquiry. The questions of the questionnaire were put in Google Docs, and the data were collected through Google Forms as graphics, tables, and figures. This method of data collection is quite easy and provides safety, speed, and trust. The questionnaire addressed the tourists who checked in at the Hilton Hotel. Further, the results obtained were interpreted. On the whole, there were a total number of 314 respondents in this study.

The research tool is the questionnaire that is broken down into 4 key sections as follows:

I: The informed consent – the aim of research and the general data involving this endeavour are presented here;

II: Use of mobile apps for accommodation – in this section, there are 4 questions that help us sketch the tourist profile in terms of use of accommodation apps;

III: Tourist behaviour towards Hilton and the Hilton Honours mobile app – These helped us analyse customer satisfaction, expectations, trust, and motivation towards Hilton hotel and its mobile app.

IV:Identifying respondents: this section includes the questions that helped us identify the respondents involved in this research in terms of age, gender, education level, income, and social background.

After collecting the data, we performed the interpretation of the results obtained. Therefore, the results got (for each question in the questionnaire) were presented as well as the significance of the results obtained.

The scientific novelty of the research. The complex methodological approach of this paper helps us identify the role and huge contribution of information technologies in terms of improving the management system of hotel units. The research results point out that information technologies are the primary factor in enhancing customer satisfaction. Consequently, remodelling the management system of the hotel units in terms of IT usage becomes a dire necessity for all competitive accommodation units.

The practical importance of the research. The research performed indicates that the implementation of novel information technologies increases customer satisfaction in the field of tourism. The obtained results in the present paper raise awareness of the necessity to remodel the management system of the hotel units in terms of implementation of information technologies that bring added value, on one hand, and, on the other, contribute to the increase of customer satisfaction.

5. The Obtained Results and Discussions

Accordingly, in the figure below, we shall render the data along with a description of the studied sampling depending on the following variables: gender, net monthly income, age, and country of origin.

As seen in the figure above, the female respondents prevail (52,17%), followed by male respondents (42,75%), while 5,07% of them preferred not to answer.

Regarding the age variable, the top position is occupied by the respondents ranging between 18 and 25 years old (42,03%), followed by the 26-35-year-old category (33,33%), and the last position is taken by persons aged over 65 years old (2,17%).

In what concerns the net monthly income, we can firmly assert that most respondents (42,75%) have an income under 1.000 Euros, followed by those with an income ranging between 1.000 and 2.000 Euros (26,09%). At the same time, 17,39% of the respondents stated their income is between 2.000 and 3.000 Euros. On the other side, only 5,07% of the surveyed persons have an income between 3.000 and 4.500 Euros or above 6.000 Euros. The least percentage (2, 17%) belongs to the persons with a net monthly income ranging between 4.500 and 6.000 Euros.

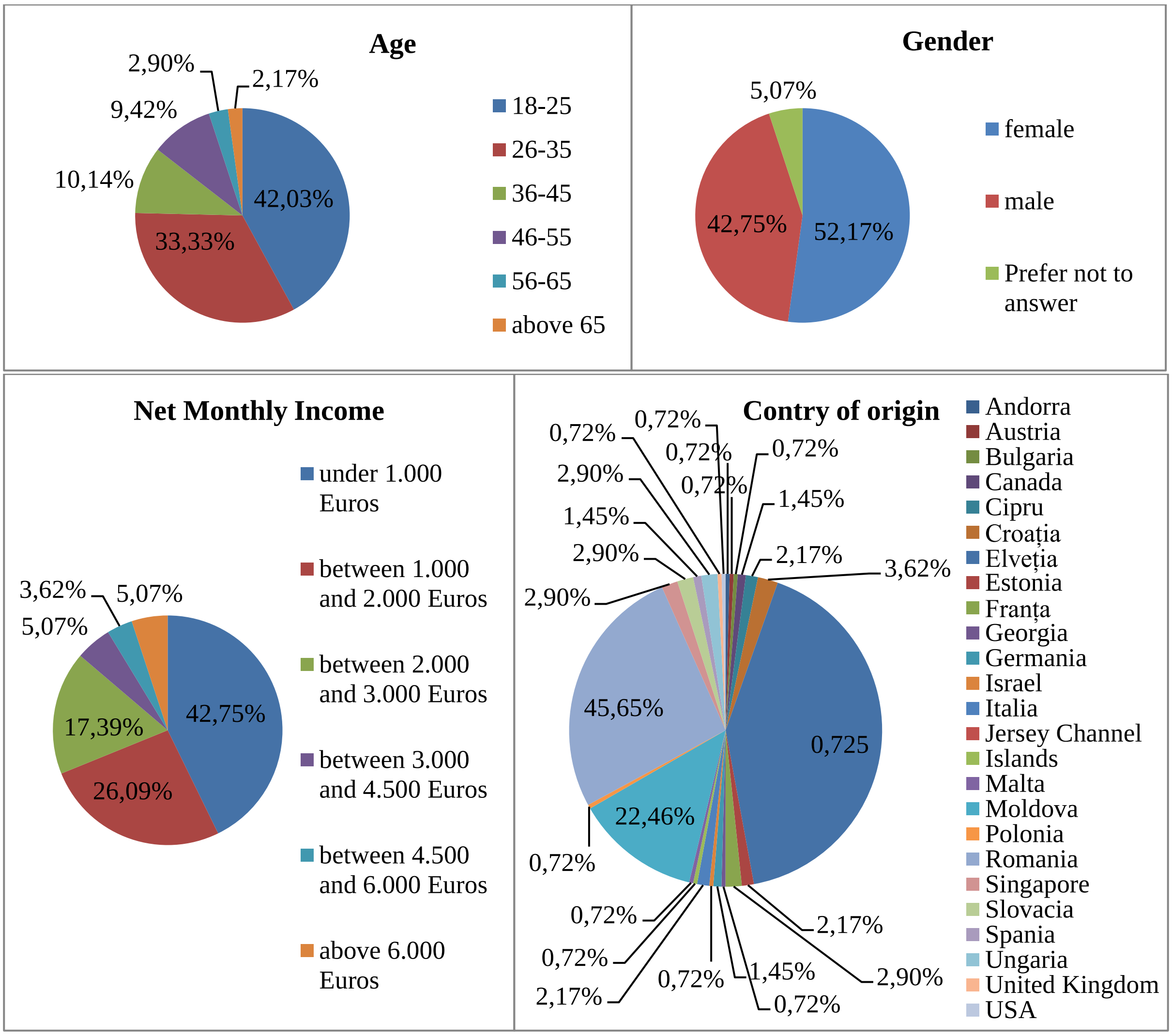

Figure 1. Sampling distribution based on demographic criteria

Source: developed by authors

Thanks to the analysis of the variable “Country of origin”, we can estimate that most respondents are Romanian citizens (45,65%), followed by persons from all over the world, such as Moldova (22,5%), Hungary (3,6%), Italy (2,9%), Canada (2,9%), Austria (2,2%), Switzerland (2,2%), U.S.A (2,2%) Cyprus (0,7%), Spain (0,7%) and France (0,7%).

As seen in Table 1, the analysis of the general behaviour for using the specific accommodation applications shows that, on average, respondents said they agree with “It brings benefits only” with a total score of 4,00 (responses were graded according to a scale from 1 to 5, 1 meaning Total Disagreement, while % was equal to Total Agreement).

At the same time, we can identify that, on average, respondents agree with the following statements: “It raises interest” and “It is easy to use” which scored an average of 4,04 and

4,11 (the answers were coded from 1 to 5, where 1 meant Total disagreement and 5 Total agreement). The average was calculated according to the formula: *Average = no. of respondents who ticked Total disagreement *1 + no. of respondents who ticked Disagreement *2 + ... + no. of respondents who ticked Total agreement*5/ Total number of respondents who took part in the study.*

By applying this formula we were able to calculate the average for each option. Thus, we can firmly state respondents pay greater attention to the Hilton Honours mobile application.

Table 1. Describing the general behaviour of using mobile apps

Attitude	Total Disagreement	Disagreement	Neither, nor	Agreement	Total Agreement	Average
It brings benefits only	5,8%	2,9%	10,9%	46,4%	34,1%	4,00
It raises interest	4,3%	2,9%	8,7%	52,2%	31,9%	4,04
It is easy to use	5,1%	2,2%	2,9%	56,5%	33,3%	4,11

Source: developed by authors

We have also analysed the duration of use for specific accommodation apps as well as their number. Accordingly, we can mention that most respondents (28,26%) have been using specific accommodation apps for 1 or 2 years, while only 8,70% of the persons surveyed have used these apps for 5-6 years. As shown in the figure below, we can state that 35,51% of the respondents have approximately 2 apps for reservations, and only 8,70% of them have 3-4 applications of the sort.

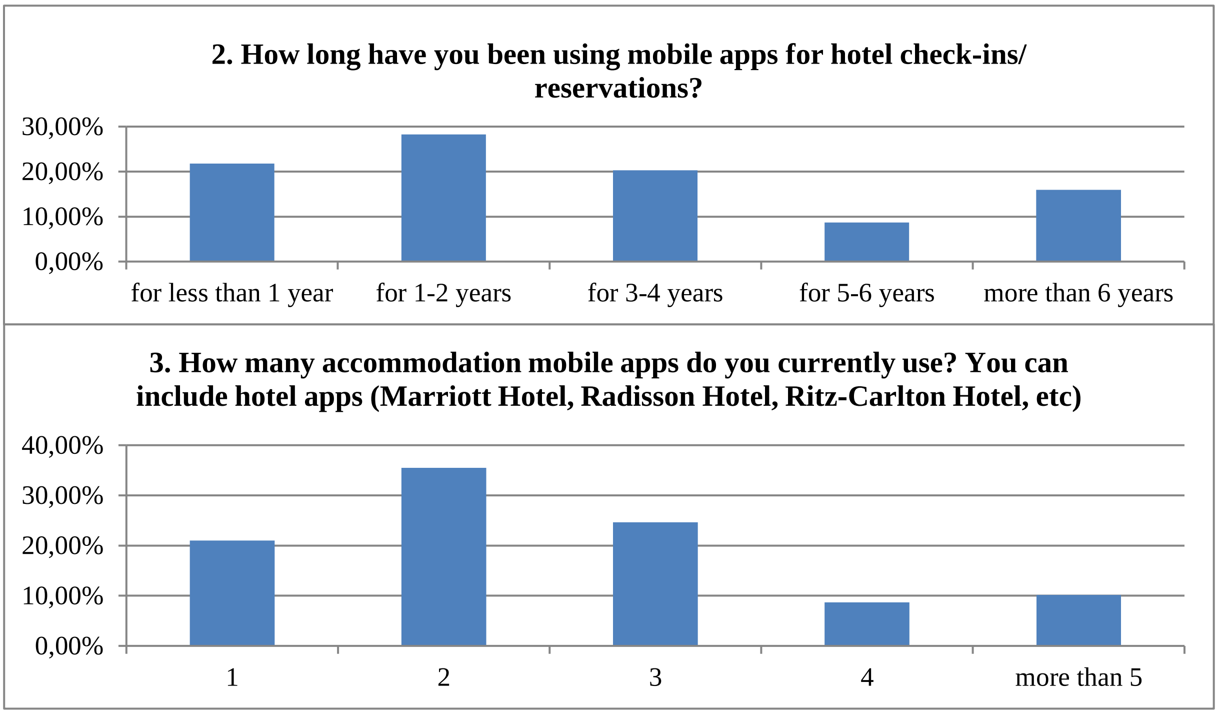

Figure 2. Determining the duration of usefor various accommodation apps

Source: developed by authors

The methods of information are presented in table 2 as well as the methods of accommodation used by respondents. Accordingly, it is certain that 29,7% of the respondents use quite often specialized websites for making reservations with a percentage of 18,8%, while 13,8% of them always use them.

Table 2. Determining the usage frequency of various accommodation methods

	Never	Very rarely	Rarely	Often	Frequently	Always
Websites for online reservations (Booking, Airbnb...)	4,3%	8,0%	25,4%	29,7%	18,8%	13,8%
Mobile Apps for online reservations (TripAdvisor, Expedia, etc.)	3,6%	7,2%	26,1%	27,5%	20,3%	15,2%
Looking up information and reservations on the website	4,3%	8,0%	20,3%	31,9%	18,1%	17,4%
Finding the hotel through tourism agencies	18,8%	19,6%	19,6%	18,1%	8%	15,9%
Making a reservation by telephone at the hotel reception	20,3%	18,8%	18,1%	18,1%	8%	16,7%

Source: developed by authors

In the case of using accommodation mobile apps, we can specify that 15,2% of the respondents always use apps such Expedia or TripAdvisor, roughly 20,3% of them use frequently/ very often these types of apps, and 27,5% of respondents use them often. We can also see that 31,9% of the surveyed persons often look for information on the hotel websites, and merely 1,4% always look up information. We can observe that only 15,9% of the respondents always seek assistance from tourism agencies, while a mere 8% make frequent use of their services. On the other hand, only 8% of the respondents ticked that they frequently call the hotel reception for extra information or for making reservations, while 16,7% of them always contact the hotel reception to get actual info at first-hand. The analysis performed from the perspective of Hilton Honors app usage by tourists allows us to observe that 41,30% of the respondents have been Hilton Honors members for less than one year, 26,09% have been members for 1- 3 years, 15,94% have been loyal members of the Hilton chain for 4 -6 years, 4,35% are long-time members (7-9 years), and 12,32% have chosen the Hilton chain for more than 9 years.

In light of the obtained results, we can conclude that 28,99% of the respondents checked in less than once per year at the Hilton hotels, and 30,43% checked twice at most. The majority of clients mentioned they use the mobile app throughout the year, scoring 43,48% out of the total number, and yet, only 10,14% have used the application for more than 6 years. It is quite certain that loyal clients can be identified by the usage frequency of the app throughout the year, and, consequently, 31,16% of the surveyed persons stated they use the Hilton Honors app once every few months, while 16,6% use it several times per month.

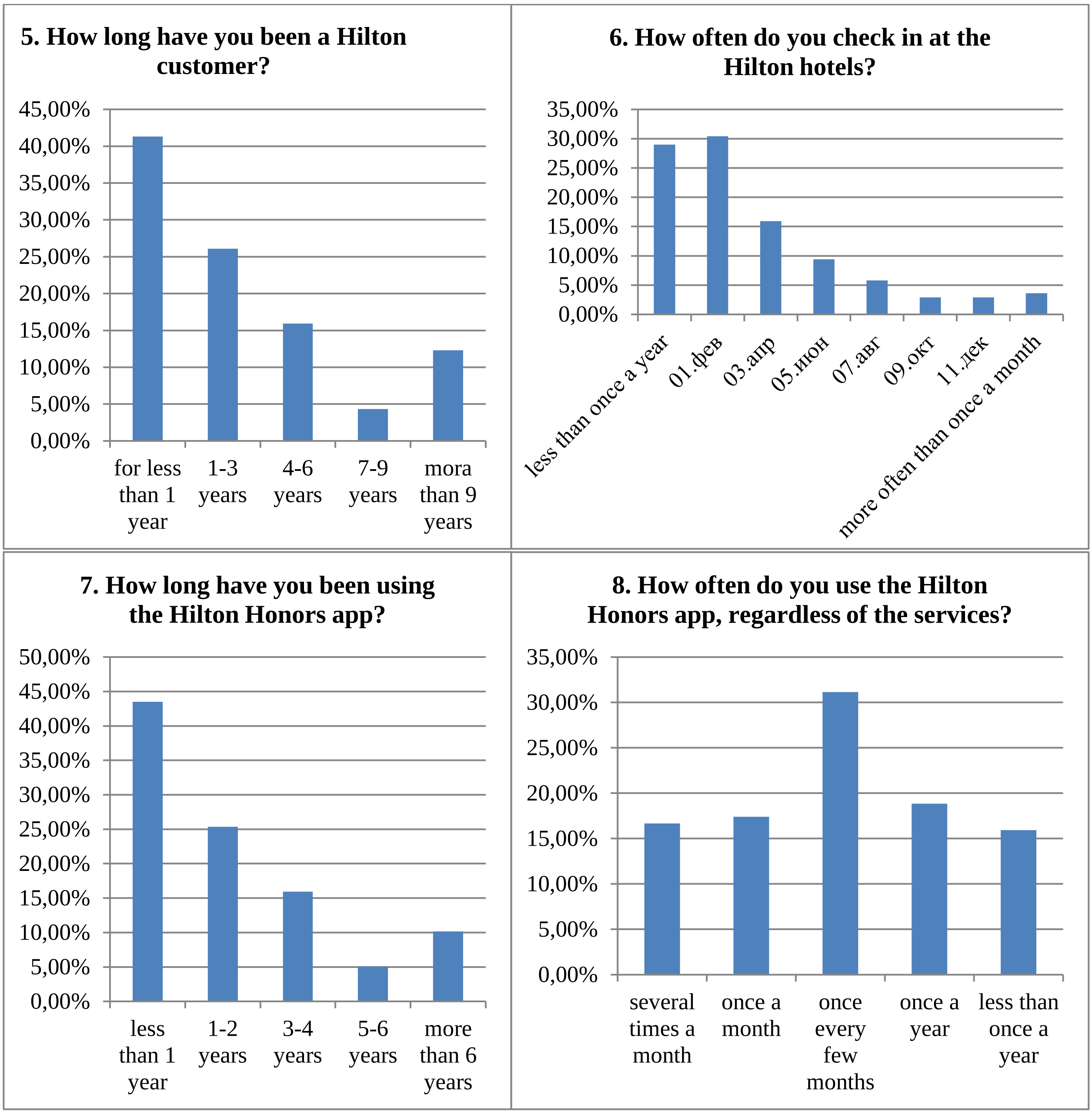

Figure 4. The usage behaviour of the Hilton Honors app

Source: developed by authors

Further, we are presenting which benefits and services are most sought by tourists. Accordingly, the analysis of this feature (table 3) shows that the most used service is hotel reservation which amassed 65,2%, followed by the option of choosing rooms while using the Hilton Honors app (60,1%). It should be mentioned that the following services are also highly appreciated: the Hilton chains provide free Wi-Fi (58,7%), accumulation of bonus points due to previous check-ins (55,8%), promotional offers (51,4%), and digital check-in (52,2%). Less interesting or appealing services to the respondents were the following: late check-out (33,33%), free accommodation for the second person (39,9%), free welcome drink (41,3%), and digital keys (42,8%).

Besides the services and benefits provided by the Hilton Honors app, the respondents also specified how often do they choose to check in the Hilton hotels. Accordingly, the analysis of the answers showed that 42,75% of the respondents use the app for less than 25% of the check-ins at the Hilton hotels, 28,26% use the app in 25-50% of the check-ins, and 28,98% of the clients often check-in between 50 and 75% of the check-ins) or very often (over 75% of the situations).

Table 3. Types of benefits and services appreciated by the clients of the Hilton chain

	Yes %		Yes %
Booking of the stay	**65,2%**	Promotional offers	**51,4%**
Choosing the room (app reservation)	**60,1%**	Digital key	**42,8%**
Free Wi-Fi	**58,7%**	Free welcome drink	**41,3%**
Gaining bonus points	**55,8%**	Free accommodation for the second person	**39,9%**
Digital check-in	**52,2%**	Late check-out	**33,3%**

Source: developed by authors

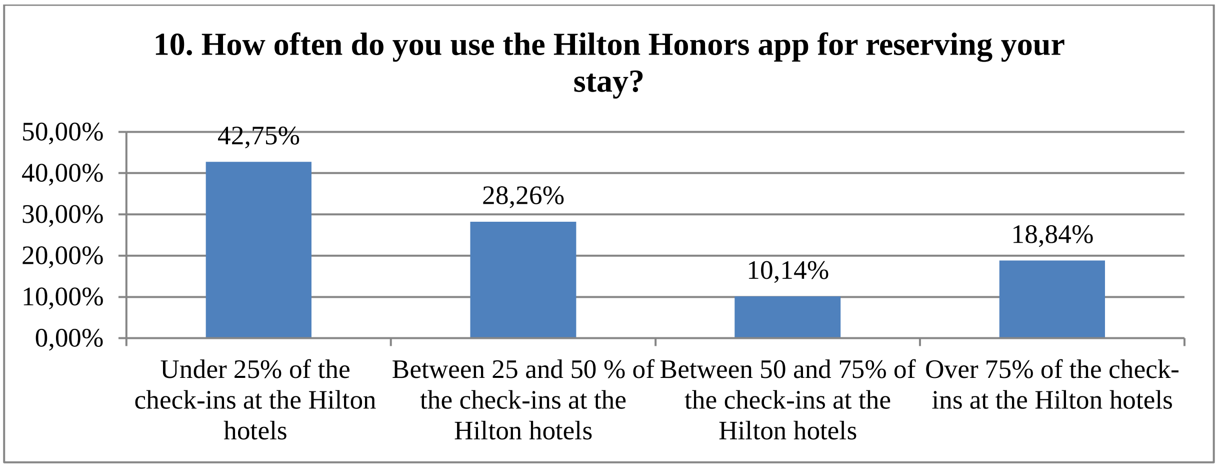

Figure 5. Customer attitude towards Hilton Honors App

Source: developed by authors

To assess customer behaviour in terms of the Hilton Honors app, we have asked a series of questions containing multiple factors which could influence the usage opinions, such as Customer Satisfaction, Atmosphere App, etc. The first parameter is Customer satisfaction, and all related data are included in Table 4.

The analysis of the average score obtained (4,18) at this compartment shows clearly that the Usage Satisfaction factor exceeds the average limit which proves that customers are pleasantly satisfied with the Hilton Honors mobile app, where most respondents gave the qualificative Agreement. In this context, the two most important motivations are ”By using the mobile app I have effective time management”, with an average of 4,22, and ”The usage experience of the mobile app is satisfactory”, with an average of 4,18.

To determine the degree of trust in the factors that influence customer satisfaction, we used the analysis based on the Cronbach Alpha coefficient. This coefficient gets values ranging between 0 and 1. This way the value between 0,8 and 1 shows a high degree of trust, while values less than 0,8 reveal a lower degree of trust.

In the case of the Usage satisfaction factor, we have recorded a Cronbach Alpha coefficient of 0,934, above the limit of 0,8, which shows a high degree of trust. Accordingly, each factor is separately investigated based on the answers collected from the respondents.

Table 4. "Customer Satisfaction in terms of Hilton Honors App" Factor

CUSTOMER SATISFACTION	Total disagreement	Disagreement	Neither, nor	Agreement	Total agreement	Average
By using the mobile app I have effective time management	2,2%	1,4%	10,1%	44,9%	41,3%	**4,22**
On the whole, the usage experience of the mobile app is satisfactory	1,4%	2,9%	8,7%	50%	37%	**4,18**
Generally, I am satisfied with the services and benefits provided by the app	2,2%	2,2%	10,9%	49,3%	35,5%	**4,14**
The app improves the service performance provided by the hotel	2,2%	2,2%	11,6%	44,2%	39,9%	**4,17**
					Average Score	**4.18**

Source: developed by authors

Another side of the present research has focused on the assessment of the App Atmosphere which gathered an average score of 4,08. Consequently, we can point out that the average score obtained by this factor has a satisfactory influence on the customer attitude in terms of the Hilton Honors app, which corresponds to the answer version "Agreement". The analysis of the Cronbach Alpha coefficient showed that the factor concerned got a value of 0,929, revealing a high degree of trust.

Table 5. "Atmosphere of Hilton Honors app"

ATMOSPHERE	Total disagreement	Disagreement	Neither, nor	Agreement	Total agreement	Average
The hotel staff gets involved in solving problems through the App chat	2,9%	3,6%	19,6%	39,1%	34,8%	**3,99**
Th number of Customer Assistance is given in the application	2,2%	4,3%	16,7%	37,7%	39%	**4,07**
The app system processes swiftly the information requested	2,9%	3,6%	10,9%	44,9%	37,7%	**4,11**

The confirmation details of the reservation are sent by SMS, email in 24 hours.	2,9%	3,6%	10,9%	40,6%	42%	**4,15**
If there are any problems related to the reservation, one can easily get in touch with a hotel representative	3,6%	1,4%	19,6%	35,5%	39,9%	**4,07**
Average score						**4.08**

Source: developed by authors

The third factor under investigation was the "The app reliability and receptivity" scoring 4,09, which shows that most respondents have given the Agreement qualificative. The app appearance and the registration process in the application are the most important features of this factor, accumulating an average value of 4,17. At the same time, at the compartment of app customization, the item concerned got a value of 3,95. The Cronbach Alpha coefficient for the factor concerned obtained a value of 0,935 which shows a high degree of trust.

Table 6. "Reliability and receptivity of the Hilton Honors app" Factor

PERCEIVED RELIABILITY AND RECEPTIVITY	Total disagreement	Disagreement	Neither, nor	Agreement	Total agreement	Average
The app appearance is stylish/ elegant and appealing	2,2%	1,4%	10,1%	50%	36,2 %	**4,17**
The app seems to use art-of-the-state technology	2,2%	3,6%	16,7%	44,2%	33,3%	**4,03**
The registration process in the app is easy	1,4%	3,6%	12,3%	42%	40,6%	**4,17**
The app has customized apps	2,2%	3,6%	19,6%	46,4%	28,3%	**3,95**
The app includes functions that are time and money savers (booking the room by card validation in the app, choosing the favourite room, etc)	1,4%	2,9%	13,8%	43,5%	38,4%	**4,14**
Average score						**4.09**

Source: developed by authors

Table 7 shows the results obtained in assessing the factor "Ease of use" which accumulated an average score of 4,32. The most important features were registered by "Very simple language", with an average of 4,37, followed by "The app is available round the clock" which got an average value of 4,36. The last positions are taken by "Information is easy to understand" and "Basic reservation services are available in the app" which have an average of 4,28. The calculus of Cronbach Alpha coefficient is 0,957, which shows a high degree of trust.

Table 7. "Ease of Use" factor for Hilton Honors mobile application

EASE OF USE	Total disagreement	Disagreement	Neither, nor	Agreement	Total agreement	Average
Very simple language	1,4%	1,4%	7,2%	38,4%	51,4 %	**4,37**
Information and instructions are easy to read and understand	1,4%	2,2%	10,9%	37,7%	47,8%	**4,28**
The app interface is friendly/ easy to use	1,4%	1,4%	8,7%	43,5%	44,9%	**4,29**
The basic reservation services are available in the app	2,2%	0,7%	10,9%	39,9%	46,4%	**4,28**
The app is available 24/7 in any place and at any moment	1,4%	1,4%	8,7%	36,2%	52,2%	**4,36**
					Average score	**4.32**

Source: developed by authors

The analysis of the data included in table 8 allows us to see that ″Perceived Utility″ factor accumulated an average score of 4,22, close to the average threshold corresponding to the answer version of ″Total Agreement″. Among the most valuable components are ″The application provides quick access to specific information″ (4,29), ″Reservations are quickly and easily processed″, and ″The app enhances my activity″, both having an average of 4,21. The Cronbach Alpha coefficient has a value of 0,945, representing a high degree of trust.

Table 8. "Perceived Utility" factor of the Hilton Honors app

PERCEIVED UTILITY	Total disagreement	Disagreement	Neither, nor	Agreement	Total agreement	Average
Reservations are quickly and easily processed	2,9%	1,4%	8%	47,1%	40,6 %	**4,21**
Application provides quick access to information such as hotel identification, provided services, etc.	2,2%	1,4%	7,2%	43,5%	45,7%	**4,29**
App enhances my efficiency in using the accommodation services	2,2%	1,4%	10,9%	44,2%	41,3%	**4,21**
It understands the basic requests and needs of the customers	1,4%	2,2%	12,3%	41,3%	42,8%	**4,22**
App is constantly updated in terms of fees, last minute offers, etc.	2,9%	0%	15,2%	38,4%	43,5%	**4,20**
					Average score	**4.22**

Source: developed by authors

The analysis of the perceived security shows that the average scored registered here was 4,13, the equivalent of "Total agreement". Particularly, the criterion ″Personal data of clients are used for authorized purposes only″ had an average of 4,23, followed closely by the criterion ″The app replies promptly in case of cancelled reservation″, with an average of 4,16. The last positions were occupied by features such as ″If there is any mistake, the app corrects it quickly and efficiently″ (4,09), and ″In case of losing internet connection or inactive account, the user is unblocked″ (4,04). The Cronbach Alpha coefficient of this factor amassed a value of 0,925, which points to a high level of trust.

Table 9. "Perceived Security" Factor of the Hilton Honors app

PERCEIVED SECURITY	Total disagreement	Disagreement	Neither, nor	Agreement	Total agreement	Average
App replies promptly if the reservation is cancelled or there are any other activities related to reservation	2,2%	2,2%	11,6%	45,7%	38,4 %	**4,16**
Account access is protected based on authorisation at multiple levels to prevent unauthorized access (membership number, security questions, etc.)	1,4%	1,4%	15,2%	45,7%	36,2%	**4,14**
Customer personal data are used for authorized purposes only	1,4%	2,2%	10,9%	42,8%	42,8%	**4,23**
In the event of losing internet connection, the user is logged out	2,2%	2,2%	22,5%	35,5%	37,7%	**4,04**
If there is any mistake, the app corrects it quickly and efficiently (first name, last name, etc.)	2,2%	3,6%	15,9%	39,9%	38,4%	**4,09**
					Average score	**4.13**

Source: developed by authors

On the other hand, the "Usage Risks" factor has got an average score of 3,34 (Table 10), the equivalent of the "Agreement" option. The highest environments got the following features ″There could be risks in personal data breeches″ (3,42), followed by ″There could be the risk of cancelling a reservation″ (3,37). The last positions are occupied by the features ″The system errors could be worrisome″ (3,33), and ″There could be unauthorized access to personal data″ (3,25). The Cronbach Alpha coefficient has got the value of 0,934, which stands for an advanced level of trust.

The accumulated average score for this factor is 4,15 (Table 11), which is the equivalent of the answer ″Total agreement″. The primacy of the factor is given by the following feature ″On the whole, I believe it is trustworthy″, with an average of 4,25. Additionally, the features related to the commercial design and offer stand out, amassing an average of 4,15, followed closely by the component of sensitive data generated by the app (4,10), and by the feature linked to getting to know customers and their particular needs through data, with an average of 4,09. The Cronbach Alpha coefficient has got a value of 0,932 which shows a high level of trust.

Table 10. "Usage Risks" Factor of the Hilton Honors app

USAGE RISKS	Total disagreement	Disagreement	Neither, nor	Agreement	Total agreement	Average
There could be risks in personal data breeches	7,2%	12,3%	31,2%	29,7%	19,6 %	**3,42**
There could be the risk of cancelling a reservation	8,7%	13%	30,4%	28,3%	19,6%	**3,37**
There could be the risk of unauthorized access to personal data by cybercriminals	9,4%	13,8%	35,5%	24,6%	16,7%	**3,25**
The system error, software problems, internet connection could be worrisome	7,2%	17,4%	29%	28,3%	18,1%	**3,33**
There could be the risk of losing or paying twice the fee for stay	10,9%	15,2%	26,8%	21%	26,1%	**3,36**
					Average score	**3,34**

Source: developed by authors

Table 11. "Trust in the Hilton Honors mobile application" Factor

TRUST	Total disagreement	Disagreement	Neither, nor	Agreement	Total agreement	Average
App usually meets the commitments made	2,9%	2,9%	8,7%	48,6%	37 %	**4,14**
The commercial design and offer of the app takes into account the desires and needs of its users	1,4%	2,9%	14,5%	41,3%	39,9%	**4,15**
I feel like they know well enough their users to provide products and services which best accommodate their needs	2,9%	2,2%	13,8%	45,7%	35,5%	**4,09**
I think that providing sensitive data is safe during the selection process of the hotel	2,2%	1,4%	13%	49,3%	33,3%	**4,10**
On the whole, I think it is trustworthy	1,4%	0,7%	10,1%	46,4%	41,3%	**4,25**
					Average score	**4,15**

Source: developed by authors

6. Conclusions

Following the complex methodologic approach, we can state that customer satisfaction is one of the most important variables determining the company decision to further develop, and it is the main pillar of the evaluation made by the customer who appreciates a product/ service based on his/ her expectations. Therefore, customer satisfaction in the hotel business is quite a complex concept, since the wide range of customer expectations in terms of hotel services makes difficult an effective assessment of tourist satisfaction.

Based on the analysis of the methods and techniques employed by companies for assessing tourist satisfaction in the hotel business, we can notice the most relevant ones, particularly: questionnaires addressing tourists, evaluation of the feedback given by tourists on the hotel websites or reservation platforms, application of the total quality management or other relevant methods. However, we think that each of these methods should be applied according to the objectives pre-set by companies.

Coming back to the hypotheses of this research, namely the basic H0 hypothesis: the use of the Hilton Honours app has a positive influence on tourist satisfaction", we can affirm that, based on the obtained results, the hypothesis has been confirmed. Thus, *theH0 hypothesis is confirmed.*

At the same time, the H1 hypothesis: the Hilton Honors app is useful and satisfies tourist expectations in due time" has been confirmed based on the answers provided by the respondents to this research. On average, this factor got 4,18 out of the maximum 5, which shows that tourists are satisfied with the Hilton Honors mobile app and will use it in the future as well. The research data show that most respondents (65,2%) use the application for booking their stay. Thus, *the H1 hypothesis has been confirmed.*

On the other hand, the H2 hypothesis „The Hilton Honors users trust the Hilton Honors application" got an average of 4,15 out of the maximum 5, which proves that most respondents trust this application. Thus, *the H2 hypothesis has been confirmed.*

Finally, the H3 hypothesis, namely Tourists expect the Hilton Honours app to be able to quickly respond and satisfy their needs in terms of accommodation services in the hotel", got 4,32, the highest average of all the studied factors. This proves that the *H3 hypothesis has been confirmed.*

Accordingly, we would recommend all accommodation units make use of information technologies in their management system to assess their customer satisfaction, which will help them meet their customer requests, gain the loyalty of their clients, be competitive and sustainable, and allow them to identify a strategic approach in terms of competitivity.

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Rezumat

Prezenta lucrare reprezintă o incursiune metodologică axată pe identificarea posibilităților de evaluare a creșterii satisfacției clienților prin prisma implementării tehnologiilor IT. Scopul cercetării este evaluarea satisfacției turiștilor hotelului Hilton de utilizarea aplicației Hilton Honours. În vederea atingerii scopului cercetării, a fost efectuată o analiză multidimensională a posibilităților de evaluare a satisfacției clienților prin prisma implementprii noilor tehnologii informaționale în cadrul unităților de primire turistică. Drept urmare, a fost efectuat un studiu cantitativ privind evaluarea satisfacției clienților în domeniul turistic. În același context, datele au fost interpretate fiind trasate concluzii și recomandări relevante. Metodologia cercetării s-a focusat pe *utilizarea multiplelor metode: analiza, sinteza, inducția, deducția, abducția, compararea, analiza statistică, modelarea. În concluzii, putem menționa că evaluarea satisfacției clienților reprezintă un pilon SMART al managementului relațional, un factor al fidelizării și loializării clienților, iar tehnologiile IT reprezintă un factor principal al sporirii satisfacției turiştilor. În acest context, unitățile de primire tuistică trebuie să-şi remodeleze sistemul de management prin infiltrarea de noi tehnologii IT care le va ajuta să facă față cerințelor clienților, să fie competitive și sustenabile, să-și loializeze turiștii, pe de o parte, dar și să-și identifice o abodare strategică în atingerea competitivității.*

***Cuvinte-cheie**: satisfacția clienților, management, evaluarea satisfacției clienților, performanță, tehnologii IT*

Аннотация

Настоящая работа представляет собой методологический экскурс, направленный на выявление возможностей оценки повышения удовлетворенности клиентов за счет внедрения ИТ-технологий. Цель исследования - оценить удовлетворенность туристов отеля Hilton использованием приложения Hilton Honors. Для достижения цели исследования был проведен многоаспектный анализ возможностей оценки удовлетворенности клиентов через призму внедрения новых информационных технологий в подразделениях приема туристов. В результате было проведено количественное исследование по оценке удовлетворенности клиентов в сфере туризма. В этом же контексте были интерпретированы данные и сделаны соответствующие выводы и рекомендации. Методология исследования ориентирована на использование нескольких методов: анализа, синтеза, индукции, дедукции, абдукции, сравнения, статистического анализа, моделирования. В заключение можно отметить, что оценка удовлетворенности клиентов является SMART-столпом управления отношениями, фактором верности и лояльности клиентов, а ИТ-технологии являются основным фактором повышения удовлетворенности туристов. В этом контексте подразделения по приему туристов должны перестроить свою систему управления, внедрив новые ИТ-технологии, которые помогут им соответствовать требованиям клиентов, быть конкурентоспособными и устойчивыми, с одной стороны, сделать своих туристов лояльными, а с другой стороны, определить стратегический подход. в достижении конкурентоспособности..

***Ключевые слова:** удовлетворенность клиентов, управление, оценка удовлетворенности клиентов, производительность, ИТ-технологии*

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PARTICULARITIES, POLICIES AND POLICY OPTIONS FOR PRICE FORMATION IN THE MARKET FOR WHITE SEA BUCKTHORN PRODUCTS

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Abstract

Even at the founding stage of for-profit enterprises, and also of some with non-profit status, their objective is to make a profit, which can only be obtained by setting favorable prices for the products or services offered to their customers. In market relations, everything around us is reflected in prices, which take various forms: fees, insurance premiums, interest, tariffs, taxes, fees, commissions, wages, taxes, etc.

This article deals with the problem of price formation for white sea buckthorn products from the point of view of increasing the degree of satisfaction of consumers' desires and expectations on the one hand, and on the other hand setting prices that ensure the profitable activity of the enterprise involved in production, distribution and marketing. The study of the market and pricing policy of white sea buckthorn products is carried out within the framework of the research project "Development of the technology of production of white sea buckthorn in an ecological system and processing of fruit and biomass", which highlighted the problems to be solved by managers and specialists involved in production and sales to ensure a high level of profitability, but also to meet the needs and expectations of consumers on the local and international market.

Keywords*: white sea buckthorn, white sea buckthorn supply and demand, marketing policies, pricing policies, pricing strategies*

1. Introduction

White sea buckthorn is a product that has been used since ancient times as a food but also as a medicine. In recent years there has been an increase in consumption, while consumer interest in white sea buckthorn fruit and products derived from it is growing, and they are being sold in the food retail network, the pharmacy network, specialist shops, etc. This makes it necessary to study in depth the issues involved in price formation and pricing strategies and policy.

Producers of white sea buckthorn products, as well as wholesalers and retailers, must take into account not only their valuable nutritional and therapeutic properties, but also ensure that the needs of consumers are met and that the production, processing, distribution and marketing of white sea buckthorn and products made from it are profitable. To achieve this objective, it is necessary to set appropriate prices, analyse costs and develop profit-oriented strategies. The paper examines how to set, analyse and adjust prices, how to estimate and analyse costs, and strategies that can ensure the products' market advantage.

2. Degree of investigation of the problem

From an economical point of view, the question of price began to be researched and analyzed by illustrious men in the 17th century, and Adam Smith is considered the father of modern economics, who showed in his works that "the real measure of the exchange value of products is labor" [17, p. 339].

It should be noted that John Locke, Sir James Stuart, Adam Smith, Alfred Marshall and In Taymiyyah are the first thinkers credited with discovering the law *of supply and demand, which is defined as the relationship between the price of a product and people's willingness to buy or sell it.*

The philosopher John Locke is credited with one of the earliest descriptions of this economic principle, stating in his 1691 publication [6, p. 28] that "the price of any commodity rises or falls in proportion to the number of buyers and sellers", and that "the natural value of anything consists in its property of satisfying the wants of, or of relieving the life of, man".

Adam Smith is considered the father of modern economics, helping to popularise many of the ideas that underpin classical economics. He was a major proponent of laissez-faire economic policies, and in his first book, *Theory of Moral Sentiments*, he proposed the idea of an *invisible hand* - the tendency of free markets to regulate themselves using competition, supply and demand, and self-interest [18, p. 17].

A. Smith demonstrated that labour is the only definite and true measure by which the value of all commodities can be assessed and compared in all ages. He stated that "always and everywhere equal quantities of labour are of equal value to the labourer" and "under ordinary conditions of health, strength, and activity, with an ordinary degree of skill and ability, he will always sacrifice the same share of his rest, liberty, and happiness" [18, p. 104]. He intuits that labour, in so far as it is expressed in the value of commodities, is nothing but the expenditure of labour-power, but even this expenditure is conceived by him only as a sacrifice of rest, freedom and happiness, and not as a normal vital activity.

An important place in the development of supply and demand theory centred on the concept of price elasticity and demand belongs to Alfred Marshall, who investigated how price changes affect demand. He established that the prices of some goods can rise without reducing demand, meaning that their prices are inelastic. Inelastic goods tend to include items such as medicines or food that consumers consider crucial to everyday life. Alfred Marshall argued that supply and demand, production costs and price elasticity work together [8, p. 347].

The ideas of A. Smith's ideas are echoed in the work of David Ricardo and K. Marcs in the 19th century and John Maynard Keynes and Milton Friedman in the 20th century.

As K. Marcs "a use value or a good has value only because in it abstract human labour is objectified or materialised. But how is the extent of its value measured? By the quantity of the 'value-creating substance', but also by the labour it contains. The quantity of labour itself is measured by its duration, and labour time, in turn, has its unit of measurement in definite parts of time, in hours, days, etc. [7, p. 49].

Until the late 19th and early 19th centuries, prices were set by negotiation between seller and buyer. With the development of industry and the advent of large-scale retailing, the idea of setting a single price for all buyers emerged. Promoters of this idea were W. Woolworth, Tiffani and Co., Jon Wanamaker and other companies who adopted *the single price policy* [5, p. 668]. *The single price* is set by the manufacturers or distributors, and is charged at the same level for similar categories of customers, who buy, as the case may be, similar quantities, provided that identical terms of payment always exist.

The problem of price formation is also studied by many contemporary authors, such as E. Busmachiu and A. Gumovschi in the work published by the Academy of Economic Studies of Moldova under the title *Prices and Tariffs* [1]. Ph. Kotler in his works, such as *Marketing Management, or Marketing Principles*, S. Petrovici and S. Mustuc [13] in the work *Marketing*, but also Romanian textbook authors, such as C. Florescu with the title *Marketing*, etc.

Thus, the problem of price formation has been addressed by scientists since ancient times, but it should be noted that in modern conditions there is a need to study the given problem in greater depth through the prism of developing and implementing pricing strategies that would contribute to achieving the objective of the enterprise to meet the highest level of consumer expectations on the one hand and to achieve a maximum level of efficiency of activity on the other.

In this paper the aim of the research is to identify the problems to be solved by the managers and marketers of the enterprise specializing in growing, processing and marketing of white sea buckthorn, responsible for the pricing policy to meet the needs and expectations of consumers and to ensure the profitability of the enterprise.

Although the consumption of white sea buckthorn products and the satisfaction of consumer desires and expectations is a current issue in the area of pricing policy for this product, no studies have been conducted that would establish some benchmarks for the rationale of pricing strategy for white sea buckthorn products and the authors set out to investigate this important topic.

3. Research methods and materials

A number of scientific research methods were used in this research: the dialectical method and its components: analysis and synthesis, the method of comparison, presentation of the results obtained in the form of tables and diagrams. The research is interdisciplinary, descriptive and applied with a logical-deductive approach.

The research was based on the study of marketing policy issues, in particular pricing policy and pricing strategies, and pricing methods. The work is carried out within the framework of the Research Project *"Development of the technology of production of white sea buckthorn in ecological system and processing of fruit and biomass"*, number 20.80009.5107.13. The data on costs and profit in the production of white sea buckthorn are provided by the LTD "PomiProConsult" carried out in the framework of the Project for the establishment of multiannual plantations of white sea buckthorn for LTD "Big Cuker" from the village of Clișova Orhei district. Data on current prices of white sea buckthorn products were gathered by researching commercial establishments specializing in food products, including agricultural markets in various localities of the Republic of Moldova.

4. Results and discussions

The modern era is characterised by the dizzying development of information technologies and the mass Internet, reversing the trend of fixed price, which gives economic agents the opportunity to return sales to a new era of negotiated prices.

The peculiarities of price formation in agriculture, to which the white sea buckthorn belongs, require that the concepts of price and cost be studied in parallel in this sector. This link between these two concepts, particularly in agriculture, is found everywhere and more frequently than in other economic fields. These terms express generically the consumption of social labour, where cost represents the value part of the commodity, and price includes other components such as producer profit, trader's mark-up, taxes (especially value added tax), excise duties. Price is an economic category that encompasses all the components of economic activity, starting with the manufacture or cultivation of agricultural products and continuing with the processing of raw materials, the distribution of goods, operations related to logistics, the marketing of products and the provision of services.

The issue of price formation in an agricultural enterprise is found in pricing policy. A **pricing policy** is a set of concrete principles, rules, measures and methods by which an economic agent defines its position in relation to the prices of its products in order to achieve specific objectives for each period of activity.

An effective pricing policy must be coordinated and subordinate to the achievement of the strategic objectives that are set by the company's marketing policy. Thus, pricing policy is associated with product policy, because the price changes frequently during the product's life cycle, with distribution policy, because the price accompanies the product throughout its entire life cycle (from producer to consumer), and with promotion (communication) policy, because the price intervenes directly in the dialogue between the product (producer, intermediary) and the buyer (consumer) and can play a decisive role in the buyer's purchasing decision, which can be influenced by the latter.

Price formation in agricultural enterprises, as well as in white sea buckthorn production, involves several steps, which are shown in figure 1.

The pricing process starts with the formulation of the tasks. The tasks of the farm business related to price formation can be:

– ensuring survival - this task is posed by fierce market competition and sudden changes in customer needs. It involves setting a minimum price level;
– maximise current profit - this task sets a price that ensures maximum current profit inflows;
– gaining market share leadership - involves setting a price that ensures a long - term profit;

– achieving leadership by quality indicators - involves setting a high price to ensure that the costs of achieving high quality, research, technology development, etc.

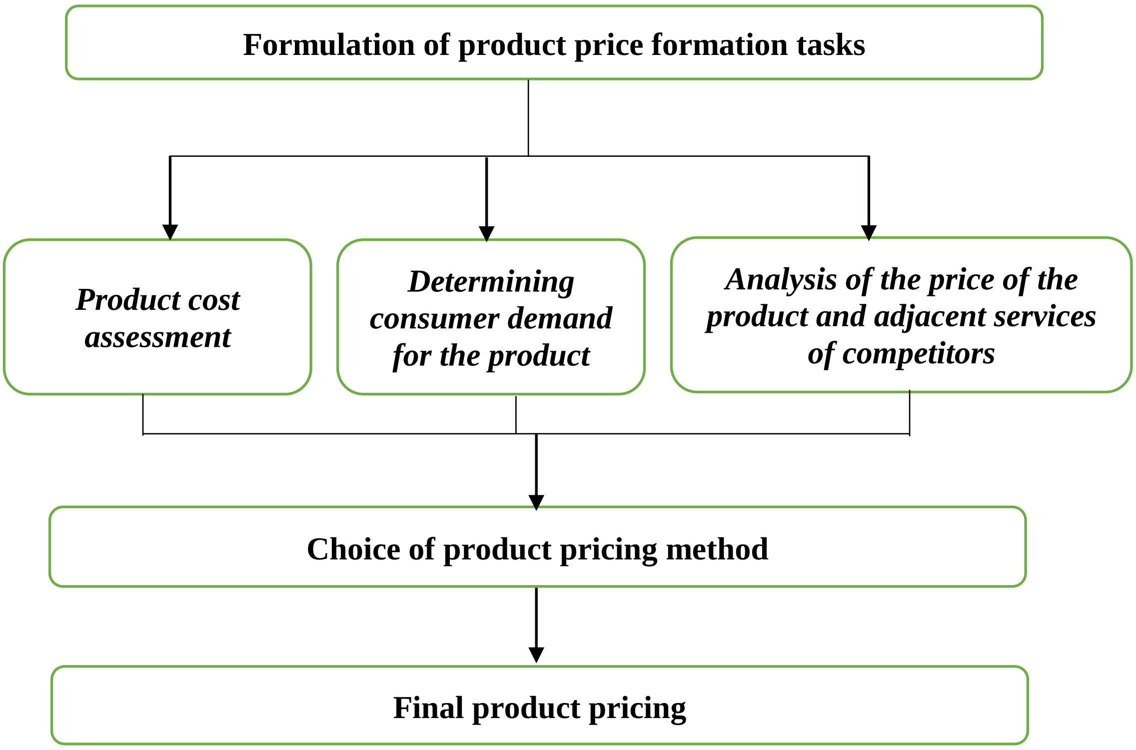

Figure 1. Product pricing steps

Source: prepared by the authors

The next step in price formation in agricultural enterprises is the analysis of the main price formation methods. These are: the cost-dependent method, the supply-demand method and the competitor-dependent method.

Product costing involves determining all the costs of producing a product. Thus, the total cost of producing white sea buckthorn fruit is calculated on the basis of direct consumption of materials (planting material, fuel and lubricants for carrying out the various mechanised operations, chemicals for controlling diseases and pests, fertilisers for feeding the plantations, as well as consumption related to the remuneration of the workers involved with the related contributions linked to wages) and indirect consumption (wear and tear on fixed assets, in particular agricultural machinery, low-value and short-lived agricultural equipment, consumption for improving technology and improving quality, maintenance of fixed assets, etc.).) [2, p. 114]. The price is then set to cover all these costs plus a profit margin to be claimed by the trader. The cost of production and the profit obtained in the cultivation of white sea buckthorn, which also provides us with data on the economic efficiency of the production of this crop, are shown in table 1.

An important aspect of setting the selling price is determining the consumer demand for the product. Consumer demand, as a rule, sets the upper limit of the price that the producer charges for his product. The price set by the company is in one way or another reflected in the level of consumer demand. In order to determine consumer demand, it is necessary to evaluate it at different price levels. In determining the relationship between consumer demand

and supply, it is necessary to consider not only the influence of price but also other factors. In the case of white sea buckthorn products, demand on the Moldovan market is characterised by increasing consumption due to their properties for the human body. Thus, we find that local consumers are prone to accept higher prices and the producer as a consequence to demand a higher price, because the product is at the end of the launch stage, the beginning of the growth stage of the product life cycle.

Table 1. Economic effciency of white sea buckthorn production in 2021

No.	Name of indicators	Level of indicators achieved in the enterprise
1	Productivity, tons/hectare	8,5
2	Selling price, lei/kg	20,00
3	Production value, thousand lei/hectare	170,00
4	Cost of production, thousand lei/hectare	22,30
5	Cost of production, thousand lei/ton	2,62
6	Gross profit, thousand lei/hectare	147,7
7	Gross profit, thousand lei/ton	17,38
8	Level of profitability, %	662,33

Source: Report on the results of the activity of "Big Cuker" Ltd. from the village of Clișova, Orhei district [20, p. 112]

The analysis of the price of the product and the adjacent services of the competitors takes place because the price of the product is considerably influenced by the price of direct and indirect competitors. For enterprises that are permanently active in an agricultural market, it is necessary to study competitors' prices. Pricing policy in the agri-food sector depends largely on the type of market determined by the number of competitors. This number of competitors changes depending on the stage of the product life cycle (launch, growth, maturity and decline. Four types of markets are highlighted according to this criterion, each of which poses certain problems in the area of price formation (Table 2).

Table 2. The peculiarities of price policy in the agri-food sector in different types of markets depending on the number of competitors

Market type	Market characteristics	Peculiarities of price formation
Perfect competition	This market is represented by a large number of buyers as well as sellers. The products are homogeneous. Factors of production are equally accessible to all producers. Certain buyers or sellers cannot influence the current price level in the market.	A reasoned elaboration of the price-related marketing strategy by the economic agent is necessary.
Monopolistic competition	This market is also represented by a large number of buyers and sellers but the products are not homogeneous. The products differ from each other in quality, properties, packaging. This also implies a wide range of prices for the same product.	The economic agent's price-related marketing strategy involves price variations depending on the buyer segment.

Oligopoly	The market is represented by a small number of sellers or producers.	The economic agent through the price-related marketing strategy must react promptly to the changes in the price strategy of the competitors.
Monopoly	This market is represented by a single producer or hunter. For the agri-food market, this situation is rare.	In this market, by changing the price strategy, the economic agent can achieve different goals (maintaining the buyer, preserving the monopoly situation on the market, etc.).

Source: adapted after Predein D. B. Агрмаркетинг / Agromarketing. Москва: Московский международный институт эконометрики, информатики, финансов и права. 2012. – 275 p. [15, p. 19]

Analyzing the market of white sea buckthorn products in the Republic of Moldova through the above mentioned criterion, we can say that the size of prices of white sea buckthorn products is related to a lesser extent to the solvency of consumer demand, as well as to the purchasing power of the population. To a large extent, the prices of white sea buckthorn products on the local market are set by the producers, as their number is small and the quantity, they produce barely meets local demand by the beginning of December each year.

Thereafter, the demand for white sea buckthorn products is met by imported products. These moments make us state that the prices of white sea buckthorn products are formed in oligopoly-monopoly markets, therefore, it is dictated by the producer-trader. In addition to this, we can mention that the life cycle of white sea buckthorn products on the market of the Republic of Moldova is at the end of the launch stage - the beginning of the growth stage. Thus, analyzing the prices of these products on the local market we have established that the price of one kilogram of fresh white sea buckthorn fruit is around 100 lei/kg. The price level of finished products made from white sea buckthorn is much higher because they require special processing technologies that are very expensive. Thus, we can mention that the accessibility of white sea buckthorn products to the final consumers on the market is at a very low level. This is also reflected in the fact that some consumers buy as little as 200 grams of fresh fruit per purchase. But it is also a positive moment. The consumer understands the need for white sea buckthorn products [11, pp. 59-64].

The next step is to choose the method of product pricing. The price will be positioned between the low price range which does not ensure profit and the high price range which prevents the formation of consumer demand, around the level of the competitors' price. The following methods are used in agromarketing for price formation:

– average cost plus profit method;
– the critical point method and ensuring planned profit;
– the product's perceived value method;
– current price level method;
– the method of closed negotiations.

The purpose of these methods is to narrow the price range within which the final price of the product will be formed.

Finally, we have the final pricing stage, which mainly involves studying the factors influencing price formation and then indicating the final price. Thus, the main factors influencing the final price are:

- the psychology of price perception;
- the company's pricing policy;
- the influence of price on other market participants, etc.

The agricultural producer does not simply set one price or another on his production, he creates an entire pricing system that encompasses a broad spectrum of commodities and products within the limits of his market assortment, taking into account a number of factors such as:

- differentiation of the costs of organising marketing in different regions of the country;
- seasonal fluctuations in consumer demand;
- distribution of purchases over time, etc.

Pricing policy must be flexible in the strategies it uses, alternatively or concurrently, as well as in the pricing tactics employed, and have continuity to drive long-term efficiency.

Thus, we see, that any enterprise must define a clear strategy towards its products, set the most important pricing policy objectives for certain periods of time, including: survival, maximization of current profit, maximization of sales volume, maximization of the quantity of merchandise sold, increasing competitive advantage in the market, promotion of a higher quality product, etc.

The price is the amount of money the buyer pays to purchase a product. It is determined for each individual product and the company's management has to establish several strategies that may change from one period to another.

Depending on the market strategy adopted, the pricing policy may aim to achieve a number of objectives, some of a general nature, others of a specific, concrete nature, some short-term (survival, maximising current profit, maximising sales volume), others long-term (maximising turnover, promoting a quality image, maximising market advantage).

In the literature we find a wide range of strategies, which we will discuss below. Thus, strategies can be grouped according to various criteria.

Authors C. Florescu [3, p. 347], V. Munteanu [12, p. 221] and C. Sasu [16, p. 234] present a wide variety of strategies focused ***on how to determine price***, including:

1. Cost-related strategies. These are based on determining the cost of production and the profit margin in order to establish the minimum price, or the lowest possible price charged by the company. Of these strategies we can highlight: average cost strategy, marginal cost strategy, break-even or return on investment strategy.
2. Demand-driven strategies. For some consumers price is a decisive factor in the buying decision, and for this reason we need to identify the maximum price ceiling the buyer can offer for the product taking into account the elasticity of demand factor. This category includes strategy focused on the analysis of elasticity of demand, consumer behaviour and product life cycle.
3. Competitive pricing strategies. Firms can set their prices taking into account competitors' prices. These will focus on analysing factors such as image, quality, loyalty levels, and strategies can be: high price strategy and penetration price strategy.

4. Combined strategy. This in itself includes several of the components listed.

Another research aspect of pricing strategies are those focused on the position of the product. This category of strategies is analyzed by Ph. Kotler [5, p. 773]. Thus, he highlights several varieties of strategies including:

1. Pricing strategy for new products. if the products are similar to existing products, or when the product represents an innovation. When the product is similar to competitors' products, an exception pricing, minimum pricing, premium pricing, or value-based strategy can be used. If the product represents an innovation and is patented, then a strategy of advantage exploitation or market penetration can be used.
2. The strategy of maximizing the profit of a set of products. When products are characterised by different costs and competitors, the following pricing strategies can be used: a product line or optional products, captive products, derivative products and package deals.
3. Price adjustment strategies may also be used in some cases. These strategies aim to adapt the price of the product to the differences that exist between consumers, especially in changing situations. This category includes strategies such as discounts and bonuses, tiered pricing, psychological pricing, promotional pricing, international pricing, geographic pricing, etc.

Pricing strategies can also be analysed in terms ***of the length of time used*** by the company. In terms of time, long-term strategies are characterized in detail by the authors St. Prutianu, C. Munteanu and C. Caluschi. [14, p. 158]. Thus, they highlight the foll pricing, final pricing, odd pricing. Short-run strategies are outlined in the works of scholars E. Hill and T. O. Sullivan [4, p. 176]. *The strategies are diverse depending on the type of price* (differentiating price, bait price, special price), the size and volume of the incentive (offering discount, bundle or package price, clearance and promotional prices).

Another direction of strategy setting is competition. Under this aspect, companies can use a variety of pricing strategies, namely: parity pricing, controlled pricing, undermining or harassment pricing and survival pricing.

Pricing strategies can also be based on social criteria. Most often NGOs and public associations use strategies such as: differentiated discounts, non-profit prices, barter, auction prices (on stock exchanges), prices set as a result of tenders or negotiations.

Strategies can also be analysed in terms of the price level set by sellers.

The fact that white sea buckthorn and its products are in the phase of launching a product on the market I have also mentioned in previous articles referring to white sea buckthorn products on the Moldovan market. If we talk about the reality of price formation of white sea buckthorn products on the market of the Republic of Moldova, then we can mention that they correspond to strategies that are formed in the phase of launching products on the market.

The main argument in this regard is illustrated in table 1, which shows the economic efficiency of white sea buckthorn production in a local agricultural enterprise. Analysing the results obtained in this enterprise we observe that this crop is very profitable. The level of profitability of 662.3% shows that each lion spent yields a profit of 6.62 lei. Moreover, these indicators show that the production price is 7.6 times higher than the production cost. This fact shows that the price of white sea buckthorn fruit on the Moldovan market is a "smothering price" which is used in the launch phase.

Another argument for the use of pricing strategies in the launch phase is the fact that domestic production of white sea buckthorn in 2021 was exhausted *in December*, and the white sea buckthorn fruit after this month present on the market was imported.

The prices currently set for white sea buckthorn fruit are good for farmers, but this should be a warning to farmers as more and more farmers will start growing the crop and market prices will start to fall.

The large profits made during this period need to be invested in post-harvest infrastructure such as cold stores needed in post harvest processes, but also in distribution and promotion infrastructure, related to packaging and labelling of the fruit, creation of the company logo and its production to be more easily recognised by loyal consumers.

Although fresh white sea buckthorn fruit still does not meet domestic demand, there is a need for white sea buckthorn producers to develop processing lines, because in a few years the domestic supply will cover domestic demand and then the surplus will need to be processed, diversifying the product portfolio offered to consumers, or exported.

5. Conclusions

The results of the study reflect the general picture of consumers of white sea buckthorn products. It provides an opportunity to develop some recommendations for producers of white sea buckthorn products, namely:

1. In order to establish a competitive price for products in agricultural enterprises, as well as in the production of white sea buckthorn, it is necessary to go through several steps. Managers responsible for price formation must start with the formulation of the farm's tasks, including: ensuring survival, maximising current profit, or achieving leadership by market share indicators.
2. Managers should use different pricing methods, including: cost-dependent, demand-supply and competitor-dependent. This requires assessing production costs, determining consumer demand, analysing the price of the product and services offered by competitors and other factors.
3. At the final stage of pricing of white sea buckthorn products, it is necessary to study the factors influencing price formation, such as the psychology of price perception, the pricing policy of the enterprise, the influence of the price on other participants of the market activity, etc. The price formation of white sea buckthorn products taking into account the purchasing power of the local consumer. This will increase the consumption of these products.
4. The company's management must analyse and determine the most effective pricing policy strategies, which may change from period to period. They should be cost-related, demand-related, competitiveness-oriented, or focused on the product's market position and others. To be successful in the market for white sea buckthorn products, three main variables need to be taken into account: quality, price and packaging.

5. There is also a need for agricultural companies in the country to increase the production of white sea buckthorn fruit in order to ensure the current consumption of the final consumer, as well as the needs of the processing industry of these products, to diversify the assortment of local products obtained from white sea buckthorn in order to replace their import.
6. In order to ensure the success of the white sea buckthorn production activity, it is necessary to carry out promotional actions and to permanently inform the consumer about the importance of white sea buckthorn so that this product becomes a traditional one in the Republic of Moldova.

Thus, the introduction of white sea buckthorn as a crop creates favourable conditions for farmers from an economic point of view, but valuable due to the fact that it does not imply the use of means or methods that are themselves polluting, for solving the major problems related to land degradation and the exit of agriculture from the crisis in the Republic of Moldova.

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Rezumat

Încă la etapa de fondare a întreprinderilor lucrative, dar și a unora cu statut non-profit acestea au ca obiectiv realizarea de profit, care poate fi obținut numai în baza stabilirii unor prețuri favorabile pentru produsele sau serviciile oferite clienților săi. În condițiile relațiilor de piață tot ce ne înconjoară se reflectă prin prisma prețurilor, acestea fiind sub diferite forme: onorarii, prime de asigurare, dobândă, tarife, taxe, comisioane, salariu, impozite etc.

În lucrare se abordează problema formării prețurilor la produsele din cătina albă prin prisma sporirii gradului de satisfacere a dorințelor și așteptărilor consumatorilor pe de o parte, iar pe de alta stabilirea unor prețuri care să asigure activitatea profitabilă a întreprinderii implicate în producere, distribuție și comercializare. Studiul pieței și a politicii de preț a produselor din cătină albă, este realizat în cadrul proiectului de cercetare „Elaborarea tehnologiei de producere a cătinii albe în sistem ecologic și a prelucrării fructelor și biomasei", care a scos în evidență problemele care urmează a fi rezolvate de către managerii și specialiștii implicați în producere și vânzări pentru a asigura un nivel înalt al profitabilității, dar și a satisface nevoile și așteptările consumatorilor pe piața locală și internațională.

***Cuvinte-cheie**: cătina albă, cerere și ofertă de cătină albă, politici de marketing, politici de preț, strategii de preț*

Аннотация

Еще на стадии основания производственных предприятий, а также в тех с некоммерческим статусом, они имеют целью получение прибыли, которую можно получить только на основе установления выгодных цен на товары или услуги, предлагаемые своим клиентам. В условиях рыночных отношений все, что нас окружает, отражается через призму цен, которые бывают в разных формах: сборы, страховые взносы, проценты, тарифы, комиссионные, заработная плата, налоги и т. д.

В статье рассматривается проблема ценообразования на продукцию из облепихи через призму наилучшего удовлетворения желаний и ожиданий потребителей с одной стороны, а с другой - установления цен, обеспечивающих прибыльную деятельность предприятия, занимающегося производством, распределением и торговлей. Изучение рынка и ценовой политики продукции из облепихи проводится в рамках научно-исследовательского проекта «Разработка технологии производства облепихи в экологической системе и переработки плодов и биомассы», в котором были выделены проблемы, решением которых должны будут заниматься менеджеры и специалисты, связанные с производством и продажами, для обеспечения высокого уровня прибыльности, а также для удовлетворения потребностей и ожиданий потребителей на местном и международном рынках.

***Ключевые слова:** облепиха, спрос и предложение облепихи, маркетинговая политика, ценовая политика, ценовые стратегии*

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ECO-INNOVATION IN THE REPUBLIC OF MOLDOVA – DEVELOPMENT PREMISES

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Abstract

The transition to a greener and more prosperous society is possible by promoting innovations that address current and future environmental problems, decreasing energy and resource consumption, while promoting sustained economic activities. Thus, a new type of innovation appears, namely, eco-innovation. This article summarizes the steps taken by the Republic of Moldova through the programs and strategies that encourage sustainable innovation and sustainable development, and brings to the attention of the Moldovan academic environment a new topic, which tends to become an area with a significant impact on the national economy. Thus, the paper carries out an analysis of the national context in Moldova for the development of eco-innovation, analyzes the existing conditions and identifies the main barriers. The author also identifies the main premises and directions that support the development of eco-innovation and elaborates the constitutive elements of the concept of eco-innovation in Moldova, from the perspective of consumers and the business environment. The methodology is based on methods of analysis and synthesis, interpretation and relevant comparisons. The results of the research highlight the fact that Moldova has potential for the development of eco-innovation, but it still does not have a clear policy and a legislative framework to support eco-innovation.

Keywords*: sustainable development, eco-innovation, Republic of Moldova, strategies, development directions*

1. Introduction

Humanity is currently using more natural resources than the planet can sustain in the long term. In 2022, according to the calculations of scientists [24], the "Earth Overshoot Day" was on July 28, which means that mankind has used the natural resources of an entire year in only 7 months. According to the Millennium Ecosystem Assessment [11], 60% of the benefits provided by global ecosystems to sustain life on Earth (such as fresh water, clean air and a relatively stable climate) are degraded or used in an unsustainable way. Recent sustainability challenges (climate change, resource scarcity, environmental degradation, etc.) are driving change in the way Governments and the private sector alike operate.

From this perspective, it is widely recognized that innovation is a driver of economic and social progress in any country, as well as a driver of business success by providing competitive advantages at the organizational level. The transition to a greener and more prosperous society is possible by promoting innovations that address current and future environmental problems, decreasing energy and resource consumption, while promoting sustained economic activities. This type of innovation is further referred to as eco-innovation.

Two basic publications exploring the wider scope of green growth possibilities have been launched for almost 10 years by international organizations - OECD "Towards Green Growth" (2011) [23, p. 9] and UNIDO "Politics for supporting green industry" [38].

The launch of the EcoAP (Eco-innovation Action Plan) initiative [7] by the European Commission and the growing number of academic papers published on eco-innovation show the growing interest in this knowledge from politicians and academia. But the role of innovation in achieving green growth can hardly be overstated in any country.

Therefore, in many countries, innovations in environmental technologies are supported by various public measures because they are considered to be promising for improving environmental conditions without hindering economic growth. Eco-innovation is thus seen as a global concept that provides direction and vision for pursuing the overall societal changes needed to achieve sustainable development.

The predominant driver for the greening of business practices has been the tightening of environmental regulations. Recently, the trend has gained ground with increased competition during the economic slowdown and growing demand for green products (with increasing consumer awareness). Whether it's regulation, pushing competition or raising consumer awareness on the topic of sustainability, a company usually needs to eco-innovate to maintain its market position or even break into new markets. For politicians, the growing concern with climate change and the depletion of natural resources have been the main arguments when justifying new and increasingly strict environmental regulations.

From a macroeconomic perspective, it has also become apparent that technological eco-innovations alone are not capable of creating incremental change at an expected pace to achieve the EU 2030 climate change and energy targets [2], therefore there is a need for a more complex approach to eco-innovation at the state level in order to achieve systemic change. To date, the promotion of eco-innovation has mainly focused on environmental technologies, but there is a tendency to expand the scope of the concept. Eco-innovation is also seen as a global concept that provides direction and vision for pursuing general societal changes needed to achieve sustainable development [18].

This paper analyzes the national context of the Republic of Moldova for the development of eco-innovation. In order to gain a clearer understanding of the environment that supports eco-innovation, the author aims to: analyze the existing conditions, as well as identify the main barriers; to define the main premises and directions to support the development of eco-innovation in Moldova; to define the constitutive elements of the concept of eco-innovation in Moldova from the perspective of consumers and the business environment.

2. Literature review

In the European Union, eco-innovation supports the broader goals of the Lisbon Strategy for competitiveness and economic growth. The concept is promoted, first of all, by the Eco-innovation Action Plan of the European Commission [7], which defines eco-innovation as *"the production, assimilation or exploitation of a novelty in products, production processes, services or in management methods and business, which aims, throughout its life cycle, to* *prevent or substantially reduce environmental risk, pollution and other negative effects of the use of resources (including energy)".*

The OECD definition of eco-innovation supports MEI's approach of evaluating eco-innovation through its output and adds wider dimensions to the concept by including "external parties" – *the implementation of a product (good or service) or a new or significantly improved process, of a new marketing method or a new organizational method in business practices, workplace organization or external relations* [22].

As defined by the European Commission [9], "eco-innovation is any innovation that have as a result a significant progress towards the goal of sustainable development, by reducing the impact of our production methods on the environment, increasing nature's resistance to environmental pressures, or by achieving an efficient and responsible use of natural resources", it seems that eco-innovation includes both technological and non-technological forms of innovation "that create business opportunities and environmental benefits by preventing or reducing their impact, or by optimizing the use of resources" [9].

Regarding the terminologies of "green innovation", "environmental innovation" or "sustainable innovation" [35], which are defined in this paper as "eco-innovation", they have been subjected to the analysis of different academic fields, such as, economics [33], management [31] and sociology [36], as well as in product design, governance, users or supply chain research [4]; [16]. Subsequently, the interest in eco-innovation among policy makers and the business environment arose due to the inherent market potential and global issues related to climate change and sustainability [14].

Thus, eco-innovation offers entrepreneurial opportunities in different fields, such as renewable energy technologies, pollution prevention schemes, waste management equipment, green financial products or ecological agriculture [3] and also supports firms that face fierce competition by offering competitive advantages [5].

Firstly mentioned by Fussler and James (1996), eco-innovation was defined as "new products and processes that provide customer and business value, but significantly reduce environmental impact", implying an initial focus on monetary and environmental failure mitigation [3]. Conversely, OECD (2010) indicates that eco-innovation also occurs in the form of “unintended side-effects” that reduce environmental impact. In fact, eco-innovation occurs wherever the reduction of environmental failure is the result of the introduction of new products, services, processes or management methods at the organizational level [22].

In addition, previous results have often ignored the positive environmental impact of "classical innovations" as well as the distinct "modes" of eco-innovation in terms of products, process organization methods [16]; [25]. Therefore, Kemp and Pearson (2007) described eco-innovation as "the production, application or use of a product, service, production process, organizational structure or management or business methods that is new to the firm (which developed or has adopted it) and which results, during its life cycle, in the reduction of environmental risk, pollution and other negative effects of resource use (including energy use) compared to relevant alternatives', which embodies a contribution basis for many subsequent research works [14]; [17]; [21]; [22]; [25].

In all the definitions presented, we can note that all the authors use the concept of eco-innovation as a means of minimizing pollution and the impact of human activity on the environment, on the one hand, and, on the other hand, as a means of obtaining a more efficient use of resources.

Critically presenting the prevailing research on eco-innovation from different points of view of various authors, a feasible definition of eco-innovation for the purpose of this paper is provided by the European Eco-innovation Observatory (2010), which this time provides a wider perspective of the concept: *"Eco-innovation is the introduction of any new or significantly improved product (good or service), process, organizational change or marketing solution that reduces the use of natural resources (including materials, energy, water and land) and enables reducing the release of hazardous substances throughout the entire life cycle"* [19].

3. The degree of investigating the problem, the purpose of the research

Eco-innovation is a relatively recent concept at international, European and especially national level. The first to use the concept of eco-innovation were Fussier Claude and Peter James in 1996. Almost 3 decades ago the authors started using the term "eco-innovation" and developed various researches around this concept. Some of the most notable researchers and specialists in the field are Rene Kemp and Pearson, who have done the final report of the MEI project on measuring eco-innovation in 2007 [16].

Later, in 2010, Kemp analyzes eco-innovation as a concept that replaces the older concept of environmental technology and provides a typology of eco-innovations, examines measurement indicators and offers measurement suggestions, in a scientific article *"Eco-innovation: definition, measurement and open research issues"* [15].

As we can notice that Eco-innovation is a relatively recent concept, there is no consensus definition of the term, being a rather complex one. The purpose of the research is to make a retrospective of the definition of this concept, to determine the role of eco-innovation in supporting sustainable development in the Republic of Moldova by defining the constituent elements of the concept from the perspective of consumers and business environment. Also, the purpose of the research is to identify the premises, barriers and directions for the development and promotion of eco-innovation at the national level.

For the EU states, interest in Eco-innovation is growing significantly, especially with the definition of the Eco-innovation Action Plan of the European Commission - EcoAP [7], which aims at a knowledge-based economy, capable of sustainable economic growth and with a better social cohesion. Thus, eco-innovation becomes a key concept that combines economic efficiency, saving resources and energy from the desire to create a new economic growth that takes into account the resources of the planet and is for the good of the citizens.

For the Republic of Moldova, the main challenge remains its low level of competitiveness, which significantly affects the research and innovation system. The high and medium technology sectors do not contribute enough to the trade balance, the demand for knowledge remains weak and the culture of innovation continues to be underdeveloped.

Moldova still occupies modest positions at the world level in terms of investments in research, innovation and sustainability. According to the Global Innovation Index 2021 [12], the Republic of Moldova ranks 64th among 132 economies, registering a decrease in position in the last 3 years, or 37th among European states. However, reported to GDP, in 2019, the performance of the Republic of Moldova is above expectations for its level of development. In terms of ecological sustainability, Moldova ranks 105th, environmental performance - 76th and the implementation of ISO 14001 environmental certificates - 97th [12], registering better performances compared to 2019.

In the context of a sustainable development at the state level, it is important to apply the principles of sustainable development in the Republic of Moldova, both in all sectors of the national economy and in the social sphere. Based on these principles, public policies have been developed that aim to restore and maintain a long-term rational balance between economic development and the integrity of the natural environment. In general, the national policy agenda is partially aligned with the Sustainable Development Goals (SDGs), and a third of the SDG targets are not reflected in any way in national policy documents. Most aligned targets are part of the "environment" sector, and most non-aligned targets - from the "governance and human rights" sector [1].

According to the National Report based on the OECD set of green growth indicators [8], the socio-economic context in Moldova is improving, but at a suboptimal pace. The economy of the Republic of Moldova, in recent years, registered a modest growth rate, which did not allow a significant improvement in the standard of living among the citizens. Also, Moldova's economic growth has partially decoupled from the use of natural resources. Under the conditions in which the CO2 evolution was constant and the GDP increased, the CO2 productivity increased from 7.3 to 9.5 MDL/kg. At the same time, the ratio between GDP and greenhouse gas emissions increased from 10.7 to 14 MDL/kg CO2 equivalent [8]. Due to these developments, there has been a partial decoupling of economic growth from CO2 emissions, but despite all this, Moldova occupies one of the last positions among European states in terms of CO2 productivity.

Both the Government and businesses in Moldova spend too little for environmental protection purposes, thus Moldova ranks last among European countries in terms of green investments. In recent years, Moldova allocated only 0.5% of GDP to environmental protection, while the EU average is 1.9%.

Innovations in the field of the environment and the green economy within the national Research and Development system, as well as within economic operators - remain quite small. Green investments require considerable financial resources for long-lasting results, resources that neither the state nor the vast majority of economic agents possess.

In the research carried out by the National Bureau of Statistics regarding the innovation activities of enterprises in 2019-2020 [34] it is mentioned that the number of innovative enterprises is 448 units and represents 12.6% of the total number of enterprises included in the research (in decrease by 26% compared to the years 2017-2018). The figures are quite modest compared to the international situation, because of the current situation of the entrepreneurs and the national infrastructure in the field of Research and Development.

Regarding environmental innovations, the situation can be evaluated based on the technologies developed in this field reported to the total number of technologies. Thus, according to Figure 1, on average, about 1/5 of the new technologies applied by domestic enterprises can be considered environmental. Most of these are related to environmental management procedures and climate change mitigation in the energy or goods production sector.

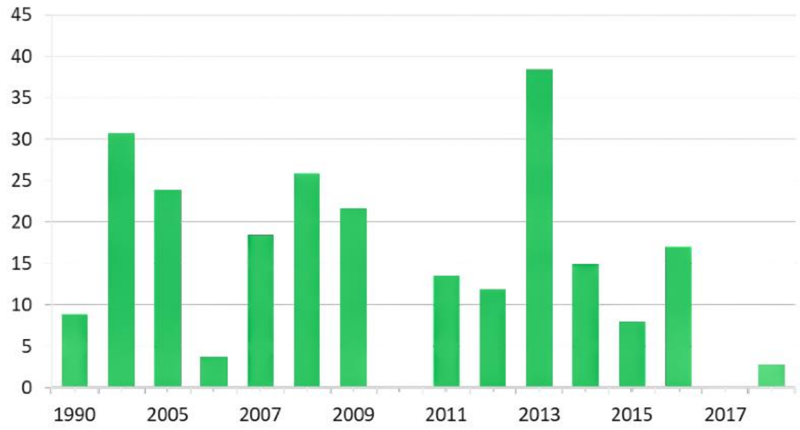

Figure 1. The share of environmental technologies in total developed technologies, %

Source: EU4Environment (2021). Spre o transformare verde a Republicii Moldova: Analiza situației din 2022. Monitorizarea progresului în baza indicatorilor creșterii verzi ai OCDE. Available on: https://www.eu4environment.org/app/uploads/2022/02/Report-Green-Growth-Indicators-Republic-Moldova-2021-ROM.pdf [8]

Both public and private expenditures for environmental protection continue to be low. In recent years, the Government has paid little attention to the dimension of environmental protection, including in terms of financial resource allocations. For example, for the implementation of the "Environmental Protection" program, on average, 240 million MDL were allocated annually, or less than 0.1% of GDP. The weak correlation of public expenditures in the field with revenues from environmental taxes determines rather a bad situation compared to European states, no matter what the country's priorities are on this dimension.

Private expenditures on environmental protection are also very low. This fact determines a volume of total environmental expenses far below of the European countries, of only 0.2% of GDP compared to the EU average of around 1.9% in 2020 [8]. According to the same report, during the 2019-2020 period, private environmental expenditures remained approximately equal at around 250 million MDL. Most of the expenses are directed to the collection and treatment of wastewater (66%) and waste management (23%) and to a small extent to other areas. This volume of financial resources allocated to the private sector is far below that allocated in European countries. The EU average reports that private environmental expenditures exceed public ones by at least 2 times, reaching, in total, a level of 1.9% of GDP (2020) [10].

In the context of a sustainable development at the national level, Moldova applied more or less the principles of sustainable development, both in all sectors of the national economy and in the social sphere. Based on these principles, public policies have been developed that aim to restore and maintain a long-term rational balance between economic development and the integrity of the natural environment.

The normative and policy framework that regulates and administers the processes of sustainable development and greening of the economy, including environmental tax reform, is reflected in several categories of documents, such as: international agreements, conventions and treaties, strategies and codes, laws and government decisions, national programs and other relevant normative documents.

In order to ensure sustainable economic development without compromising environmental objectives, the Republic of Moldova has two strategic international commitments: the Association Agreement with the European Union and the 2030 Agenda for Sustainable Development. By signing the Agreement, the Republic of Moldova undertakes to harmonize national legislation with European legislation and to ensure the integration of environmental protection provisions, rational use of resources and energy efficiency, in all sectors of the national economy and social life [32].

Among the most notable policy documents from Moldova, which are the basis for the *development of eco-innovation*, the author identified the following:

– The Government's activity program, which dedicates a chapter to the promotion of the green and circular economy.
– National Development Strategy "Moldova 2030" (under review, with expected adoption in 2022).
– The environmental strategy for 2014-23, which stipulates as a priority the integration of the principles of sustainable and ecological economy in all economic sectors.
– Energy strategy -2030.
– The strategy of the development of SME sector for 2012-2020.
– Adapting the 2030 Sustainable Development Agenda to the context of the Republic of Moldova.
– Environmental tax reform.

Among the most important national programs in Moldova, which support and promote the *development of eco-innovation*, the author identified the following programs:

– The National Program in the fields of research and innovation for 2020-2023.
– The program for the promotion of the green economy in the Republic of Moldova and the Action Plan for 2018-2020 (HG/GD no. 160/2018).
– Greening program for small and medium enterprises [26], approved by HG/GD no. 592/2019 (the program provides financial support to SMEs for the implementation of greening actions regarding resource efficiency, the application of sustainable production and consumption models, the introduction of eco-innovations in technological processes, waste reduction and management, pollution prevention and water resources management).
– EU4Business Program (encouraging ecological enterprises/businesses or ecological technologies by offering various facilities, including financing) [27].
– "Clean technology innovation program for SMEs and Start-ups from the Republic of Moldova".
– National program for energy efficiency 2011-2020.

The SMEs Greening Program is one of the most important programs currently carried out at national level, which aims to promote, support and develop the entrepreneurial capacities of SMEs to adapt their production processes and services towards sustainability social and environmental. Supporting eco-innovations in the business environment is one of the three key areas of the SMEs Greening Program, managed by the Organization for the Development of the Small and Medium Enterprise Sector (ODIMM). The successful implementation of eco-innovations can be achieved by providing training and education programs, thus workshops are organized within the project, which aim to present the UNEP and EU methodology for promoting eco-innovation within SMEs [30].

The development of innovation is supported by financial sources from the national budget, international grants and private sector contributions. According to the National Program in the fields of research and innovation for 2020-2023 [28] and the "State Program" contest, there are financed projects for the following strategic priorities: Health; Sustainable agriculture, food security and food safety; Environment and climate change; Social challenges and economic competitiveness and innovative technologies.

An important support for research and innovation are international grants. The most visible in the implementation of innovations is the energy sector. The study of the objectives regarding some ways to improve the energy sector indicates that by 2020 the final energy consumption in all sectors of the national economy will be reduced by 20%, the losses in the electricity networks will be reduced by 11%, the share of electricity from sources renewables constitute 10%, and the reduction of greenhouse gas emissions is reduced by at least 25%, and by 2030 by 64% [29].

Also, the Energy Efficiency Agency together with the United Nations Organization for Industrial Development launched the "Clean Technology Innovation Program for SMEs and Start-ups from the Republic of Moldova" project. The main objective of the project was to identify and promote entrepreneurial initiatives in the field of energy efficiency and renewable energy sources in the most important sectors of the national economy.

Over time, the field of eco-innovation has shown increasing interest among the academic environment in Moldova, as are the higher education institutions that carry out research and education activities in the field of innovation, such as the Academy of Economic Studies from Moldova, Technical University of Moldova, Moldova State University, Trade Co-operative University of Moldova etc. One of the most important research institutes in the Republic of Moldova is the National Institute of Economic Research that carries out different studies and research in the field of green economy, circular economy and eco-innovation etc. The National Institute of Economic Research carried out various relevant projects and studies in the field, and among the most important we mention: "Study on the prerequisites for the transition to the circular economy of the Republic of Moldova", elaborated within the project "Development of the circular economy formation mechanism in the Republic of Moldova (2020- 2023)”; "The introduction of a new priority "Green economy for SMEs" in the Action Plan for 2015-2017 for the implementation of the Strategy for the development of the small and medium-sized enterprises sector for 2012-2020"; Survey of SMEs within the project "Promoting the improvement of the environmental performance of small and medium-sized enterprises (2014) [13].

4. Methods and materials applied

For preparing this paper, the author resorted to the investigation of theoretical and practical sources, using various research methods, such as: the method of analysis and synthesis of the literature in the researched field, the comparative method, induction and logical deduction, etc., followed by a dissemination of the results in order to express a personal opinion. As informational support, there were used bibliographical resources, studies and researches, normative acts, official reports and documents (e.g., strategies, national programs, etc.), websites of governmental organizations, national statistical data, publications from Republic of Moldova and other countries in the field of sustainable development, green economy, sustainability and eco-innovation. Analysis and synthesis are based on processed and summarized data.

There were also used the study of the literature and the presentation of the synthesis of its results, the analysis of research and studies in the field regarding the definition of eco-innovation concepts in the contemporary economy, the analysis of the European and national context regarding eco-innovation policies, as well as the analysis the existing conditions for the development and implementation of eco-innovation in the Republic of Moldova in order to formulate theoretical arguments, as well as the application of the comparison method in the process of realizing one's own visions. In the theoretical approach, based on the current literature discussion, the author prioritized a juxtaposition of sources from different fields, such as eco-innovation and sustainable development.

5. Results obtained and discussions

The introduction of systemic eco-innovation at the country level requires the creation of favorable conditions, structured on two levels of intervention: market-based instruments and a policy dedicated to science, technology and innovation. At the national level, a strong vision and awareness is a prerequisite, with a clear strategy and objectives to address societal challenges, as well as a strong promotion of sustainable consumption and production practices. In addition, general framework conditions (degree of gaps, ease of doing business, ease of innovation) are essential factors to facilitate innovation as well as eco-innovation.

According to OECD 2009, innovation policy in most countries was under the responsibility of the ministries for economy and trade, industry, science and technology, while environmental policy was under the responsibility of the minister for environmental protection, with little effort to integrate these two policy areas. While environmental policies have traditionally focused on "end-of-pipe solutions" rather than pollution prevention solutions or an extensive focus on the supply chain, innovation policy is usually too broad to appropriately address specific environmental concerns. To realize its full potential, eco-innovation will require actions to ensure that the entire innovation cycle is effective, with policies ranging from adequate investment in research to support for the commercialization of existing and innovative technologies [21].

Both environmental and innovation policy areas would benefit from better integration and interconnection. At the market level, a combination of market-based instruments can be designed for eco-innovation, with demand-side measures (regulations and standards, public procurement and demand support, technology transfer) and supply-side measures (equity support, research and development (R&D), education and training, networks and partnerships, infrastructure provision).

From the author's point of view, the conditions for eco-innovation at the national level are based on a number of elements, such as the attitude of companies towards eco-innovation; the public policy framework and legislative environment that supports eco-innovation; support services for eco-innovation and access to financing and available financial resources.

There are few studies at European or national level regarding eco-innovation activities. The most representative European study is the Eurobarometer Flash 315 "Attitudes of European entrepreneurs towards eco-innovation" [37] carried out in 2011, which identifies the main concerns, obstacles and driving elements perceived by EU entrepreneurs in relation to eco-innovation. Among the main findings of the report on eco-innovative activities, it is mentioned that:

- over a fifth of the surveyed companies estimated that 30% of their innovation investments were related to eco-innovation: Sweden (21%), Greece (22%), Austria (23%), CDPIu and Luxembourg (both 24%) and Poland (30%);
- around 3 out of 10 EU companies have introduced a new or significantly improved eco-innovative product or method in the last two years, while around a quarter have introduced a new or significantly improved eco-innovative organizational method. A similar proportion (25%) introduced a new or significantly improved eco-innovative product or service to the market;
- among companies that introduced at least one type of eco-innovation in the last two years, the largest number (42%) said that such eco-innovation led to a reduction in material use between 5% and 19% at a unit of output, while about a third estimated that the reduction in material use was less than 5% at a unit of output;
- the main barriers encountered by entrepreneurs in the development of eco-innovation are: the uncertain demand from the market; uncertain return on investment or too long payback period; lack of funds for eco-innovation; insufficient access to existing subsidies and tax incentives; existing regulations and structures do not provide incentives for eco-innovation;
- the main drivers for the accelerated adoption of eco-innovation identified in the study are: expected increases in energy prices; current high energy prices; current high material prices; good business partners; ensuring or increasing the existing market share; access to existing subsidies and tax incentives.

As an overview of the situation of eco-innovation in Moldova, we can observe that, although the first steps have been taken in promoting a green economy, concrete actions in the development of eco-innovation are missing. The main reasons for this situation are: the regulatory framework does not encourage eco-innovative practices, products and services, research and development activities do not meet current economic, environmental and social needs, and the business sector is characterized by a short-term perspective regarding obtaining profit.

The analysis carried out for this paper identified several barriers to the development of eco-innovations in Moldova, but also catalysts and positive premises that can contribute to a large-scale application of eco-innovative solutions.

So, the author find that *the main barriers to eco-innovation* are: the absence of government support for research and development in terms of funding, infrastructure and policies; lack of legislative framework and mechanisms to support eco-innovation initiatives in the industry and services sector and stimulate the development of products and services with low environmental impact; lack of knowledge of the economic and environmental benefits, at the company level, regarding the efficient use of resources and the minimization of waste and emissions; reduced availability for financing platform initiatives or sustainable production and consumption projects; lack of cooperation between stakeholders in supporting the introduction of eco-innovation; sacrificing environmental priorities in favor of other current priorities, with the Government reducing environmental expenditures during the budget year.

The research carried out reflects the existing **opportunities** in Moldova and demonstrates that the eco-innovation potential is important and must be taken into account. Following the investigation, we identified the existing **premises** and the **potential** for eco-innovation, which, with the right approach, can be transformed and used as agents of change. The author formulates several important ***premises*** *for the development of eco-innovation in Moldova:*

- well-educated and innovative human capital;
- increased access to information;
- consumers with a positive attitude towards green products;
- increased demand for green products in global supply chains;
- high access to financial resources through financing programs;
- improved and harmonized legislation.

Regarding the *catalysts of eco-innovation*, the author identifies the most important ones in his opinion, namely: the continuous increase in prices for energy and raw materials, increased competition in the European free market, increased legislative pressures for the elimination of hazardous and polluting substances, the reputation and trust become essential for a successful business, better access to capital, more and higher environmental taxes and, last but not least, new markets for green and eco-responsible products and services.

In recent years, Moldova has developed its programmatic framework, mainly due to the pressures from the EU and the commitments assumed as a precondition to access funds. The implemented plans and strategies address more or less the ecological and innovation aspects in a wider social and economic context.

The possible ***strategic directions*** for increasing eco-innovation in Moldova are:

- Alignment with the priorities and objectives of the 2030 Sustainable Development Agenda and the European Green Deal, as well as with the commitments of the EU-Republic of Moldova Association Agreement.
- Strengthening the capacities of public authorities, as well as the business environment regarding the promotion and implementation of eco-innovation.
- The higher level of use of green public procurement and other demand-side policies could encourage more sustainable business practices; research and development activities should be made more efficient in order to face the current challenges in Moldova, thus improving its economic and social attractiveness.
- Adjusting the normative regulatory framework to the needs of SMEs development; improving their access to finance to improve their conditions and capacity to eco-innovate; human capital development by promoting skills in eco-innovation.

- Defining national sectors with potential for smart specialization to give them more focused and specific support that will also improve the potential for eco-innovation.
- Harmonization and updating of the legislative framework on energy efficiency and waste (restrictions on the use of certain hazardous substances in electrical and electronic equipment, waste electrical and electronic equipment (WEEE)).
- Creation of a framework for establishing requirements in terms of eco-design of products.
- Updating the legislative framework regarding product labeling and indicating, through labeling and standard information about the product, the energy consumption and other resources of energy impact products.
- Ensuring a good coordination of the sectoral efforts of the ministries (Ministry of Economy, Ministry of Environment, Ministry of Education and Research, Ministry of Agriculture and Food Industry, etc.).
- Collaboration in the field of eco-innovation especially between the public and private sector.
- Establishing partnerships at national, European and international level in order to transfer know-how in the field of eco-innovation.

At the national level, information on the investments intended for environmental protection made in the private sector is limited. Also, there are no national studies that provide an insight into the current situation regarding consumer perceptions toward sustainability or that provide an insight into eco-innovation within businesses.

Starting from these premises, as well as from the catalysts of eco-innovation, for a better understanding of the concept of eco-innovation and its development in Moldova, it is necessary to have an overview of the interests and needs of the existing demand on the market, i.e. consumers as well as supply alike. Consequently, the author **initiated 2 important studies** in Moldova:

1. Study on consumer perceptions regarding sustainability and green products (305 respondents).
2. Study on eco-innovation in enterprises from Moldova (200 enterprises from the Industry, Services and Agriculture activity sectors).

Both studies were initiated between August and September 2022, in the Chisinau municipality and the Central Region.

The consumer study aims to analyze the attitudes and behaviors of Moldovan consumers regarding sustainability and whether they are making more conscious decisions considering the existing environmental problems. It also aims to explore how consumers adopt a more sustainable lifestyle, how much they value ethical and sustainable practices within companies and how this influences their purchasing behavior.

The purpose of the enterprise study is to analyze existing eco-innovation activities, as well as material costs, in the context of rising resource prices and resource scarcity. Also, the study aims to identify the main barriers and drivers for the accelerated adoption of eco-innovations, as well as to identify the main interests, needs and expectations of Moldovan entrepreneurs in order to develop eco-innovative businesses.

Table 1. Constituent elements of the concept of eco-innovation in the Republic of Moldova from the perspective of consumers and the business environment

Demand Study Study among consumers	**Supply Study** Study among enterprises
The studies analyze:	
1) The interest of Moldovan consumers regarding climate change, as well as the degree of knowledge of the concepts of green products and what they consider a sustainable product/ service. 2) Consumer attitudes and behaviors regarding green products and sustainability. 3) The main barriers and needs in adopting a more sustainable lifestyle.	1) Strategies, the business environment in the context of climate change. 2) The costs of materials within the company. 3) Eco-innovation activities within the company. 4) Barriers and drivers for accelerated adoption of eco-innovations. 5) Interests, expectations and needs of entrepreneurs regarding the development of eco-innovative businesses.

Source: elaborated by the author

Implementing eco-innovation is a challenging process and will not be suitable for all enterprises. Thus, these studies will provide, on the one hand, an understanding of consumer behavior regarding green products and, on the other hand, will identify barriers and opportunities at the level of the business environment, as well as the main gaps in policies and education, which could help to building a better understanding of the context and optimal conditions for the development of eco-innovation in Moldova.

6. Conclusions

In recent years, the Republic of Moldova has made progress in promoting the green economy, but it has also identified priority areas for further actions, such as: promoting eco-innovation, greening small and medium-sized enterprises and creating more green jobs; increasing energy efficiency and diversifying energy sources by increasing the share of renewable energy; reducing greenhouse gas emissions in accordance with nationally determined contributions or promoting green investments [8].

Following the analysis carried out, the author considers that, at the national level, there is potential for eco-innovation, but Moldova has not yet established a clear policy and legislative framework to support eco-innovation. It is not enough to implement general strategies aimed at green growth, if they are not followed by concrete support mechanisms, such as incentives, education policies, policies regarding sustainable production and consumption, access to financing and institutional development.

Not all innovations require government support. In general, step-by-step innovation does not require special support. On the contrary, transformational innovations encounter a number of obstacles, related to costs, uncertainty, difficult access to capital and the need for institutional changes. To be effective, innovation and eco-innovation policies must be designed based on particular types of obstacles rather than abstract notions such as market or system failure.

There are many opportunities for eco-innovation, which can target low-carbon solutions for various business sectors, green products, waste regeneration systems and green business models, to zero-waste cities with smart infrastructures or a better management of ecosystems and citizens' lifestyles [6].

The Republic of Moldova also started moving in this direction by implementing the principles of green growth. Moldova initiated the promotion of eco-innovation by adapting public policies to the EU sustainable development objectives through various national programs and establishing partnerships at the national and international level, but which are not sufficient for the introduction and development of eco-innovation at the national level.

Following the analysis carried out, the author believes that in Moldova there is potential for eco-innovation, which must be capitalized both in the public and private systems, while the business and public environment is faced with a low level of knowledge and understanding of the concept in general.

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Rezumat

Trecerea către o societate mai ecologică și mai prosperă este posibilă prin promovarea inovațiilor care abordează problemele de mediu actuale și viitoare, scăderea consumului de energie și resurse, promovând în același timp activități economice susținute. Astfel, apare un nou tip de inovare, și anume, eco-inovarea. Prezentul articol sintetizează demersurile pe care Republica Moldova le-a făcut prin programele şi strategiile care încurajează inovarea sustenabilă şi dezvoltarea durabilă, și aduce în atenția mediului academic din Moldova un subiect nou, care tinde să devină un domeniu cu impact semnificativ asupra economiei naționale. Astfel, lucrarea realizează o analiză a contextului naţional din Moldova pentru dezvoltarea eco-inovării, analizează condiţiile existente şi identifică principalele bariere. De asemenea, autorul identifică principalele premise și direcţii care susţin dezvoltarea eco-inovării și elaborează elementele constitutive ale conceptului de eco-inovare în Moldova, prin prisma consumatorilor și mediului de afaceri. Metodologia se bazează pe metode de analiză și sinteză, de interpretare şi comparații relevante. Rezultatele cercetării evidențiază faptul că Moldova are potenţial pentru dezvoltarea eco-inovării, doar că încă nu are stabilita o politică clară şi un cadru legislativ care să susţină eco-inovarea.

***Cuvinte-cheie**: dezvoltare durabilă, eco-inovare, Republica Moldova, strategii, direcţii de dezvoltare*

Аннотация

Переход к более экологичному и процветающему обществу возможен путем продвижения инноваций, которые решают текущие и будущие экологические проблемы, снижают потребление энергии и ресурсов, способствуя при этом устойчивой экономической деятельности. Таким образом, появляется новый тип инноваций - эко-инновации. Данная статья обобщает шаги, предпринятые Республикой Молдова посредством программ и стратегий, стимулирующих устойчивые инновации и развитие, и предлагает молдавской академической среде новую тему, которая имеет тенденцию стать областью, оказывающей значительное влияние на национальную экономику. Таким образом, в статье проводится анализ национального контекста в Молдове для развития эко-инноваций, анализируются существующие условия и определяются основные барьеры. Автор также определяет основные предпосылки и направления, способствующие развитию эко-инноваций, и разрабатывает составные элементы концепции эко-инноваций в Молдове, с точки зрения потребителей и бизнес-среды. Методология основана на методах анализа и синтеза, интерпретации и сравнений. Результаты исследования подчеркивают тот факт, что Молдова обладает потенциалом для развития эко-инноваций, но в стране до сих пор нет четкой политики и законодательной базы для поддержки эко-инноваций.

***Ключевые слова**: устойчивое развитие, эко-инновации, Республика Молдова, стратегии, направления для развития*

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COMPARISON OF ISRAEL AND MOLDOVA OF HIGHER EDUCATION LABOR MARKET AND ITS CHALLENGES

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Abstract

In the article the author compares some of the factors of supply and demand for labor in higher education in Israel and the Republic of Moldova. Under conditions of rapid growth of technologies, the demands of employers to the employees also change rapidly. The labor market is the main entity who determines modern demands towards the education services. The higher education market supplies the labor market with the professional human resources (specialists) that companies and industries need to function effectively. Any higher education institution must take into account the situation on the labor market, both today and in the future. The author compared Higher education market in Israel and Moldova, identified challenges in the labor market in the field of education and proposed possible solutions based on international experience.

Keywords*: labor market, Higher education, human resources, education system, challenges and solutions*

1. Introduction

Solution of problem of agreement between labor market and education system is one of main preconditions for successful functioning and progressive development of any national economics. Lack of concordance of demand for human resources structure and its supply causes various negative consequences: unemployment within capable population, reduction of level and quality of life, excessive stratification of society, worsening of moral climate within society. Successful functioning of labor market greatly depends on agreement between educational proposals and labor market demands.

Europe Union developed reforms for education system. For example, there are strategies and practices for support of education system called “lifelong learning” [1]. Main principles of this system are formulated in “Memorandum on lifelong learning”, which was prepared by Europe Union commission in 2000 [1]. In this paper, “lifelong learning” was defined and it was pointed out that this system should be open for any innovations, based on equal opportunities and react actively on any social and economic changes. “Lifelong learning” consists of three directions of educational activity: formal education within institutions, graduation of which will bring to certifications and diplomas issuing; “non- formal education” which does not grant any official certification but does include learning at the place of work, within civil social organization, various unions and political parties; “informal education” which is related to self-development in everyday life (events, tourism, exhibitions). In the frame of proposed concepts, all the three kinds of education should be accepted as equal. It is proposed to unite them into a uniform system, by building up a normative base for lifelong education and development of qualified evaluation of learning outcomes and quality of education. Higher education institutions get a special role in this reform [1].

In Israel, main factors for demand for teachers and lecturers are population growth in the education system and demand for certain professions in the Higher education. Main factors of supply are salary, job conditions, satisfaction from job and appreciation by the management [2].

In the Republic of Moldova the 21-st century, most of the population is still convinced that Higher education is necessary for a successful person [13]. People strive to increase their status by getting a Higher education. They believe in its ability to guarantee better employment and social conditions. In the author’s opinion, this is one of major challenges. Education value deteriorated, since education quality is much lower, and over qualification in Israel is severe, so Higher education diploma does not guarantee good employment conditions anymore.

2. The degree of investigation of the Higher education challenges at the present moment, the purpose of the research

In the economic literature, the educational services market is considered as a well-established expression, as a type of market. Estimates of the current processes and the future of higher education in Israel are based on various opinions and points of view of scientists, leaders and experts [5]. Israeli authors highlight various aspects of the economic impact on universities and focus on a number of problems and the state of education in the country [2]. The work of teachers is complex and requires great investment and perseverance, charisma and confidence [9].

3. Methods and materials applied

Scientific and public sources of information regarding labor market in Israel and Moldova were used in order to analyze challenges of supply and demand at the labor market of Higher education. Today, it is highly important for the labor market professional structure to be adjusted to the economics market demands. There is a number of exogenous factors regulating labor relations, helping to form viable mechanisms in order to help the employers and employees meet each other’s requirements and demands, and finding out the reasons of in-agreement between them. Main method chosen by the author is analysis of two economies' education markets, based on scientific and statistical sources, in order to compare them and suggest how they can contribute to each other's problem solutions.

The author used office and field research methods. Office research was conducted by the method of studying different sources of information using analysis, deduction and a graphical method. Field research involved collecting primary information for the purpose of carrying out this study using the: observation method, comparative method, description and critical evaluation of dynamics.

4. Results obtained and discussions

Currently, Moldova labor market keeps a tendency of high level of unemployment in formal sector and high ratio of employment in non-formal sector, especially for youth. Low development of modernization, technological progress and low salary in national economics bring about non-agreement between level of preparedness of youth and labor conditions, which in turn causes young people to leave abroad looking for a job.

Employers still insist on higher education for some professions that do not need it at all. The labor market of Moldova stimulates these aspirations. Today, in order to get a simple job of a seller, a potential employee needs to be educated. This attitude is quite similar to Israeli one [5].

As a result, young people in Moldova do get diplomas of Higher education, but there are no enough qualified professionals. There is a plenty of Higher education institutions in Moldova. The choice is diverse- there are both state and private institutions within the country and a wide variety abroad. In Israel there is also a plenty of academic institutions.

During the 31 years of Moldova independence, its Higher education system changed greatly. Academic institutions had to solve many problems, which were previously solved for them by the state. Consequently, the major part of these problems required monetary investments, which brought about commercialization of Moldavian education [12]. Academic institutions had to survive and needed money for this purpose. And in cases the state reduced or cancelled out its support, the money could be obtained only from the students. To attract more students, the Higher education had to become more available for all. As of today, the number students almost constant and number of academic institutions in Moldova is decreasing, as is presented in the following figures.

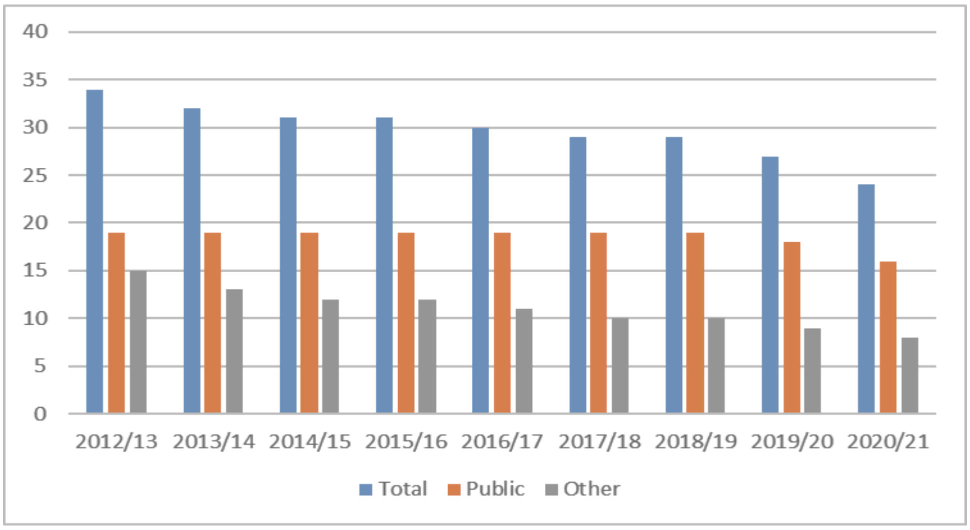

Figure 1. Number of Higher education institutions in Moldova by forms of ownership and years

Source: elaborated by the author based on [6]

Figure 1 presents data on a number of Higher education institutions in Moldova by forms of ownership. This figure demonstrates that the number of both state and private institutions is reducing.

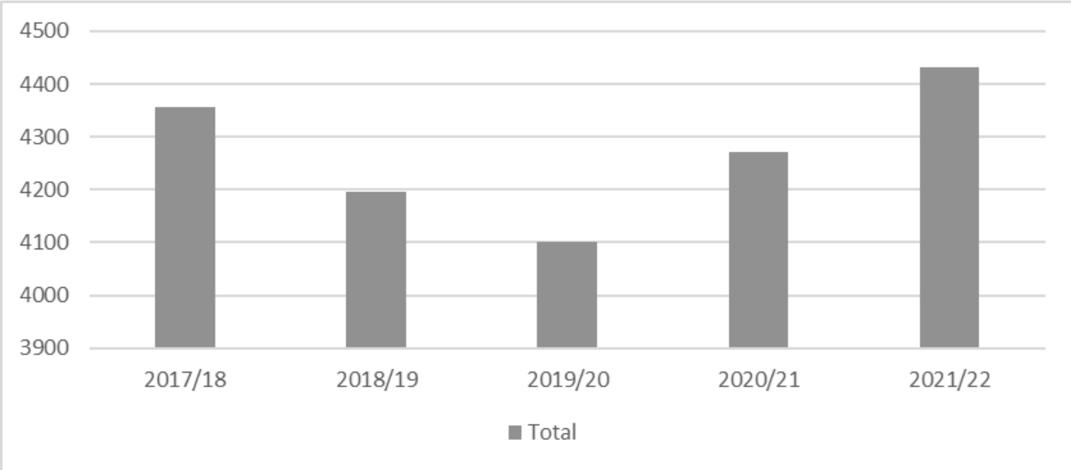

Figure 2. Number of students in Higher education institutions of Moldova during 2017-2022

Source: elaborated by the author based on [6]

Figure 2 presents a number of students of Higher education institutions in Moldova. A general number of students is reduced starting from the 2017/2018 academic year to 2019/2020. Last two years there has been an increase in the number of students.

Of course, social crises contributed also to education system and its labor market. Economics education became especially demanded since the transition of Moldova to market-based relations [12]. It was thought that economic specialist diploma will open more doors, and as a result, this profession became highly demanded. The majority of academic institutions did not have a material-technical basis and a qualified teaching staff for that, but they did rush to satisfy this huge demand and began to establish economics faculties, which must have influenced quality of teaching and learning. The ever-growing competitiveness also pushed them in this direction, since the Higher education was treated as a commercial sector. The quality of education reduced, since the main focus was made upon profitability and not on training good human resources.

A similar phenomenon existed in Israel at the same period. In Israel, the demanded profession was related to Information Technologies (IT), for High-tech companies which developed very rapidly in the 1990s- 2000-s and were ready to employ "almost everyone" [8].

In May of 2005, the Moldavian government decided to transit into new education standards of Bologna convention countries [10]. Israel did not join the Bologna convention; however, its higher education started to open up to cooperate with other countries. In addition, like in Moldova, there were professions with too few and too many candidates [5].

Additionally, today education in colleges and universities both in Moldova and Israel is only a basic platform enabling a student to navigate in her future profession. This platform is usually superficial and does not grant a student an acquaintance with all the possible sides of the profession in depth. After graduation, a young specialist is supposed to widen her knowledge all the time. A level of knowledge is not a criterion of success in education process. What really matters is also a practical direction of the knowledge. This aspect is quite poor in Moldova. Less so it is in Israel, but still more practical accent in needed. Katz [5] described in depth the challenges of over-qualification in Israeli education system and a failure to reduce gaps between poorer and richer society segments.

The following figure presents Higher education in Israel, which keeps growing.

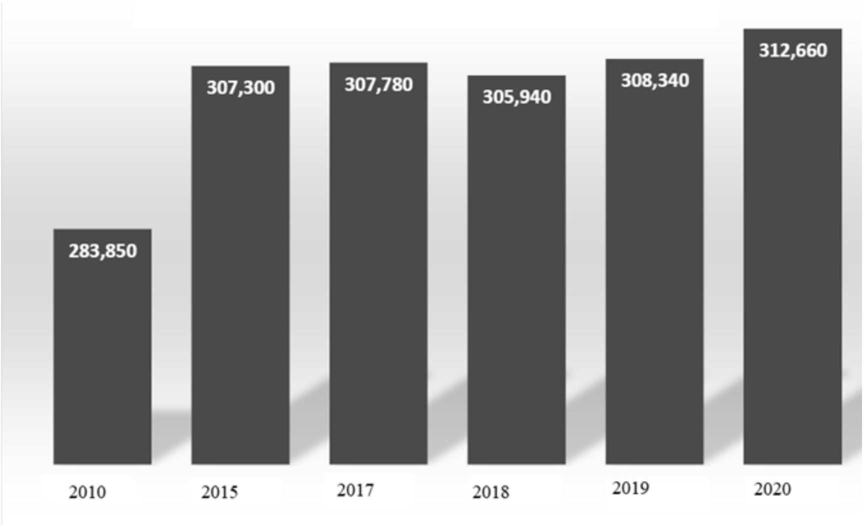

Figure 3. Number of Higher education institutions' students in Israel

Source: [3]

The following table summarizes current challenges on the education labor market of Moldova and Israel. Definitely, this is a prestige of Higher education in society, which brings about a wide variety of academic institutions, part of which are lack of high-quality staff and programs, supplying availability in order to survive, on expense of quality. Consequently, deterioration of academia takes place due to becoming a commercial sector while a practical education is not developed enough and employers do not get enough qualified staff, and Human Resources management is required for better planning, starting from school age and parents' perceptions.

Table 1. Higher education labor market challenges of Moldova and Israel

Education market challenge	Moldova	Israel
1	2	3
Higher education matters even if not really needed	VV	VV
Variety of academic institutions	VV	VV
Availability in order to survive, on expense of quality	VV	V
Deterioration of academia due to becoming a commercial sector	VV	V
Non-balanced labor market	VV	VV
Practical education is not developed enough	VV	VV
Bologna process	yes	no
Human Resources management required for better planning	VV	VV

* VV – strongly manifested; ** V- clearly manifested

Source: elaborated by the author

Nowadays, professional education environment of Moldova encounters non-agreement between labor market demands and knowledge that students gathered during their studies. Many young people become unemployed after graduation Higher education institutions, or change their qualification. This phenomenon points out existing problems with quality of education, its formality, dominance of theory over practice and non-qualified staff. In Moldova, Higher education is still very theory-based, not related to labor market needs. Therefore, organizations are not ready to cooperate with Higher education institutions. Real increase in match between professional training of specialist and actual needs of national economy requires involvement of business field to develop educational propositions and prepare professional specialists.

Ministry of Education and science of the Moldova Republic suggests the following actions:

1. Concentration of resources in order to empower university and research systems.
2. Making scientific researches more available to students by integration of research institutions into universities.
3. Financing a process of Higher education modernization and research sector support.

Right now, there are not enough students and too many universities in Moldova. At the global level, there is a tendency of resources concentration rather than their dissemination. The competencies are too disseminated. Perhaps, Moldova is too small a country to claim it may supply a quality education according to the same curriculum in 6-7 and more universities. The goal of Ministry of Education of Moldova is to build up well-established, united, and competitive universities with well-developed modern infrastructure, which suits wide-world standards. This way, the universities will get better international ratings, and as a result- more attractive for students, both in the country and abroad. For this purpose, more resources will be appointed to education and research causes, rather than management; research system will be supported and cherished and relations between education and researches will grow up; universities will transferee more knowledge and technologies, and cooperate more with business organizations, thus making research projects up to date for economics and society.

As mentioned above, it is highly important for the labor market professional structure to be adjusted to the economics market demands. There is a number of exogenous factors regulating labor relations, helping to form viable mechanisms in order to help the employers and employees meet each other's requirements and demands, and finding out the reasons of in-agreement between them.

To become a senior University lecturer in Israel, one should graduate her BA degree at the relevant faculty with good and preferably excellent grades [9]. The next step is MA and PhD studies and working as a teaching assistant. Such a graduate student is supposed to publish scientific journal articles, tries to get excellence scholarships. It is common and prestigious to graduate the post doc studies abroad, then come back to Israel and continue teaching, at the beginning as a teaching assistant and later on as a lecturer. However, the seniority and a higher level of salary will be granted only after 5 years, or else the lecturer could be also fired. Therefore, the Higher education employee could find herself without a regular job at the age of 35 or 40, if she did not get a senior lecturer position. The seniority is usually given 10-12 years after the lecturer begins as a teaching assistant [9].

Senior staff lecturers' gross salary gets to 20-25 thousands NIS a month for a professor degree. A professor who gets an administrative appointment in the University, like the University president, can have a gross salary of about 50 thousands NIS a month [4]. College lecturers' salary is generally lower- it is about 15-20 thousands NIS a month. Senior lecturers have a Sabbatical year once in seven years, when they get about 80% of their salary but do not work. They also enjoy research funds scholarships, a few thousands of NIS per year, and some funding for participating in research programs. The job itself is hard, but it is worth pointing out that the lecturers work only 30 weeks per year. Senior lecturers at the fields of economics and business management can work additionally as counselors for start-up companies and have other incomes.

For scientists from the former Soviet Union who came to Israel in the 1990-s, there were special financing funds allowing to absorb them at the Higher education institutions as scientific and teaching assistants, for a period of three years. After that, some of them were recruited as external teachers, scientist assistants, or fired [11].

One of the biggest problems in Higher education in Israel today is outsourcing of the academic staff. As for today, there are too many external teachers and lecturers who are not sure about the future employment and conditions.

External teacher is a lecturer, usually having a PhD degree, who does not belong to the permanent faculty staff of the institution. The position of the external teacher includes teaching only, without research and without guidance for postgraduate students. The outside teachers are called junior members of the faculty. Since the 1980s, universities and academic colleges in Israel have begun to use teachers from outside as a cheap alternative to employing regular teaching staff.

There is no a collective agreement between the organization and the management, so that every one of them is not sure about her future employment, and any semester could lose her job. The junior lecturers are not a part of the College team, so they do not have a stable position and their salary is not connected to their tenure and work experience, there are no proper social conditions. Only the obligatory pension that is insured by the state law. The agreement between the lecturer and the College is renewed every semester.

About two third of the academic college staff in 20 Israeli higher education institutions are external lecturers. The reason is obvious - this way of hiring is much cheaper for both the colleges and the state that budgets them. The external lecturers are fired each semester and are hired again by the college needs. Most of them hold only partial positions and their salary is not influenced by the tenure, they are not insured health costs or advanced study fund. Like other outsourced workers, such as cleaning and security staff, the lecturers are not sure about their employment continuation. It is worthy to note that Israeli academy did not invent anything new. Similar phenomenon of external teachers exists in another countries as well.

The following table presents a challenge existing in Israel, its essence, possible solution and compares it to the situation in Republic of Moldova.

The perspective to give up on the old system of employees' recruitment, which assumes that the teachers are accepted at the staff and pass all the stages of career growth in the institution, raises lots of questions. From the pure financial point of view, outsourcing in teachers' recruitment has obvious advantages, since it allows to cut the expenditures greatly. However, the real value and price of education is hard to quantify. It is highly dangerous to count on the human resources hired by the one-time agreement, since there is a need to deal with teachers who can possibly replace each other, which means they do not feel obligation toward the students, and researchers who are not directly connected to the intellectual life of the organization they work in.

Table 2. Higher education employment challenges in comparison to Moldova situation during 2010-2020

Challenge name	Challenge contents	Possible solution	Situation in Moldova
Temporary appointment of external lecturers	An external lecturer's appointment is often done for only one semester	Planning teaching hours by courses and teachers (in advance)	The planning of teaching hours is carried out at the end of the previous academic year
Social conditions	External lecturers often do not have proper pension and other social conditions, nor advanced study funds and Sabbatical year, like regular staff	Better conditions for external (outsourced) staff	There is a problem of keeping payment agreements for temporary employees, which are not always honored in private institutions. However, in case the wage is not correct, a complaint can be submitted to the Labor Inspection and the institution will have to pay a fine.
Social changes	There are too many Higher education institutions in Israel, too many overqualified workers [5]. The young generation does not intend to get as much education as the previous ones. They want guarantees the job will be found and are not ready to invest is learning just to get smarter.	Developing a professional education more and Higher education less, investing more in future professions.	Young people leave the country not because of bad education, but rather because of better economic situation in other countries.

Source: elaborated by the author

5. Conclusions

Education system is high priority for any society, yet we should remember it must serve people. The goals of education system are meant for people, and the author tries to make clear what exactly the possible steps to accomplish these goals are.

This paper compares Higher education systems and supply-demand for education market for Moldova and Israel. There are many challenges and problems in education systems of both countries, some of which are similar and others are not.

Today, when there are market-driven relations with limited state support for Higher education institutions, they have to find ways to optimize future specialists' training, to look for new ways for reforms' implementations, to increase personal potentials of students.

During last decades, young people look at possible future salary and prestige upon choosing future profession, or listen to others' opinions (parents, friends etc.) As a result, they graduate professions which they do not want to work in, since it is not interesting and rewarding enough. In order to avoid such problems, experts suggest future students to study in advance the demands at the labor market and think carefully about their own preferences. Better comprehension of tendencies of demand for skills and competencies, forecasted deficit for professional skills should improve coordination and interactions between education system and labor market, development and advancement of appropriate politics of labor market and economic growth stimulation. For this end, better Human Resources management is required to navigate demand and supply at the labor market, both in Moldova and Israel.

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Rezumat

În articolul dat autorul compară unii factori ai cererii și ofertei forței de muncă în învățământul superior din Israel și Republica Moldova. În condițiile creșterii rapide a tehnologiilor evoluează constructiv și cerințele angajatorilor față de angajați. Piața muncii determină cerințele actuale față de serviciile educaționale. Piața învățământului superior asigură piața muncii cu resurse umane profesionale (specialiști) necesare entităților pentru a funcționa eficient. Orice instituție de învățământ superior trebuie să țină cont de situația de pe piața muncii, atât în prezent, cât și în viitor. Autorul a comparat învățământul superior din Israel și Moldova, a identificat provocările de pe piața muncii în domeniul educației și a propus soluții posibile de soluționare a acestora în baza experienței internaționale.

Cuvinte-cheie*: piața muncii, învățământ superior, resurse umane, sistem de învățământ, provocări și soluții*

Аннотация

В данной статье автор сравнивает некоторые факторы спроса и предложения рабочей силы в высшем образовании Израиля и Республики Молдова. При условиях быстрого роста технологий, спрос работодателей на рабочую силу также быстро меняется. Рынок труда в первую очередь решает каковы потребности от образовательных систем. Рынок высшего образования поставляет рабочую силу (специалистов), обладающую необходимыми профессиональными навыками, для эффективной деятельности компаний и индустрий. Любой вуз обязан считаться с ситуацией на рынке труда, как сегодня, так и в будущем. Автор сравнивает высшее образование в Израиле и в Молдавии, выделяя сложности на рынке труда в области образования и предлагает возможные решения на основании международного опыта.

Ключевые слова*: рынок труда, высшее образование, трудовые ресурсы, система образования, проблемы и решения*

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- Papers will only be submitted in English;
- Total content of the articles should be 6-15 pages (references included);
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- A clear definition of the terms used is recommended;
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