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## ANALYZING SUSTAINABILITY ISSUES IN URBAN LOGISTICS IN THE CONTEXT OF GROWTH OF E-COMMERCE

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**Abstract.** E-commerce has been keeping fast increasing worldwide since beginning of the 21<sup>st</sup> century. Rapid growth of e-commerce & parcel shipping is a booming business. However, how to handle with many hard-to-solve sustainability issues of transport in urban areas, is becoming a serious challenge for urban logistic sector and numerous stakeholders. The sustainability issues contain the problems of air pollution, congestion, and sub-contractors. This paper reported those issues in the context of growth of e-commerce and analyzed their efforts on the sustainable urban logistics development.

**Keywords:** *E-commerce, Last-mile delivery, Logistic solution, Parcel shipping, Transport, Sustainability, Urban logistic.*

**Rezumat.** Comerțul electronic a crescut rapid în întreaga lume de la începutul secolului 21. Creșterea rapidă a comerțului electronic și a transportului de colete este o afacere în plină expansiune. Cu toate acestea, modul de a face față multor probleme de durabilitate, greu de rezolvat ale transportului în zonele urbane, devine o provocare serioasă pentru sectorul logistic urban și pentru numeroasele părți interesate. Problemele de durabilitate includ aspecte legate de poluarea aerului, congestionare și subcontractanți. Prezentul articol examinează aceste probleme în contextul creșterii ponderii comerțului electronic și a eforturilor atestate în vederea dezvoltării logistice urbane durabile.

**Cuvinte cheie:** *comerț electronic, livrare pe ultima sută de metri, soluție logistică, transport colete, durabilitate, logistică urbană.*

### 1. Introduction

The sales of e-commerce have keeps rapidly growing globally [1]. In 2019, retail e-commerce sales worldwide amounted to 3.53 trillion US dollars and e-retail revenues are projected to grow to 6.54 trillion US dollars in 2022 [2]. Online shopping is one of the most popular online activities worldwide[3]. At the same time, according to Pitney Bowes' Parcel Shipping Index (2020) [4], there were 103 billion parcels shipped worldwide in 2019, it reveals growth of 18% from 2018, Worldwide are 3,248 parcels shipped every second. This report forecasts that by 2026, the total volume of parcel shipping would be more than double as recently and achieve to 220 to 262 billion.

In urban contexts, logisticians, authorities, and citizens face a multiplicity of challenges. First, there are freight externalities that authorities and citizens would like to prevent. It is common to see in urban logistics literature citizen's vested interests in public measures to tackle freight externalities with the aim of promote sustainability and livability [5].

Moreover, there are also problems with space, access, and distance in urban areas that logisticians and authorities face on a regular basis. This depends strongly on availability and development of transport systems, infrastructure, efficient fleet, better transportation modes, companies' sustainability policies, and so on [6].

Also, the delivery speed is another challenge, especially if the logistic companies have the aim is to deliver in a profitable and sustainable way.

## 2. Distribution channels for E-commerce

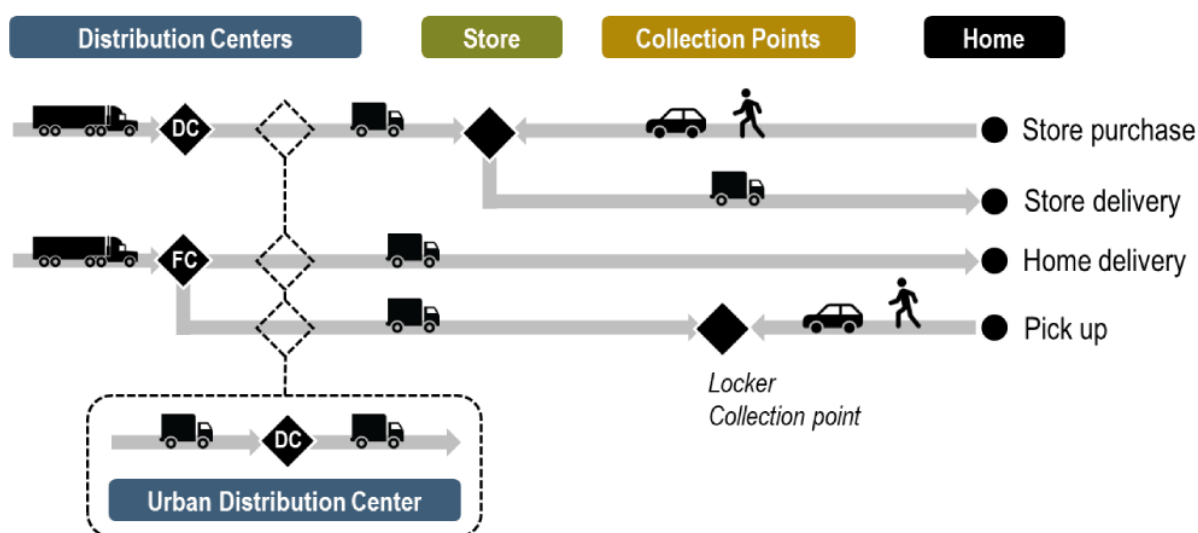
The growth of e-commerce has incited the setting of various distribution channels for home deliveries (see figure 1) [7].

**Store purchase.** Represents the conventional shopping trip to a retail outlet which is supplied by truck deliveries from regional distribution centers (DC).

**Store delivery.** Involves home deliveries originating from a store location for goods that could have been purchased in store or ordered online. This is particularly the case for bulky (appliances) or perishable (food) purchases.

**Home delivery.** An online order processed by a fulfillment center (FC) and delivered to the home address of the purchaser (at times to an alternative location such as the workplace). This represents the conventional online purchase delivery chain.

**Pick up.** A series of options for deliveries that are an alternative to home deliveries. Locker boxes or collection points offer lower cost alternatives than direct home deliveries and the option to pick up a parcel at a time that matches better the consignee's availability. 'Click-and-collect' schemes are emerging pickup strategies implemented by several grocers where online orders are picked up at a designated area such as the parking lot adjacent to the grocery store.



**Figure 1.** Distribution Channels for E-commerce.

Source: Metrofreight consortium, 2020.

In the context where there is increasing congestion and volumes of deliveries, the setting of urban distribution centers becomes a value proposition.

For instance, sortation centers are emerging as intermediary locations to assign deliveries to specific areas.

### **3. Challenges to urban freight companies**

Meet to characters of E-commerce, the logistical systems of many companies are not sufficient to manage the new challenges. There are three main challenges in relation to e-commerce:

1) Challenge to fast and small-size deliveries. E-commerce customers are increasingly demanding faster transportation and with increased service quality. Many e-commerce users have a belief that online products must be shipped as soon as possible after the order is made. Responding to the increased demand of fast and small-sized frequent shipments incurred by e-commerce has become one of the biggest challenges for logistics express delivery companies. A successful delivery of shipments to consumers distributed across large geographical areas will require re-designing of the existing distribution network including terminals, hubs, and the network paths that connect them [8].

2) Challenge to home delivery. Customers' tendency to purchase separate items from several different web-based companies (each requiring separate delivery), additional sortation requirements to combine multiple customers' orders prior to delivery [9]. Highly bundled shipments to retailers are substituted with far less bundled shipments to end consumers. Therefore, retailer and manufacturer will have to reconfigure their established logistics systems from consolidated shipments to small packages. This development is often criticized for causing increased traffic.

3) Challenge to reverse logistics. The increasing challenge in reverse logistics today is the growth of returns resulting from the rise of e-commerce. Reverse logistics is concerned with managing the movement of goods back to manufacturers, distributors, and retailers, because they are the wrong size, broken, out of date, or are not actually ordered. While returns rates to stores are around 8%, this jumps to around 25% for items bought online. 30% of shoppers deliberately over-purchase and subsequently return unwanted items. 19% admitted to ordering multiple versions of the same item so they could make their mind up when they are delivered [10].

### **4. Sustainability issues in urban logistics**

#### **4.1. Air pollution**

As for air quality in cities, organization of transport is a remarkable problem. Transport processes are the origin of air pollution and waste such as tyres, oil and other materials. Air pollution is an especially burdensome factor, because it means harm to people's health as well as deterioration of living conditions. Quality of air is one of the Local Agendas 21 indexes which determined the sustainability of a city at a local level. Waste and landfilling are another important problem in a city. Landfills generate particulate and gaseous pollution which considerably influences the quality of air. Organizing waste management is no longer merely an obligation, but a challenge for city authorities. The difficulties include the growing area of landfills and inhabitants' reluctance toward starting new ones [11].

Last-mile Logistics is considered as the most expensive and polluting segment in the entire supply chain network [12]. With increasing concerns over the impact of this segment on environment, necessary steps were taken to reduce the Greenhouse Gas (GHG) emissions. But, with rapid increase in customer demand for Last mile logistics, innovative strategies need to be developed to limit the GHG emissions [13]. A recent study of EU countries E shows that in 60% of cities, there are significant difficulties in terms of urban logistics management; 55% of vehicle emissions are caused by goods distribution [14].

In major cities, commonplace obstacles like road closures, construction, heavy traffic, and even parking restrictions make the last mile remarkably time- and energy-consuming. For example, London recently announced the expansion of its ultra-low emission zone, making the

deployment of last-mile delivery vehicles even more complicated for logistics companies. On the other hand, in more remote areas, the infrastructure (or lack thereof) as well as a low volume of deliveries often render the logistics excessively inefficient. Carbon dioxide emissions from freight transportation account for 30% of all transportation-related carbon emission from fuel combustion [15].

#### 4.2. Congestion

The disproportionate expense of the last mile delivery is caused by the difficulty of reaching end-customers, particularly in congested urban areas. The boom in e-commerce makes it even more difficult to distribute the package at a convenient time for both carrier and customer. All packages tend to be delivered at the end of the day, when customers have finally returned home, but also during rush hours period. The growing number of vehicles in urban areas implies increased congestion, while delayed deliveries have a detrimental impact on customer satisfaction [16].

Demand for urban last mile delivery is expected to grow by four-fifths (78%) by 2030, leading to 36% more delivery vehicles in inner cities. In turn, traffic congestion is forecast to rise by over 21%, the equivalent of adding 11 minutes to each passenger's daily commute, according to The Future of the Last-mile Ecosystem analysis [17].

In 2015, Americans were stuck in traffic for eight billion hours, with Los Angeles commuters each spending more than 104 hours a year in congestion. This is not a uniquely American problem: commuters in Moscow spend more than 90 hours stalled in traffic and similar delays are found in Bogota (79 hours), Sao Paolo (77 hours) and London (73 hours) [18]. According to the survey for UPS and GreenBiz, when asked to identify the top issues of concern in regard to the urban environment, 53 percent noted traffic congestion. This far surpassed other factors such as more convenient public transit, safety and traffic noise. Many cities are trying to move some of those trips to other modes such as mass transit, biking or walking, and away from personal vehicle use because for most cities, there is no more available land to build more roads.

Traditionally, smaller, on-demand delivery companies design logistics processes and distribution networks that are based on dynamic responsiveness, rather than efficiency. This will not be sustainable moving forward. A high proportion of freight and service transport in cities takes place during peak hours on the road network. At the same time, trends in supply chains and logistics management together with changes in the behavior by business and private consumers are leading to increased fragmentation of last mile deliveries. The combined result of this is that more vehicles are trying to make more deliveries at the same time and the infrastructure available (road space and curbside space) cannot cope.

Road congestion will increasingly impact upon the functioning of world urban locations freight network. Freight movement across city centers will become more challenging as delivery vehicles negotiate higher levels of traffic congestion, particularly in the "last mile" of parcel delivery. The challenges of increased pollution and congestion are being compounded by the rise in B2C or E-commerce. Urban customers tend to order more online and those goods are shipped to him or her directly rather than being picked up at a retail store.

Many cities suffer from problems of traffic congestion and have introduced some form of congestion charging that has implications for freight transport. Similarities in trends are clear with a growing number of smaller vehicles being used in urban supply chains. Using of smaller vehicles is a complicated mix of regulatory issues and trends towards a more fragmented last mile delivery system in urban areas. This has consequences for congestion patterns because the nature of the loading and unloading patterns for the vans is very different from that applying to trucks where more specialized space is often required.

### 4.3. Workloads and subcontractors

Workloads for parcel deliverers have risen substantially in recent years. These days a single courier easily handles as many parcels as two couriers would have delivered 15 to 20 years ago according to report of [19]. Employees and self-employed parcel deliverers in many cases do not receive a fixed income but instead are paid per delivery. Thus, they are forced to work extremely long hours to cover their costs. Couriers are contracted by subcontractors and sometimes even by sub-subcontractors [19]. However, while the number of packages has risen steadily, the cost of sending them has not. Giant retailers like Amazon put pressure on delivery companies and the price per package delivered keeps falling [20].

Another example to problem of parcel delivery drivers' workloads is the giant online retailer Amazon. With Amazon's rapid growth, the environment for drivers is getting only more demanding. Amazon delivered over 5 billion Prime packages worldwide in 2017 [21]. To ensure that millions of packages are delivered each day, Amazon employs some drivers through its Amazon Flex program. The Flex drivers work directly with Amazon. They make their own hours and are their own bosses. Many drivers described a variety of alleged abuses, including lack of overtime pay, missing wages, intimidation, and favoritism.

Subcontractors are witnessing enormous cost pressure which they pass on to their couriers. DPD and GLS, PS and DHL in Hungary, the Czech Republic and Austria are handling all their parcel deliveries through subcontractors. According to [20], DPD alone works with about 1.000 sub-contractors from whom 11.000 couriers' work in 2018 and for Christmas, another 4.000 drivers would be added. Hermes and Trans-o-flex in Germany have also "outsourced" most of their couriers. Seeing as sub-enterprises in Germany are not usually bound by collective agreements, their wages do not conform with those set out in the said agreements in force. In Austria collective agreements for small transport enterprises apply yet the regulations under such agreements are frequently ignored. This keeps couriers' wages low and even full-time employment in many cases does not secure their livelihood [19].

## 5. Conclusion

Meet to fast growth of e-commerce, urban logistic sector faces to handle many new challenges due to sustainable development. For urban logistic companies, the main challenges are the fast delivery, home delivery with small-size delivery, and storage management in terms of high return rate. Besides that, air pollution throughout transportation process in urban areas, congestion in terms of numerous delivery vehicles in inner cities and critical sub-contractors of logistic companies are other sustainability issues. Obviously, to solve those complex sustainability issues, a functional co-operation concept with wide range of stakeholders, such as public administration, entrepreneurs, academics, Non-governmental organizations (NGOs), and citizens, is necessary.

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## DIGITAL ECONOMY. THE CONVERSION OF THE TRADITIONAL ECONOMY AS A CONSEQUENCE OF THE ICT INNOVATIONS

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**Abstract.** The ability of the global economy to compete and evolve in the 21st century increasingly depends on the innovative and efficient use of information and communication technologies (ICT). Over the last decade, digitalization has improved decision-making in the global business ecosystem in a variety of contexts, and recent advances in technology transformed the business models in a way that reshapes the economic actor's interaction with business activities. The emergent conversion of the traditional economy is changing as automation tools, process standardization, and reuse of goods along with cloud computing technology shape the global economy towards digitalization, arising the concern to ensure the development of ICT proficiency in all sectors of the economy in order to create economic balance, avoiding a potential crisis based on the innovation deficit. The speed of digital transformation in the business environment will directly affect the models of economic growth and social development in the future. The present technological revolution is a valid indicator of the civilization progress of the 21st century and the digital transformation requires an improved association of organizational e-leadership skills, innovation, and business development based on business intelligence concepts. Therefore, the reduction of e-leadership skills can be a competitive disadvantage for the industry and a constraint on potential growth. From these considerations, the aim of the paper is to examine the diffusion of business intelligence elements in the global economy, providing examples of business models that have emerged as a result of digitalization improvement, and contributes to an overview of the main features of the digital economy that have emerged in these business models. Using a methodology based on the systematic review of the literature and global analysis regarding the topic, the paper presents a framework of the role that digitalization performs in the global economy transition from analog to digital configuration.

**Keywords:** *innovation; progress; globalization, digital economy.*

**Rezumat.** Capacitatea economiei globale de a concura și de a evolua în secolul 21 depinde din ce în ce mai mult de utilizarea inovatoare și eficientă a tehnologiilor informației și comunicațiilor (TIC). În ultimul deceniu, digitalizarea a îmbunătățit luarea deciziilor în ecosistemul global de afaceri într-o varietate de contexte, iar progresele recente în tehnologie au remodelat interacțiunea actorilor economici cu activitățile de afaceri. Conversia emergentă a economiei tradiționale se schimbă pe măsură ce instrumentele de automatizare, standardizarea proceselor și reutilizarea bunurilor împreună cu tehnologia *cloud computing* modelează economia globală spre digitalizare, apărând preocuparea de a asigura dezvoltarea competenței TIC în toate

sectoarele economiei pentru a crea un echilibru economic, evitând o potențială criză bazată pe deficitul de inovare. Viteza transformării digitale în mediul de afaceri va afecta în mod direct modelele de creștere economică și dezvoltare socială în viitor. Revoluția tehnologică actuală este un indicator valid al progresului civilizației din secolul 21, iar transformarea digitală necesită o asociere îmbunătățită a abilităților organizaționale de e-leadership, inovație și dezvoltare a afacerilor bazate pe concepte de business intelligence. Prin urmare, reducerea abilităților de e-leadership poate fi un dezavantaj competitiv pentru industrie și o constrângere asupra creșterii potențiale. Din aceste considerații, scopul lucrării este de a examina difuzarea elementelor de business intelligence în economia globală, oferind exemple de modele de afaceri care au apărut ca urmare a digitalizării și contribuie la o imagine de ansamblu a principalelor caracteristici ale sistemului digital, economie care a apărut în aceste modele de afaceri. Folosind o metodologie bazată pe revizuirea sistematică a literaturii și analiza globală a subiectului, lucrarea prezintă un cadru al rolului pe care îl are digitalizarea în tranziția economiei globale de la configurația analogică la cea digitală.

**Cuvinte cheie:** *inovație; progres; globalizare, economie digitală.*

### **Introduction**

All sectors of the economy have adopted ICT to improve productivity, expand market coverage, and reduce operating costs. This adoption of ICT is illustrated by the spread of broadband connectivity in enterprises, which in almost all OECD countries is universal for large enterprises and reaches 90% or more, even in small enterprises [1].

The widespread adoption of ICT and the increase in the performance of these technologies has contributed to the development of new activities in both the public and private sectors. Together, these technologies have expanded market coverage and reduced costs, and enabled the development of new products and services, while also changing the way such products and services are produced and delivered, as well as the business models used by all companies, from multinational companies to start-ups.

The advent of the Internet has brought great changes, primarily to the entertainment, printing, advertising, and retail industries. In these sectors, the first major digital players initially started with traditional business models, adapting them to the best end-user technologies (both inside and outside organizations) and to wider interconnection on the Internet. In terms of technological advances and declining costs, ICT has proven to be a generic technology that has become an integral and central part of the business models of businesses operating throughout the economy.

Companies in all industries are now able to design and build business models around technological capabilities to improve flexibility and efficiency and expand their coverage in global markets [2]. These advances, together with the liberalization of trade policy and the reduction of transport costs, have expanded the capacity of enterprises in all sectors to take advantage of global value chains in which production processes can be geographically dispersed around the world and, at the same time, to exploit the characteristics of local markets. For example, in sectors that rely heavily on technology, research, and development, design and production can be managed centrally, while the group can be fragmented into different countries to exploit skilled labor and local resources [3]. Other sectors, such as retail trade, logistics, and education, financial services, production and agriculture, healthcare have changed and continue to change due to the spread of ICT.

With the adoption of digital technologies throughout the economy, the digital economy is becoming more and more the economy itself being impossible to separate the digital economy from the rest of the economy. Trying to isolate the digital economy as a separate sector



inevitably requires arbitrary choices between what is digital and what is not. Therefore, the challenges and concerns raised by the digital economy can be better identified and addressed by analyzing existing structures adopted by actors in the global entrepreneurial ecosystem and new business models resulting from the application of business intelligence elements, focusing on the key features of the digital economy and determining which of these characteristics raises or exacerbates the challenges or concerns of the digital economy.

### **E-commerce. The digital economy and the emergence of new business models**

The digital economy has given rise to a number of new business models. Although many of these models have parallels in traditional activities, modern advances in ICT have made it possible to carry out substantially more types of activities on a larger scale and over longer distances than was previously possible. Some of these business models can complement each other and, in some cases, overlap. Indeed, just as innovation in the digital economy allows the rapid development of new business models, it can quickly lead to the obsolescence of existing businesses.

Electronic commerce has been defined by the OECD regarding the indicators for the Information Society as "the sale or purchase of goods or services, carried out in a network by methods specially designed for the purpose of receiving or arranging orders. or services are ordered by these methods, but the payment and final delivery of the product or service are real. An e-commerce transaction can be between businesses, households, individuals, governments, and other public or private organizations" [4].

Business-to-business models - The vast majority of e-commerce consists of transactions in which one company sells products or services to another company (so-and-so B2B). This may include online versions of traditional transactions in which a wholesaler buys goods online, which are then sold to consumers at retail outlets.

Business to consumer models - B2C models were among the first forms of e-commerce. A company that follows a B2C business model sells goods or services to people who operate outside the business. B2C models fall into several categories, including, for example, so-called "pure-play" online sellers without physical stores or off-network presence, click-and-mortar business integrates existing business with online sales, and manufacturers using the online business. to allow customers to order and customize the product directly [5].

Consumer to business models - This e-commerce model refers to individuals (consumers) who use the Internet to sell their products or services to companies and to look for sellers to bid for the products or services they need.

Models consumer-to-consumer - (C2C) operations are becoming increasingly common. C2C e-commerce companies play the role of intermediaries, helping individual consumers to sell or rent, publishing their information on their website and facilitating transactions. These companies may or may not charge a consumer fee for these services, depending on their business model [6].

### **The impact of e-business and cloud computing services on the global economy**

The Internet facilitates transactions in goods and services. This means that many transactions that would have taken place even without the Internet can be carried out more efficiently and at a lower cost. As a result, the number of companies trading on the Internet has increased dramatically in the last ten years [7].

E-business integration is the result of the usage of ICT strategies by enterprises with the aim of upgrading the entire business processes. The IT process that allows the electronic exchange of information between different elements of the business is known as applications for enterprise resource planning (ERP) And the process of integrating and managing the community

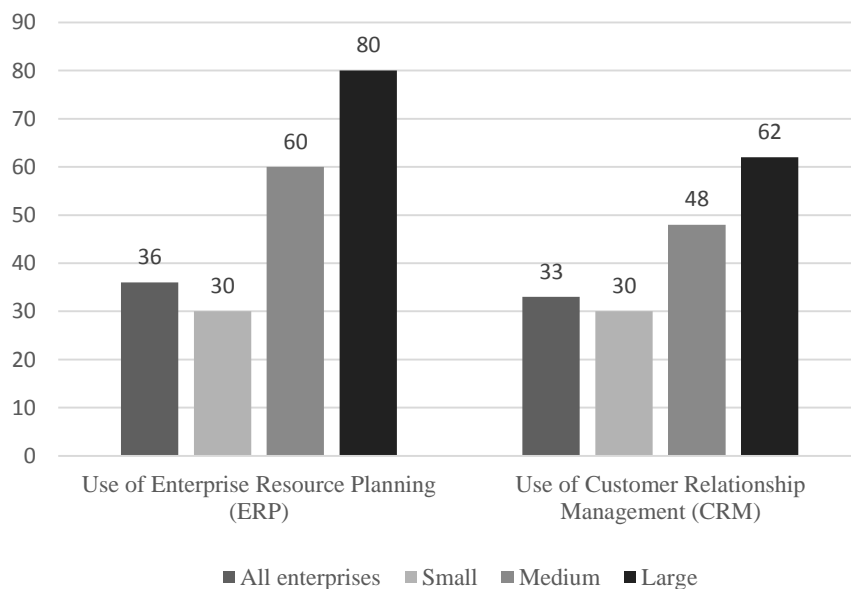
with customers is performed using the customer relationship management (CRM) application [8].

According to statistics provided by Eurostat, at the European level, at least one in three companies use ERP software, and in 2018, this percentage reached 36%. All these data show the fact that the use of the ERP application was lower in small companies in the SME sector, reaching a percentage of only 30%, twice lower than the European percentage above the average which had a share of 60 %.

The adoption of ERP software applications was especially low for small businesses with a share of 30%, which was twice less than the European average of 60% and more than two and a half times lower than the 80% registered by large companies.

Also in 2018, 33% of enterprises in the European Union using CRM software to manage customer relations, while the share of small companies in the SME sector used applications in a percentage of 30%, an aspect that offered a framework comparable to the use of ERP software.

At the same time, the use of CRM software in large enterprises has reached a usage threshold of 62%, about 20 percent less with the implementation of ERP applications [10]. These statistics are presented in the figure 1.



**Figure 1.** Adoption of e-business applications in enterprises by size class, EU-27, 2018 (% enterprises).

Source: *Digital economy and society statistics - enterprises Statistics Explained*, Data extracted in September 2020 from Eurostat, (isoc\_eb\_iip), own processing.

### The main features of the digital economy

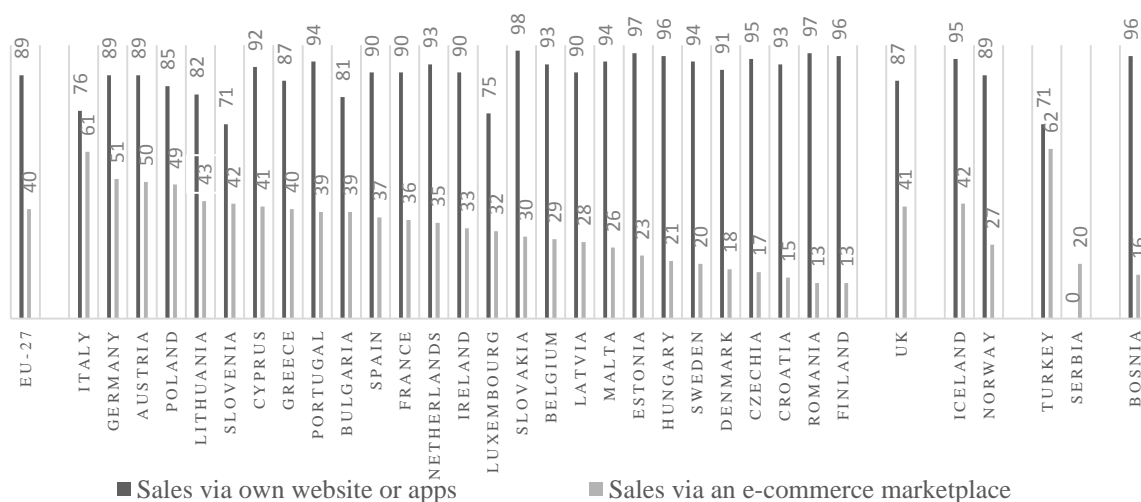
There are a number of features that are increasingly relevant in the digital economy and that are potentially economically relevant [10]. While these characteristics may not all be present at the same time in a particular business, however, they increasingly characterize the modern economy.

These features include [11]:

*Mobility of intangible assets* - The development and exploitation of intangible assets is a fundamental feature of the digital economy. Investing in incorporating intangible assets contributes to creating value and growth for businesses in the digital economy. For example, digital companies often rely heavily on software and invest in research and development to upgrade existing software or develop new software products.

*Mobility of users and customers* - Advances in ICT and the increasing connectivity that characterizes the digital economy translates into a large number of users being able to carry out distance activities across borders. The challenges of increasing consumer mobility are exacerbated by the ability of many consumers to use virtual personal networks or proxy servers that may, intentionally or unintentionally, mask the location of the final sale. The fact that many interactions on the Internet remain anonymous adds to the difficulty of identifying and locating users.

*Mobility of company functions* - Improvements in telecommunications, information management software, and personal computing have significantly reduced the cost of organizing and coordinating complex long-distance activities. Therefore, companies are always able to manage their global operations in an integrated way from a central location that can be geographically removed both from the location where the operations are carried out and from the location where suppliers or customers are offered. One impact of these changes has been the expansion of access capacity to remote markets, which has significantly increased the ability to provide goods and services across borders. This has been illustrated by the dramatic growth of international trade in recent years [12]. The data provided by Eurostat show that companies have used their own applications and websites rather than the marketplace, and the figure 2 shows the breakdown of sales channels that were chosen by companies for web sales for 2018.



**Figure 2.** Enterprises with web sales, by type of sales, 2018 (% of enterprises with web sales).

Source: Digital economy and society statistics - enterprises Statistics Explained, Data extracted in September 2020 from Eurostat (isoc\_eb\_iip), own processing

The figure shows two segments: that of sales made through their own website and sales made via e-commerce marketplace, 89% of the companies of the 27 European states analyzed used their own websites or apps and a percentage of 40% used e-commerce marketplace [13]. The countries with the highest percentage of sales made via their own website or apps are Slovakia (98%), Estonia (97%), and Romania (97%). Also in this segment, the countries with the lowest sales percentages are Slovenia (71%), Luxembourg (75%), and Italy (76%).

Regarding the companies that chose the marketplace, the highest levels were reached by Italy (61%), Germany (51%), and Austria (50%). The lowest percentages were recorded in Romania and Finland, as well as in Denmark (18%), the Czech Republic (17%), and Croatia (15%).

In addition, technological advances allow companies to engage more and more in an economic activity that has the least need for staff. In many cases, companies are able to grow significantly in size, with minimal increases in the number of staff needed to manage the day-to-day operation of the activities (the so-called "massless ladder") [14]. This is especially true for internet activities, which in many cases have quickly accumulated a large number of users, while

maintaining a small workforce. Therefore, the average income per employee of the top internet companies is substantially higher than other types of enterprises in the ICT sector. The ability to manage the business centrally, while maintaining considerable flexibility in the position of business functions, has increased the ability of companies to spread functions and activities between different countries.

Although this globalization of business among larger organizations is not a new phenomenon, the spread of the digital economy, combined with the growing importance of the "services" component, as well as reduced trade costs for trade and liberalization of investment and regulatory reforms, have helped eliminate logistical barriers and the increasing pace at which such globalization is possible. Technological advances have also allowed for greater integration of companies around the world, which has increased the flexibility of companies to spread their activities between different locations around the world, although these positions can be moved away from each other and physically. of their end customers. In addition to improving the flexibility of larger and more established organizations, advances in information and communication technology have also made it possible for small and medium-sized enterprises to reach global markets. In short, global interconnection has grown to unprecedented levels.

### **Multilateral business models**

A multi-faceted model is one that is based on a market in which several distinct groups of people interact through an intermediary or platform, and the decisions of each group of people influence the outcome for other groups of people through positive negative externality. In a multi-faceted business model, the prices charged by the members of each group reflect the effects of these externalities. If the activities, on the one hand, create positive externality, on the other hand, the prices, can also be increased.

An example of a multi-sided business model that involves positive externalities for different parts of the market is a payment card system, which will be more valuable to merchants if more consumers use the card and more valuable to consumers if more merchants accept the card. Similarly, an operating system is more important to end users where more developers write software for it, and more valuable to software developers as more users of the operating system means more potential buyers of the software. Negative externality, on the one hand, and on the other can be offset by a lower or even free price for users. The growth of the digital economy has made multi-sided business models more widespread in a cross-border context. In this regard, there are two main features of multi-sided business models for the digital economy [15]:

*Flexibility:* The nature of digital information and internet infrastructure greatly expands the ability to design and implement multi-faceted business models. Resources such as content, user data, or executable code can be stored to create long-term value after they have been produced. This specificity of digital assets makes them a resource in business models where different sides of the market can be created dynamically and then adapted based on the evolution of technology, the latest expression of consumer demand and a company's position in the constantly evolving market. In addition, as will be discussed later, digital technology has improved the ability to collect, analyze and manipulate user and market data, which has allowed platforms to increase value for one part of the market share on the other side of the market.

*Ability to extend:* the digital economy also makes it easier to identify the different faces of the same business model in different countries. Considering that many traditional multi-sided business models such as advertising-subsidized broadcasting, or shopping malls that have been confined to a limited perimeter due to physical or regulatory constraints, top digital economy

firms can more easily connect two parties that they are located away from each other to maximize value on each side.

For example, the resources intended to collect the data can be located near individual users, while the infrastructure needed to sell this data to paying customers can be located elsewhere.

The digital economy has two important categories of multi-sided business models. First, a company can implement several applications that provide complementary services. This creates two types of synergy: on the one hand, the various activities pool their resources such as executable code, content or user data; on the other hand, activities can be packaged in a package that is more attractive to users. Secondly, vertical platform models are used to make resources available to third-party developers to attract their creativity as part of open innovation strategies.

### **Volatility**

Technological progress has led to advances in miniaturization and a downward trend in the cost of processing power. In addition, neither the end user nor, in many cases, the service provider is obliged to pay a marginal price for using the network. These factors, together with increased performance and capital expenditures, have significantly reduced barriers to entry for new internet-based businesses.

As a result, in a short period of time, companies that seemed to control a substantial part of the market and quickly enjoyed a dominant position found themselves losing market share to the challengers who built their business on more powerful technologies, on a more attractive proposition of pro value or on a more sustainable business model.

Due to the rapid pace of innovation, the few companies that have been successful in the long run have generally done so by investing significant resources in research and development and in acquiring start-ups with innovative ideas, by launching new features and new products. and by continuously evaluating and changing business models, in order to exploit its market position and maintain its dominant market position.

### **Conclusions**

Technological advances have improved access to real-time market information and business analysis and improved communications within and between companies. These improvements have expanded the ability of companies to manage their global operations on an integrated basis, and improved telecommunications, information management software, and personal computers have significantly reduced the costs of organizing and coordinating complex tasks over long distances. new and more efficient business models. This integration has facilitated the adoption by companies of global business models that centralize functions at the regional or global level, rather than at the country level. Even for SMEs, it has now become possible for "micro-groups" to operate and have staff in different countries and continents.

The aim of the paper was to provide an overview of the impact on ICT innovations it has had on The Conversion of Traditional Economy, which seems to be becoming more challenging and common globally, alongside with the examination of business intelligence diffusion elements in the global economy, providing examples of business models that have emerged as a result of digitalization improvement, and contributes to an overview of the main features of the digital economy that have emerged in these business models. E-commerce, cloud computing and new business models are improvements and developments in technologies that, if combined with increased development and the experience of user organizations, can fundamentally change the way business intelligence as a result of ICT implications can lead to the development of the digital economy while offering a global balance of distribution.

As operations around the world have become more integrated, production processes are increasingly integrated into global value chains, where different stages of production are distributed in several different countries and are carried out by a mix of independent and affiliated suppliers. Companies are increasingly able to choose the optimal location for production activities and fixed assets, although this position may be far from the position of customers or the location of other stages of production. In addition, rapid advances in information and communication technology have meant that services such as data entry, information processing, research, and counseling can always be carried out remotely. In addition, skills and talents remain an essential resource for the digital economy. While many features can be performed with limited staff, managers, developers, software architects, and designers, among other key functions, remain critical. Therefore, the position of many of the substantial functions of a digital business needs to take place in places where these key people are willing to work. In addition, while digital services can significantly expand business-coverage, the same services often require massive investment in infrastructure components. For these reasons, I believe that there are good reasons for companies to be positioned as close as possible to the key markets of internet users so that the user experience is less latent, faster, and of higher quality. In addition, in some companies, the need for a tangible presence in a jurisdiction for regulatory reasons may also limit the options for locating infrastructure and business activities.

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## ANALYSIS OF THE EUROPEAN FRAMEWORK ON THE CIRCULAR ECONOMY

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**Abstract.** In the transition to a circular economy, monitoring key trends and patterns is essential to understand how the various elements of the circular economy develop over time, identify Member States' success factors and to assess whether sufficient action has been taken. Thus, the EU Council, based on the results of the monitoring, must be based on setting new priorities for achieving the long-term goal of the circular economy in the future. The crisis caused by Covid-19 mitigates part of the impact of economic activities on the environment and climate. Thus, the transition to a more circular economy could bring benefits such as reducing pressure on the environment, improving security of supply of raw materials, increasing competitiveness, stimulating innovation, stimulating economic growth, creating jobs. The authors in this study analyze the European framework on the circular economy.

**Keywords:** *circular economy, strategy, sustainable development, measures, production, recycle, environment.*

**Rezumat.** În tranziția către economia circulară, monitorizarea tendințelor și modelelor cheie este esențială pentru a înțelege modul în care se dezvoltă diferitele elemente ale economiei circulare în timp, pentru a identifica factorii de succes ai statelor membre și pentru a evalua dacă au fost întreprinse acțiuni suficiente. Astfel, Consiliul UE, pe baza rezultatelor monitorizării, trebuie să stabilească noi priorități pentru realizarea obiectivului pe termen lung al economiei circulare. Criza provocată de Covid-19 atenuează o parte din impactul activităților economice asupra mediului și climei. Astfel, tranziția către o economie mai circulară ar putea aduce beneficii prin reducerea presiunii asupra mediului, îmbunătățirea aprovizionării cu materii prime, creșterea competitivității, stimularea inovației, stimularea creșterii economice, crearea de locuri de muncă. Autorii acestui studiu analizează cadrul european privind economia circulară.

**Cuvinte cheie:** *economie circulară, strategie, dezvoltare durabilă, măsuri, producție, reciclare, mediu.*

### Introduction

The transition to a circular economy is an opportunity to transform and make the economy more sustainable, to contribute to the achievement of climate goals and to conserve the world's resources, to create local jobs and to generate competitive advantages for Europe in a world in profound change (COM (2017) 479), [1].

The European Commission has decided to withdraw its legislative proposal on waste and to present a new more constructive package by the end of 2015 covering the entire business



cycle, not just waste reduction targets. Thus, in December 2015, a "new era" of the European circular economy framework begins, represented by a set of well-targeted measures, approved by EU Member States. Thus, a number of initiatives have emerged at European level, such as:

- *The European Circular Economy Stakeholder Platform* - facilitates the exchange of good practices between stakeholders and provides them with a database that includes good practices at European level.
- *The European Cluster Collaboration Platform (ECCP)* supports collaboration between EU thematic clusters, as well as international initiatives.
- *The Enterprise Europe Network* includes approximately 600 organizations from over 60 countries in order to support SMEs for access to funding opportunities for eco-innovation, energy and resource efficiency etc. [2].

### **Regulation of the circular economy at EU level in the period 2015-2020**

Regulatory policies for the circular economy have been proposed by the European Commission with the adoption of the first Circular Economy Action Plan, which includes measures to help stimulate Europe's transition to a circular economy, boost global competitiveness, boost sustainable growth and generating new jobs (First Circular Economy Action Plan). Therefore, through this EU circular foreground: Communication: *Closing the loop - an EU action plan for the Circular Economy*, - Brussels, 2.12.2015, COM (2015) 614 final. - a concrete and ambitious action program is set out, with measures covering the whole cycle: from production and consumption to waste management and the secondary raw materials market, and a revised legislative proposal on waste. This package, adopted by the Commission on 2 December 2015, includes legislative proposals on waste, with a number of long-term objectives for reducing waste disposal and increasing recycling and reuse. Thus, the circular economy package includes 54 measures to "close the circle" in the life cycle of products - from production and consumption, to waste management and the secondary raw materials market.

The COM (2.12.2015) includes for the first time a *definition of the circular economy* as an economy "in which the value of products, materials and resources is maintained in the economy for as long as possible and waste generation is minimized". According to this communication, in order to close the loop on product life cycles, it included an Action Plan to support the circular economy at every stage of the value chain: production, consumption, repair and manufacture, waste management and secondary raw materials which are reintroduced into the economy. The EU financially supports this transition through the European Structural and Investment Funds, Horizon 2020, the European Fund for Strategic Investments (EFSI) and the LIFE program. All 54 actions under the plan have been completed or are being implemented [3].

According to the evaluation of the European Commission presented in the impact study of the circular economy package (*Report on the implementation of the Circular Economy Action Plan*, COM (26.1.2017)), the following important actions are assigned:

- I. The first action taken by the Commission concerned legal guarantees for consumer goods. On 9 December 2015, the Commission adopted a legislative proposal on online sales of goods. The proposal aims to strengthen the guarantees offered to consumers in order to provide them with better protection against defective products and contributes to the durability and repair potential of products. This prevents the disposal of products and contributes significantly to the circular economy.
- II. On 17 March 2016, the Commission proposed a regulation that will create a genuine single market for fertilizers made from secondary raw materials (especially recycled nutrients), thus turning waste management issues into economic opportunities. The draft regulation provides for rules for the free movement of all CE marked fertilizing products throughout the EU, including for organic fertilizers.

- III. The Commission has published a call for expressions of interest for "Innovation Agreements for a Circular Economy", which was launched from 26 May to 15 September 2016. The call is a pilot approach to help innovators facing obstacles. in matters of regulation;
- IV. Ecological design for a more circular economy. On 30 November 2016, according to the Ecodesign Work Plan for 2016-2019, (as part of the Clean Energy Package for All Europeans), the New Work Plan to contribute to the EU's energy and climate goals under the Agreement will be implemented. from Paris, with the aim of achieving energy savings comparable to Sweden's annual primary energy consumption by 2030, by creating jobs and stimulating innovation.
- V. On 1 August 2016, the Commission set up the EU platform on food loss and waste. It launched a stakeholder platform on food waste prevention, made progress in developing an EU methodology for measuring food waste and prepared EU-wide guidelines for facilitating food donations and the use of former foods as food. for animals. Therefore, the necessary steps have been taken to meet the commitment to the Sustainable Development Goals by halving food waste per capita by 2030 [4].

From the above, a number of key measures have been taken in areas such as food waste, eco-design, organic fertilizers, consumer goods guarantee, innovation and investment. These initiatives are important to support the circular economy covering the entire value chain, from production to consumption, waste management and the use of secondary raw materials.

Commission adopts *Communication on waste-to-energy processes and their role in the circular economy - Brussels, 26.1.2017, COM (2017) 34 final*. The main objective of the communication is to harness the energy of waste used for waste treatment by (ensuring the recovery of energy from waste in the EU) supporting the objectives of the circular economy action plan and strictly following the EU waste hierarchy. This document highlights the main objectives:

1. The position of the various waste energy recovery processes and the implications of this position for public financial support shall be clarified in the waste hierarchy. The waste hierarchy and the protection of the health of the population and the environment are obligations and not options. Failure to do so will result in severe fines. Waste managers at the level of producers or waste holders must take concrete steps to respect the waste hierarchy and protect the health of the population and the environment when designing, applying, verifying and analyzing the effectiveness of the waste management system within the community or organizations.
2. provide Member States with guidance on how they can make better use of economic instruments and capacity to avoid or address potential problems of waste incineration overcapacity;
3. identify the technologies and processes that currently have the greatest potential for optimizing the production of energy and materials, taking into account the projected change in the materials that enter into the processes of energy recovery of waste [5].

Regarding the regulation of waste management at EU level, a number of legislative acts have been adopted. Therefore, the main waste directives are:

- ✓ Directive (EU) 2018/849 of 30 May 2018 amending Directive 2000/53 / EC on end-of life vehicles;
- ✓ Directive 2006/66 / EC on batteries and accumulators and waste batteries and accumulators;
- ✓ Directive 2012/19 / EU on waste electrical and electronic equipment;
- ✓ Directive (EU) 2018/850 of 30 May 2018 amending Directive 1999/31 / EC on landfills;

- ✓ Directive (EU) 2018/851 of 30 May 2018 amending Directive 2008/98 / EC on waste;
- ✓ Directive (EU) 2018/852 of 30 May 2018 amending Directive 94/62 / EC on packaging and packaging waste [6].

The revised legislative framework on waste entered into force in July 2018. Thus, after amending Directive 2008/98 / EC, the main objective of the new Directive 2018/851, according to Article 1, is to establish "*measures to protect the environment and public health through preventing or reducing the generation of waste, the adverse effects of waste generation and management and reducing the overall effects of resource use and increasing the efficiency of their use, which are essential for the transition to a circular economy and to guarantee the Union's long-term competitiveness*".

In this Directive, art. 5 specifies the correct management of waste by "using economic instruments and other measures in order to provide incentives for the application of the waste hierarchy, or other appropriate instruments and measures."

Following the above, the revised legislative framework on waste under Directive 2018/851, in order to move to a European circular economy with a high degree of resource efficiency, Member States shall take the necessary measures to achieve the *following objectives*:

*Directive 2018/851, according to art.11 par. 2*

- ✓ separate collection of hazardous household waste (until the end of 2022), biological waste (until the end of 2023), textiles (until the end of 2025).
- ✓ the preparation for reuse and recycling of municipal waste increases to a minimum level of 55% by weight by 2025, respectively 60% by weight by 2030 and 65% of waste by 2035.
- ✓ From 1 January 2027, Member States may consider municipal bio-waste entering aerobic or anaerobic treatment as recycled only if they have been collected separately or have been separated at source, according to art. 22.
- ✓ waste storage meant to reduce the waste landfill to a maximum of 10% of municipal waste by 2035;
- ✓ By 1 January 2025, Member States shall organize the separate collection of hazardous waste fractions from households to ensure treatment and to ensure that they do not contaminate other municipal waste streams.
- ✓ specific measures to combat food waste and marine litter, in order to achieve the United Nations Sustainable Development Goal of 50% reduction in food waste per capita worldwide, in the retail and consumer network, and on reducing food losses in production and distribution chains by 2030;

*Directive 2018/852, according to art.6 par.5.*

- ✓ recycling of packaging waste by 31 December 2025 at the latest, at least 65% of the weight of all and at least 70% of the weight of packaging waste will be recycled by 31 December 2030;
- ✓ recycling targets for certain packaging materials, by 31 December 2025 at the latest, for the recycling of the following specific materials contained in packaging waste: Paper and board: 75%, Ferrous metals: 70%, Glass: 70%, Aluminum: 50%, Plastic: 50%, Wood: 25%.
- ✓ recycling targets for certain packaging materials, no later than December 31, 2030: Paper and cardboard: 85%, Ferrous metals: 80%, Aluminum: 60%, Glass: 75%, Plastic: 55%, Wood: 30% [6-3].

During 2018, several actions related to the circular economy were carried out. Thus, the European Commission has published the so-called *circular economy package*. The first important action is the adoption of a European strategy on plastics: Communication: A European strategy on plastics in a circular economy Brussels, 16.1.2018, COM (2018) 28 final - this strategy lays the foundations for a new plastics economy, in which the design and production of plastics and

plastics products fully meet the needs of reuse, repair and recycling and in which more sustainable materials are developed and promoted.

This Strategy proposes concrete actions to turn the vision for a more circular economy of plastics into reality. In this context, the strategy proposes a set of measures at EU level, as by 2030 all plastic packaging should be recyclable, thus contributing to the transition to a more circular economy. The strategy provides for actions to:

1. Improving the economic aspects and the quality of plastics recycling;
2. Reduction of plastic waste and waste disposal in the public domain;
3. Orientation of investments and innovation towards circular solutions;
4. Capitalizing on global action.

The Communication notes that in Europe's external market, per capita consumption of plastics is growing rapidly, especially in Asia. Thus, the value chains of plastics are spread across continents, and plastic waste is traded internationally: in the EU, almost half of the plastic waste collected is sent abroad, where uncertainties remain about its treatment. And more than 85% of exported plastic waste is currently shipped to China, a situation that will soon change given China's decision to ban the import of certain types of plastic waste, thus creating opportunities for EU recycling companies [7].

Over the period 2014-2020, more than EUR 5.5 billion has been allocated to improving waste management. Thus, this is expected to lead in particular to an increase in waste recycling capacity of 5.8 million tonnes per year. The European Fund for Strategic Investments (EFSI) plays an important role in supporting greater integration of the value chain and closed-loop plastics recycling projects.

As part of the strategy, the Commission has launched several international fora and "commitment" campaigns to ensure that by 2025, ten million tones of recycled plastic are found in new products on the EU market. Respectively also initiatives launched in international fora (such as the G7, G20, the United Nations and in the context of the MARPOL Convention) and regional maritime conventions; The agenda for international governance of the oceans for the future of the oceans includes actions against marine litter.

*COMMUNICATION on a monitoring framework for the circular economy. Strasbourg, 16.1.2018 COM (2018) 29 final.* The Commission proposes an EU monitoring framework for the circular economy, consisting of a set of key indicators, covering each stage of the product life cycle, at European and national level. Spectrum of indicators will be constantly updated on the website dedicated to the monitoring framework. This site includes, tools for monitoring progress and documents methodologies for indicators, data sources, definitions and publication standards, in particular food waste and green public procurement [8].

In 2018, the European Commission adopted other ambitious initiatives in the context of the Circular Economy Action Plan: *the EU Directive on reducing the environmental impact of certain plastics. Brussels, 28.5.2018 COM (2018) 340 final.* The European Commission proposes on 28 May 2018 for adoption a new directive that aims to reduce the impact of certain plastics on the environment by implementing the EU Strategy for Plastics, addressing the gaps identified in existing legislation. The Directive proposes key actions for specific disposable plastics items, taking into account consumer behavior as well as consumer needs and opportunities for businesses. When clearly available alternatives - both single-use and multi-use - restrictions are proposed. Other measures include appropriate labeling, raising awareness, voluntary action and establishing extended producer responsibility schemes that would cover the costs of landfilling [9].

Thus, on 4 March 2019, the European Commission presented a comprehensive report on the implementation of the Action Plan for the Circular Economy to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions.

*Report on the implementation of the circular economy action plan. Brussels, 4.3.2019 COM (2019) 190 final.* The report outlines the main results of the implementation of the action plan and outlines the future challenges of shaping the EU economy, by creating a competitive advantage, paving the way for a climate-neutral economy, where pressure on natural and freshwater resources, as well as on ecosystems is minimized. The report is a response to the Council's request for "a written annual update on the progress made in implementing the action plan", a request also taken up by the European Parliament.

In order to create a more circular economy, the report presents the most important achievements. Thus, the Commission defines the circularity process which means adapting industrial processes. To ensure the circuit, the design that is at the beginning of the product life cycle comes to the rescue. Products and services designed in a circular manner can minimize resource use and promote the reuse, recovery and recycling of materials in the future. The Commission has introduced circularity issues (energy consumption and use of materials, waste prevention, recycling and reduction of hazardous chemicals) in reference to Best Available Techniques (BREFs) under the Industrial Emissions Directive, turning them into reference standards for Member States when granting authorizations for industrial installations.

Circularity has also opened up new business opportunities, led to the emergence of new business models and developed new markets, both domestically and outside the EU. In 2016, circular activities, such as repair, reuse or recycling, generated an added value of almost EUR 147 billion, while the value of investments was around EUR 17.5 billion. The report also highlights the importance of adopting the first policy framework at EU level - the Strategy for Plastics in a Circular Economy, which states that by 2030, all plastic packaging placed on the EU market must be reusable or recyclable, and by in 2025, 10 million tons of recycled plastics will be included in new products.

The Report sets out adapted sets of measures, which are in the final stages of the legislative process on disposable plastic articles and fishing gear, such as:

- ✓ measures to reduce the consumption of food containers and beverage cups, plastic, as well as the specific marking and labeling of certain products;
- ✓ the target of including 30% of recycled plastics in beverage bottles from 2030 and 25% for PET bottles from 2025, as well as the target of separate collection of 90% of plastic bottles by 2029, as well as the introduction of design requirements for connecting caps to bottles;
- ✓ measures aimed at reducing plastic waste from ships, such as setting a flat rate for waste from ships, etc.

The Commission proposes that EU countries, in order to accelerate the transition to a circular economy, need to invest in innovation and provide support for adapting the industrial base. Over the period 2016-2020, the Commission has stepped up efforts in both directions, providing public funding for the transition totaling more than € 10 billion [10].

The year 2020 is a year with tough challenges for the entire planet, shaped by the COVID-19 pandemic crisis, with a negative economic and social impact with isolation measures. However, it revealed the vulnerability and dependence of the population on raw materials. Thus, the competent institutions must find the necessary measures to transform this crisis into an opportunity for an ecological restart and a sustainable society.

The new action plan for the circular economy, adopted by the European Commission on 11 March 2020, is part of the main blocs of the European Green Pact, a new European agenda for sustainable growth and an EU growth strategy to achieve climate neutrality by 2050.

*Communication A circular economy action plan for a cleaner and more competitive economy. Strasbourg, 11.3.2020 COM (2020) 98 final.* The document proposes initiatives throughout the life cycle of products, aiming at their design, promoting the processes of the

circular economy, encouraging sustainable consumption and aiming at ensuring that the resources used in the EU economy are preserved for as long as possible.

The communication proposes the following objective: expanding the circular economy from pioneers to major economic actors will make a decisive contribution to achieving climate neutrality by 2050 and decoupling economic growth from resource use, while ensuring the EU's long-term competitiveness and it is not left behind. It also states that the principles of the circular economy across the EU economy have the potential to increase EU GDP by 0.5% by 2030, creating around 700,000 new jobs. There are also clear economic arguments for individual companies: given that EU manufacturing companies spend on average around 40% on materials, closed-loop material management models can increase their profitability, while protecting them from resource price fluctuations.

At the same time, in order to promote a longer product life, the Commission proposes a series of actions focused on the sectors that use the most resources and where the potential for circularity is high. Thus, the Commission introduces concrete measures on:

- ✓ electronic products - "Initiative for circularity in the field of electronics" to have products with a longer life and to improve waste collection and treatment;
- ✓ batteries and vehicles - a new regulatory framework for batteries in order to improve the durability and boost the potential for battery circularity (this legislative proposal will be based on the evaluation of the Batteries Directive and the work of the Battery Alliance);
- ✓ packaging - new mandatory requirements on what is allowed on the EU market, including the reduction of (excessive) packaging;
- ✓ plastics - new mandatory requirements for the content of recycled materials, special attention being paid to both micro-plastics and plastics of biological and biodegradable origin;
- ✓ textiles - a new EU Strategy for textiles in order to strengthen competitiveness and innovation in this sector and stimulate the EU market for the reuse of textiles;
- ✓ constructions and buildings - a comprehensive Strategy for a sustainably built environment that promotes the principles of circularity in the case of buildings;
- ✓ food - a new legislative initiative on reuse, in order to replace disposable packaging, crockery and cutlery with reusable products in food services [11].

### Conclusions

At both European and national level, this provision pays attention to the avoidance of waste production as a whole and its transformation into high-quality secondary resources that benefit from a functioning secondary raw materials market. Thus, the Commission will examine the possibility of establishing a harmonized model at EU level for the separate collection and labeling of waste. The action plan also proposes a series of actions aimed at minimizing EU waste exports and addressing the issue of illegal shipments in this area.

To the European Committee of the Regions, presented an Opinion *The new Circular Economy Action Plan to be adopted in plenary on 12-14 October 2020*. The document proposes to strengthen the local and regional pillar of the new Circular Economy Action Plan, in order to put cities and regions in the spotlight. According to Eurostat, the amount of waste generated annually by EU economic activities amounts to 2.5 billion tones, which means 5 tones per capita [12]. There is currently no comprehensive set of legal and policy requirements to ensure that all products placed on the EU market are increasingly sustainable and meet the circularity criteria, and the Commission's New Circular Economy Action Plan (CEAP) European Parliament, presented on 11 March 2020, aims to do just that.

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## THE CONTRIBUTION OF INTEGRATED REPORTING IN DETERMINING THE PERFORMANCE AND VALUE OF A SUSTAINABLE ORGANIZATION

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**Abstract.** In the current business environment, financial reporting has become insufficient in terms of information, which is caused by the increasing information needs of stakeholders. In this context, an integrated reporting modality has emerged thanks to the International Integrated Reporting Council (IIRC), where the information presented is both financial and non-financial information, such reporting being called "Integrated Reporting". Thus, starting from this consideration, the main objective of the paper aims at the main aspects that lead to the presentation of the benefits of implementing integrated reporting in organizations, through the ability to understand, in a more complete way, the "real" performance of a sustainable organization. The essential elements contained in an integrated reporting concern the capital, the business model and the process of creating and maintaining value, this reporting must be integrated in the strategy and vision of the organization, allowing through the transparency of these integrated reports the observation of all aspects led to the results obtained by the organization, as well as providing information on the role of the organization in society and the context in which it operates, the image of the organization being complete. The purpose of this paper is to highlight the importance and role assigned to integrated reporting in measuring the performance of a sustainable organization, by making it easier to understand the cause and effect of the link between financial performance and sustainability by stakeholders.

**Keywords:** *sustainable organization, financial reporting, non-financial reporting, corporate reporting, value creation, business model, real performance.*

**Rezumat.** În actualul mediu de afaceri, raportarea financiară a devenit insuficientă din punct de vedere informational, cauzate de nevoile informaționale tot mai mari ale părților interesate. În acest context, a apărut o modalitate de raportare integrată grație Consiliului internațional de raportare integrată (IIRC), în care informațiile prezentate sunt atât informații financiare, cât și non-financiare, astfel de raportare numindu-se „Raportare integrată”. Deci, pornind de la această considerație, obiectivul principal al lucrării vizează principalele aspecte care conduc la prezentarea beneficiilor implementării raportării integrate în organizații, prin capacitatea de a înțelege, într-un mod mai complet, performanța „reală”, a unei organizații sustenabile. Elementele esențiale conținute într-o raportare integrată privesc capitalul, modelul de afaceri și procesul de creare și menținere a valorii, această raportare trebuind integrată în strategia și viziunea organizației, permițând prin transparența acestor rapoarte integrate observarea tuturor aspectelor ce au condus la rezultatele obținute de organizație, precum și furnizarea de informații cu privire la rolul organizației în societate și contextul în care operează, imaginea organizației



fiind completă. Scopul acestei lucrări este de a evidenția importanța și rolul atribuit raportării integrate în măsurarea performanței unei organizații durabile, facilitând înțelegerea cauzei și efectului legăturii dintre performanța financiară și sustenabilitate de către părțile interesate.

**Cuvinte cheie:** *organizație sustenabilă, raportare financiară, raportare nefinanciară, raportare corporativă, creare de valoare, model de afaceri, performanță reală.*

### **Introduction**

The management of an organization has an essential role in implementing the concept of integrated reporting because its decisions can lead to the understanding and correct implementation or not of such reporting, exceeding the declarative level and also improving the activity of the organization [1]. Currently, organizations are determined to "think" in an integrated way, ie, the more they will use an integrated approach to their business, the more will justify the application of the concept of information connectivity in managerial reporting, analysis and decision-making [2]. Many studies presented in the literature on organizations that apply integrated reporting and implement sustainability principles in business development showed the causal relationship that exists between integrated reporting, sustainability and stakeholder interests [3 - 6].

At present, where the existence of a social responsibility is required, there is a need to determine the non-financial performance (social and environmental), which must be found as information, indirectly, but in an obvious concordance and in the financial statements of those entities [7]. Basically, profit maximization and increasing market share are the main objectives of organizations, but they must be joined by other objectives that take into account the effects of business decisions on stakeholders [8].

In the global economic context, where the situation of organizations can change 360 degrees from day to day and where the uncertainty of tomorrow is a concern facing a multitude of people, investors need information to provide them as much as possible much confidence in the continuity of the organization, its productivity and the ability to cope with all obstacles, always achieving positive results [9]. Financial information is no longer sufficient to meet the information needs of investors, so organizations have moved to a tool that includes both financial and social information, environmental information, strategy, opportunities and risks, as is integrated reporting [10].

### **The concept of integrated reporting of a sustainable organization**

Corporate sustainability has been presented in the literature as representing the ultimate goal of organizations, by meeting the needs of the present without compromising the ability of future generations to meet their own needs [11]. We note that the three aspects of sustainability (economic, environmental and social) are translated into an approach to corporate sustainability [12]. Socially responsible companies have highlighted in their financial statements specific elements to be followed by all categories of stakeholders [13]. The shift to corporate responsibility in business practice is a response not only to the negative environmental effects that the organization can have, but also to assessing the economic and social effects of the organization on a global scale, long-term corporate sustainability emphasizing the impact on an organization. from an environmental, economic and social point of view as well as their interactive effect [14].

Non-financial reporting has taken many forms in addition to the inclusion of non-financial information in the annual reports under the heading of social responsibility reports, environmental balance sheet, social balance sheet, corporate governance report or sustainability report, but they have not been sufficient to keep pace with changes in the world economy and with the desire to achieve a sustainable economy [15].

The International Council on Integrated Reporting (IIRC) defines integrated reporting as follows: *“Integrated reporting is a process founded on integrated thinking that results in a periodic integrated report by an organization about value creation over time and related communications regarding aspects of value creation”* [16].

Integrated reporting is thus a set of processes and activities that allow the integration of corporate reporting and the development of communication of financial, environmental and social performance through a single annual report, which provides an overview of the organization's ability to create value responsibly and efficiently, addressing all stakeholders in a comprehensive, clear, concise and comparable manner [17].

Integrated reporting is not additional reporting, prepared and published in addition to existing ones, but is a new approach to financial reporting that includes issues related to strategy, financial performance and the social, environmental and economic context in which the organization operates [18]. Eccles and Serafeim (2011) state that integrated reporting focuses on the process of creating value for all stakeholders in the medium and long term through a single report accessible to all stakeholders that shows how social and environmental performance together with good governance contributes to a high financial performance [19].

### **The evolution of integrated reporting**

The concept of integrated reporting has evolved both theoretically and in the practice of organizations around the world. Integrated reporting has its origins in two main ideas that began to circulate in the mid-1990s [6].

The first idea starts from the premise that organizations should supplement the reported financial information with other relevant non-financial information, the motivation being the inability to obtain a complete picture of the organization's performance.

According to the second idea, stakeholders are not only shareholders, for this reason, the reporting should also take into account those environmental, social and governance issues that, although not relevant to shareholders, nevertheless draw attention and the interest of a multitude of people. To materialize the last idea, the first steps were taken in 1997 by Robert K. Massie and Allen L. White [8], by setting up the non-profit organization Global Reporting Initiative (GRI), with the aim of creating an accountability mechanism to ensure compliance with CERES principles (*Sustainable Use of Natural Resources, Protection of the Biosphere, Reduction and Disposal of Wastes Energy Conservation, Risk Reduction, Safe Products and Services, Environmental Restoration, Informing the Public, Management Commitment, Audits and Reports*) for environmentally responsible behavior [20].

The late 1990s are characterized by a growing interest in the performance of ESG (Environmental, Social and Corporate Governance), with financial performance becoming insufficient in terms of the information provided [4]. In 2002, the Danish bio-industry Novozymes published its first integrated report. Two years later, the pharmaceutical company Novo Nordisk also published a report containing both financial and non-financial information. The Canadian cooperative Vancity, although measuring and reporting social and environmental performance since 1997, only in 2005 began a process of integrating aspects of strategy, planning, risk management, performance reporting and financial information. In 2005 White wrote about "integrated, balanced and honest reporting" in Danish [21]. In 2010, 1861 companies issued sustainability reports using the "G3 guidelines" of the non-profit organization GRI.

The first American company to publish an integrated report was United Technologies Corporation, in 2008. A year later, South Africa published the King III Corporate Governance Code, which recommended that organizations publish integrated reports. This provision shall apply to companies listed on the Johannesburg Stock Exchange as of March 1, 2010 [22].

In 2009, the British organization "The Prince of Wales" convened a high-level meeting of investors, companies, accountants, standardizers and UN representatives, including IFAC and GRI, to establish the International Integrated Reporting Committee (IIRC), renamed in 2011 the International Integrated Reporting Council, as a body to deal with the creation of a globally accepted integrated reporting framework, this international body must bring together organizations with relevant experience and recognition in the fields of transparency, accounting and financial reporting. The purpose of this meeting was, as we specified, the development of a conceptual framework on integrated reporting (financial and non-financial), as a first step in the process of achieving a sustainable economy [23]. IIRC developed the Conceptual Framework on Integrated Voluntary Reporting in 2013 and argues that integrated reporting promotes a more coherent and effective approach to corporate reporting and aims to improve the quality of information available to financial capital providers to enable more efficient capital allocation [24]. IIRC's long-term vision is a world in which the concept of integrated thinking is implemented in business practices in the public and private sectors so that integrated reporting has become a norm of corporate reporting [25], and communication resulting from reporting. The main purpose of the Integrated Fund is to support long-term investor decisions on the allocation of financial capital, aiming to align the public interest in the long term, as well as the creation and maintenance of short- and medium-term value [26]

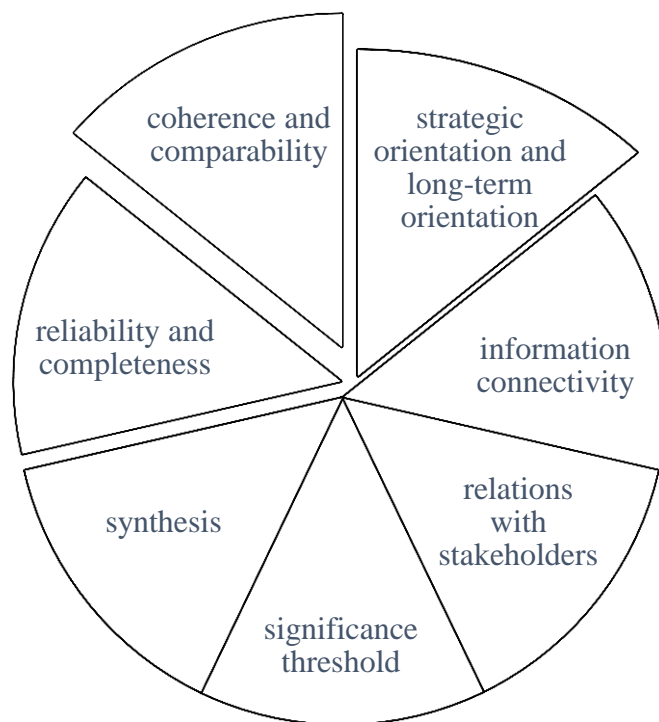
#### **Integrated reporting - business model of a sustainable organization**

The global economic crisis has not only affected the economy but also affected corporate reporting, with organizations around the world realizing that they need to change the way they do business, so traditional financial reporting has been overtaken by the new approach to business sustainability and information requirements of the stakeholders [27].

The business model is a system of inputs, value-added activities and outputs, which aim to create and maintain value in the short, medium and long term [26]. Sustainable business models (SBM) [9] incorporate a threefold approach and consider a wider range of stakeholder interests, including the environment and society. Sustainable business model archetypes are introduced to describe clusters of mechanisms and solutions that can contribute to building the business model for sustainability [26]. The main purpose of integrated reporting is to explain to capital providers how an organization creates value over time, taking into account all available information, whether financial or non-financial. According to the IIRC, the best way to do this is through a combination of qualitative and quantitative information that takes the form of the six capitals: financial, productive, intellectual, human, social and relational, as well as natural [28].

Capitals are valuable structures that are affected and transformed by the activities of the organization. However, organizations are not required to pursue this division in their own integrated reports. The integrated report aims to illustrate the ways in which an organization interacts with the external environment and what capital is used to create value in the short, medium and long term. The ability of an organization to create value for itself allows capital providers to achieve an economic return, this ability being associated with value created by the organization for stakeholders and society, through a wide range of activities, relationships and interactions. When the latter significantly affect the organization's ability to create value, they are included in the integrated report [29].

The international framework of integrated reporting adopts an approach based on the objective of these principles, consisting in achieving a balance between flexibility and requirements, so as to analyze the many variations introduced by the specific circumstances of a single organization and, at the same time, ensure a level of comparability between organizations sufficient to meet the relevant information needs. Thus, in the elaboration of the integrated report the principles presented in figure no. 1 must be based:



**Figure 1.** Integrated report compilation principles.  
 Source: Own processing based on: <https://integratedreporting.org>

In accordance with these principles, an integrated report should provide detailed information on the organisation's strategy and how this strategy affects both the ability to create value and the use of capital and its effects on capital; it should provide a complete picture of the links and dependencies between the factors that influence the organisation's ability to create value over time; it should provide detailed information on the nature and quality of the organisation's relations with stakeholders and the extent to which the organization responds to their needs and interests; should provide information on issues that significantly affect the organization's ability to create value over time; it should be concise and contain all material issues; all the information contained in the report should be useful, consistent, in a format that allows comparison with other organizations [28].

From all these stated characteristics we can say that an integrated report benefits all stakeholders in the organization's ability to create value over time, including employees, customers, suppliers, business partners, local communities and legislators. Thus, there are a multitude of benefits associated with integrated reporting for both the organization itself and stakeholders, and a concise presentation of the content and benefits of such a report can be presented in Table 1.

Table 1

<b>The content and benefits of an integrated report</b>	
<b>The content of an integrated report</b>	<b>The benefits of an integrated report</b>
A presentation of the organization and the external environment	Encourage the organization to think in an integrated way
The way the organization supports its ability to create value in the short, medium and long term	All information is contained in a single report
The business model of the organization	It allows easier identification of risks and opportunities

Continuation Table 1

Risks and opportunities	Allows identification of all factors that have contributed to the performance of the organization and easier identification of risks and opportunities
Strategy and method of resource allocation	Develops a clearer link between strategy, materiality, performance indicators and risk
The extent to which the organization has achieved its strategic objectives	Improves information connectivity
The challenges and uncertainties that the organization may face in implementing its strategy	It demonstrates the value that an organization creates for society and for itself
How the organization chooses which aspects to include in the integrated report and how they are evaluated and quantified	Provides more complete information
	Allows a better analysis of economic, social and environmental issues, relevant to improving their financial performance
	Improves stakeholder involvement
	Strengthens trust with different interest groups

Source: Own processing based on [10] [30-31]

Despite the many benefits, there are people who do not recommend the development of the integrated report, criticizing in particular the international framework developed by the IIRC, saying that the interest is more in the value for investors to the detriment of other categories of stakeholders. The report also contains a wealth of information, sometimes even unnecessary, lacking the ability to make a clear distinction between information that influences the value of the organization and that does not influence [32], and the risk of disclosure of information is given by increased costs corporate reporting [33].

### Country analysis of integrated reporting organizations

Today a number of organizations from different countries and fields publish integrated reports. The situation in the period 2013-2017 regarding the number of reporting organizations and the number of integrated reports can be seen in Table 2.

Table 2

Integrated reporting in the world	
Country	Number of integrated reports from total reporting organizations
Argentina	9/4
Australia	64/23
Austria	17/8
Bangladesh	3/3
Belgium	15/5
Botswana	4/1
Brazil	147/58
Bulgaria	3/1
Canada	20/9
Chile	25/17

Continuation Table 2

China	3/2
Colombia	33/15
Costa rica	1/1
Croatia	1/1
Cyprus	3/2
Czech republic	1/1
Denmark	8/2
Finland	24/15
France	89/44
Germany	26/8
Greece	17/5
Hungary	1/1
Iceland	1/1
India	44/29
Indonesia	7/4
Ireland	1/1
Israel	1/1
Italy	105/38
Japan	374/162
Jordan	1/1
Kenya	13/4
Lebanon	1/1
Malaysia	32/20
Mauritius	20/9
Mexico	7/6
Nigeria	1/1
Namibia	6/4
Norway	10/6
Pakistan	7/5
Peru	4/2
Philippines	11/7
Poland	25/10
Portugal	10/7
Republic of Korea	91/33
Russian federation	64/22
Saudi arabia	6/3
Serbia	1/1
Slovenia	3/2
South africa	939/243
Spain	168/61
Sri Lanka	195/65
Sweden	34/22
Swaziland	6/2
Switzerland	20/9
Uganda	2/1
UK	82/37
Ukraine	2/2
United Arab Emirates	4/3

Continuation Table 2

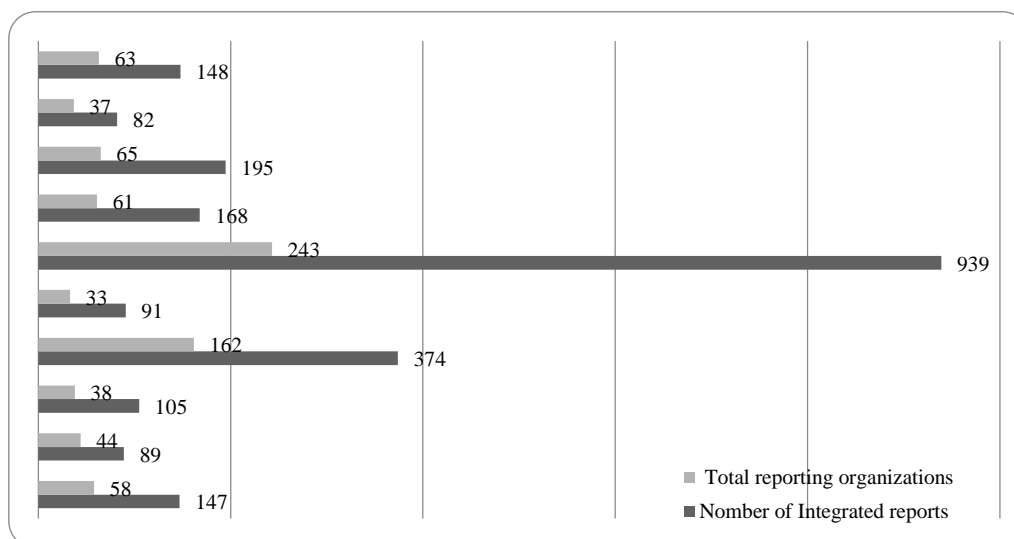
USA	61/30
Qatar	7/4
Thailand	12/5
Taiwan	24/13
The netherlands	148/63
Turkey	19/9
Zimbabwe	3/3

Source: Own processing based on [34]

A top of the first 10 countries in which we find the most organizations that prepare integrated reports can be viewed in figure no. 2.

As can be seen from table number 2 and the graphical representation in Figure no. 2, the main reporting countries (according to the number of published reports) are South Africa (939), Japan (374), Sri Lanka (195), Spain (168), the Netherlands (148), Brazil (147) and Italy (105). However, South Africa and Japan alone have over 100 reporting organizations.

South Africa's supremacy can be considered to have its origins in the publication of the King III Corporate Governance Code in 2009, which recommended that companies prepare an integrated report that reflects an organisation's strategy, risks, performance and sustainability.



**Figure 2.** Top 10 countries by number of reporting organizations and number of integrated reports prepared.

Source: Own processing based on the data in Table 2.

However, as the principles of the code were later included in the listing requirements of the Johannesburg Stock Exchange (JSE), listed companies were required to prepare the integrated reports [5]. Today, integrated reporting is a common practice that has spread even in the public and non-profit sectors. South African organizations follow the best practice guidelines of the framework in line with the general principles of corporate governance and the practices recommended by the new governance code, King IV.

According to a report published by KPMG, in 2018 there were 414 integrated reports declared by Japanese companies. Compared to previous periods, there has been an increase in the number of published reports in Japan, most of which come from large companies. Of the 2,218 organizations in the first section of the Tokyo Stock Exchange, 382 issued integrated reports [34].

From the analysis of the data presented of the number of integrated reports in each country, Japan is clearly one of the leading countries in the world for voluntary integrated reporting. The situations between the two countries are completely opposite, one being obliged to draw up integrated reports and the other reporting voluntarily. However, both are in the first place when it comes to integrated reporting, which shows that the implementation method is not relevant. Instead, the results are visible, with the number of reporting organizations increasing. Romania currently has no companies to prepare integrated reports, however there are many organizations that prepare both financial and non-financial reports, such as sustainability reports, among them Electrica and Antibiotice SA.

### **Use of integrated reporting as a tool to communicate financial and non-financial performance to stakeholders**

Recently, large corporations present their business in a more transparent and accountable manner [31]. Thus, in order for businesses to be able to fulfill their obligations in accordance with the ethics of stakeholder responsibility, they must provide relevant, timely and intelligible information about their activities through corporate reports. The organisation's conventional reports on annual financial performance, sustainability and governance disclosures often fail to link the organisation's strategy, financial results and environmental, social and governance performance. Recognizing the inherent shortcomings of existing reporting models, there is a growing trend towards integrated reporting [21].

According to GRI (Global Reporting Initiative), sustainability reporting is the practice of measuring, disclosing and being accountable to internal and external stakeholders in terms of organizational performance to achieve the goal of sustainable development. A sustainability report should provide a balanced and reasonable representation of the sustainability performance of the reporting organization, including positive and negative contributions [35].

With integrated reporting, stakeholders in the organization's situation can better understand the cause and effect of the links between financial performance and sustainability. The transparency of the integrated reports allows the observation of all aspects that led to the results obtained by the organization. In addition, this report provides information on the role of the organization in society and the context in which it operates, the image of the organization presented in the report being complete, taking into account all aspects that influenced the management of the activity and performance.

The integrated report communicates to stakeholders all information on its performance, whether good or bad, also creates commitments to improve future performance and establishes responsibility for meeting the objectives, and the dependencies between financial and non-financial performance are highlighted in this report. Those who prepare strictly financial annual reports provide only a financial picture of performance, which is insufficient in a qualitative decision-making process. The integrated reports help to complete the financial report with that information that allows obtaining a complete vision on the real performance of the organization [36-37]. Integrated reporting is a new practice that is more comprehensive on the one hand, as it takes into account the many information needs of stakeholders, and, on the other hand, brings together financial and non-financial factors in a single report, providing the possibility to determine easier and more relevant to the value of the organization and performance [37].

Moreover, reports on annual financial performance, sustainability and governance disclosure often fail to link the organisation's strategy, financial performance and environmental, social and governance performance. In this context of shortcomings in existing reporting models, integrated reporting has emerged as a preferred approach [31-33], as "a holistic and integrated representation of the organization's performance in terms of both funding and sustainability". In general, the integrated reporting activity aims to combine two traditional forms of corporate



reporting - financial reporting and sustainability - to compensate for the identified inadequacies of previous corporate reporting procedures [21].

An overview of the organization's performance can be seen even without integrated reporting in the annual report prepared by most organizations. However, this image is often incomplete, as the performance of the organization may be the result of factors other than financial. An example can be the situation of an organization that has registered positive results due to the employment of a large number of people with higher education who have made a significant contribution in production techniques and methods of work organization [35-36]. Such information would provide a different picture of the performance of organizations and could lead to the emergence of employee training programs or even the creation of facilities for employees who are engaged in higher education. This type of information is presented in the integrated reports.

The study by García-Sánchez et al. (2018) aimed to analyze whether the trend towards integrated reporting depends on management and whether this relationship is influenced by internal control mechanisms (eg board of directors) or external (level of investor protection) [28]. The study of the impact of the transition from sustainable reporting to integrated reporting on non-financial disclosure of eight South African companies using the analysis of the content of annual reports was conducted by Clayton, et al, in 2015, the purpose of this study is to review the development of integrated reporting corporations in South Africa.

Loprevite et al. (2018) present in their study the link between integrated reporting and integrated performance (financial, social, environmental and governance), the authors concluding that voluntary regimes, integrated performance levels achieved by organizations are higher levels and integrated performance shows significant improvements in the years of mandatory adoption of integrated reporting, with intensifying effects in the medium term. A positive example in this situation is South Africa where integrated reporting has become mandatory since 2010 for publicly listed companies.

Most studies found in the literature focus on factors that influence organizations' decision to adopt integrated reporting, on the compliance of reports published by organizations with the international reporting framework under the IIRC, on the credibility or asymmetry of information in integrated reports, but there are fewer related studies the integrated performance of an organization or other perspectives of financial implications [36].

Integrated reporting provides an overview of the performance of the organization, which is described both financially and from other points of view considered non-financial but relevant to the full understanding of the real situation [34]. This report describes to users the resources and relationships that underlie value creation and which are used to preserve value in the short, medium and long term [37,38]. Overall, all the data in this report aims to provide a transparent presentation of how the organization is managed, the results and the actual performance, so that investors are helped to manage risks and allocate resources as efficiently as possible.

### **Conclusions**

Integrated reporting gives stakeholders the opportunity to evaluate the organization from all points of view, whether financial or economic, environmental or social performance, thus facilitating the decision-making process, and the full picture provided by the report facilitates the measurement of the organization's capacity to create long-term value. The performance image provided by integrated reporting is useful for all categories of users as it takes into account the diversity of information needs and the diversity of the interests of the parties.

In conclusion, integrated reporting has a very important role in measuring performance as it offers the possibility to understand all the factors that were the basis of the process of

creating the value of the company, respectively the factors that determined its achievement. Thanks to the integrated report, performance is observed from all angles and the decision-making process is simplified and much more relevant.

In order for an organization to fulfill its obligations in accordance with the ethics of responsibility, it is important that stakeholders are provided with relevant, timely and easy-to-understand information about their activities. We can strongly argue that integrated reporting must be implemented in the entire activity of an organization through the concept of integrated thinking so as to influence not only the way of reporting but also its results. Adopting integrated reporting can be useful in increasing financial performance and strengthening the relationship with stakeholders if used properly overcoming the barrier of being a simple management policy adopted to respond to external pressure from stakeholders and the international market.

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## THE IMPACT OF POLICY ON THE PANDEMIC ECONOMY

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**Abstract.** The new economy, as defined in the current period of socio-economic development, has as its main feature globalization. Thus, during this period, as a result of the appearance and spread of the Covid-19 pandemic, in addition to the great human tragedies caused by this virus, a series of economic and financial problems arose, which is a real challenge for both international bodies and for national institutions. The objective of the research is to identify the main socio-economic changes that have occurred at the international level, but also nationally, on the occasion of this pandemic and highlighting the impact of measures taken by competent bodies. The research method is non-participatory observation, and the data source is the information published by authorized national and international bodies, but also the literature. The research results aim to highlight the impact of the measures taken so far, worldwide and nationally, on economic and social life. Future research directions include the analysis of the evolution and impact of this pandemic on national and international economic life, as well as the highlighting of measures taken, both locally and internationally, by authorities or other competent bodies, in order to remove the negative consequences generated by this new crisis, to end the pandemic, but also to prevent its recurrence.

**Keywords:** *economic crisis, pandemic, Covid-19, globalization, political interventions.*

**Rezumat.** Noua economie, așa cum este definită actuala perioadă de dezvoltare socio-economică, are ca principală caracteristică globalizarea. Ca urmare a acestui lucru, efectele acesteia, pozitive sau negative, se transmit foarte repede și se resimt la o scală foarte mare, generală. Astfel, în această perioadă, ca urmare a apariției și răspândirii pandemiei Covid-19, pe lângă marile drame umane pe care le-a generat acest virus, au apărut o serie de probleme economico-financiare, care constituie o adevărată provocare, atât pentru organismele internaționale, cât și pentru instituțiile naționale. Obiectivul cercetării constă în identificarea principalelor modificări socio-economice apărute la nivel internațional, dar și național, cu ocazia acestei pandemii și evidențierea impactului măsurilor luate de organismele abilitate. Metoda de cercetare este observația neparticipativă, iar sursa de date o constituie informațiile publicate de organismele naționale și internaționale autorizate, dar și literatura de specialitate. Rezultatele cercetării urmăresc evidențierea impactului măsurilor luate până în acest moment, la nivel mondial și național, asupra vieții economico-sociale. Ca direcții viitoare de cercetare se pot menționa analiza evoluției și impactului acestei pandemii asupra vieții economice naționale și internaționale, precum și evidențierea măsurilor luate, atât la nivel local, cât și internațional, de către autorități sau alte organisme abilitate, cu scopul de a se înlătura consecințele negative generate de această nouă criză, de a pune capăt pandemiei, dar și de a preveni reapariția acesteia.

**Cuvinte cheie:** *criză economică, pandemie, Covid-19, globalizare, intervenții politice.*

## Introducere

Viața economică și socială de pe întreg globul este afectată în prezent de o pandemie îngrozitoare provocată de virusul Covid-19. Acest virus s-a răspândit cu o viteză enormă și numai în decursul a câtorva luni a ajuns să fie prezent în toate colțurile lumii, ceea ce a alarmat organismele internaționale, dar și naționale, care au adoptat o serie de măsuri menite să preîntâmpine efectele devastatoare ale Covid-19 asupra sănătății umane, dar și unele care au avut drept scop evitarea unui blocaj economico-financiar, care să conducă în final la o nouă criză internațională. Se pare că lupta cu această pandemie nu este deloc ușoară și nici de scurtă durată, ci, dimpotrivă, este una de durată și cu multe necunoscute. Dacă în domeniul medicinei efortul este orientat spre investiții în echipamente necesare pentru tratarea cât mai eficientă a pacienților infestați și în activități de cercetare, care au drept scop identificarea unui vaccin salvator, în domeniul economic se caută soluții care să prevină un blocaj de nivel mondial.

În acest context, rolul statului în economie a crescut, iar măsurile adoptate ar trebui să asigure buna desfășurare a activității socio-economice. În România, principalele măsuri luate de autorități, în această perioadă de pandemie, au constat în restricționarea circulației persoanelor și închiderea unor sectoare de activitate.

## Revizuirea literaturii de specialitate

Rolul statului în economie a reprezentat de-a lungul timpului un subiect de controversă între economiști, motiv pentru care întâlnim în literatura de specialitate foarte multe studii care abordează acest subiect, atât la nivel internațional (cele mai actuale: [1, 2, 4, 6]), cât și național (cele mai actuale, fiind [3, 9, 10]).

Dacă unii autori sunt adepții statului neutru, alții, dimpotrivă, susțin statul intervenționist, cu implicări puternice în viața economică și socială. Astfel, în secolul XVIII și în prima jumătate a secolului XIX, școala economică de gândire „clasică”, reprezentată de A. Smith, J. B. Say, D. Ricardo, J. St. Mill etc., susține liberalismul economic și neimplicarea statului în economie, concepție reluată și dezvoltată în anii 1970 de către economiștii „neoliberali”, precum M. Friedman, Th. Sargent, A. Laffer, care au susținut și dovedit că intervențiile statului destabilizează economia și au pledat pentru „statul minimal”. Gândirea economică „neoclastică” de la sfârșitul secolului XIX și începutul secolului XX, reprezentată de S. Jevons, A. Marshall, A. Pigou, C. Menger, E. Böhm-Bawerk, F. Wiese, L. Walras și V. Pareto, a acceptat, în general, creșterea rolului economic al statului [5].

Mai nou, unii autori și-au îndreptat atenția asupra impactului pe care îl are noua pandemie Covid-19 în rolul implicării statului în economie [8].

## Metodologia cercetării

**Obiectivul cercetării** constă în identificarea principalelor modificări socio-economice apărute la nivel internațional, dar și național, cu ocazia apariției și răspândirii Covid-19 și evidențierea rolului organismelor internaționale abilitate, dar și a statului în lupta cu această pandemie.

**Metoda de cercetare** este observația neparticipativă. **Sursa de date** o constituie informațiile publicate de organismele naționale și internaționale autorizate, dar și literatura de specialitate.

**Rezultatele cercetării** urmăresc evidențierea impactului asupra vieții economico-sociale a măsurilor luate de către organismele abilitate până în acest moment, atât la nivel mondial, cât și național, în lupta cu actuala pandemie Covid-19.

Ca **direcții viitoare de cercetare** se pot menționa urmărirea și analiza evoluției și impactului noului virus asupra economiei, cu evidențierea măsurilor luate în vederea înlăturării efectelor negative generate, stopării acestei pandemii, dar și prevenirii reapariției acesteia.

### Rolul statului în economie în contextul stării de pandemie

Dezvoltarea științei economice coroborată cu transformările apărute în funcționarea economiei de piață, dar și cu celelalte evenimente marcante ale secolului XX au condus la redefinirea rolului statului. În primul rând, în a doua jumătate a secolului XIX, însuși rolul „statului-jandarm” a crescut și au fost adoptate primele legi anti-trust (SUA, 1890 și 1914), iar, pe de altă parte, la sfârșitul secolului XIX, unii lideri politici din țările occidentale au luat o serie de măsuri care au introdus conceptul responsabilității statului pentru bunăstarea populației, conform căruia guvernul acționează asupra mecanismelor pieței cu scopul de a-i proteja pe cetățeni de evenimente neprevăzute și, totodată, pentru a le asigura un nivel minim de trai [5].

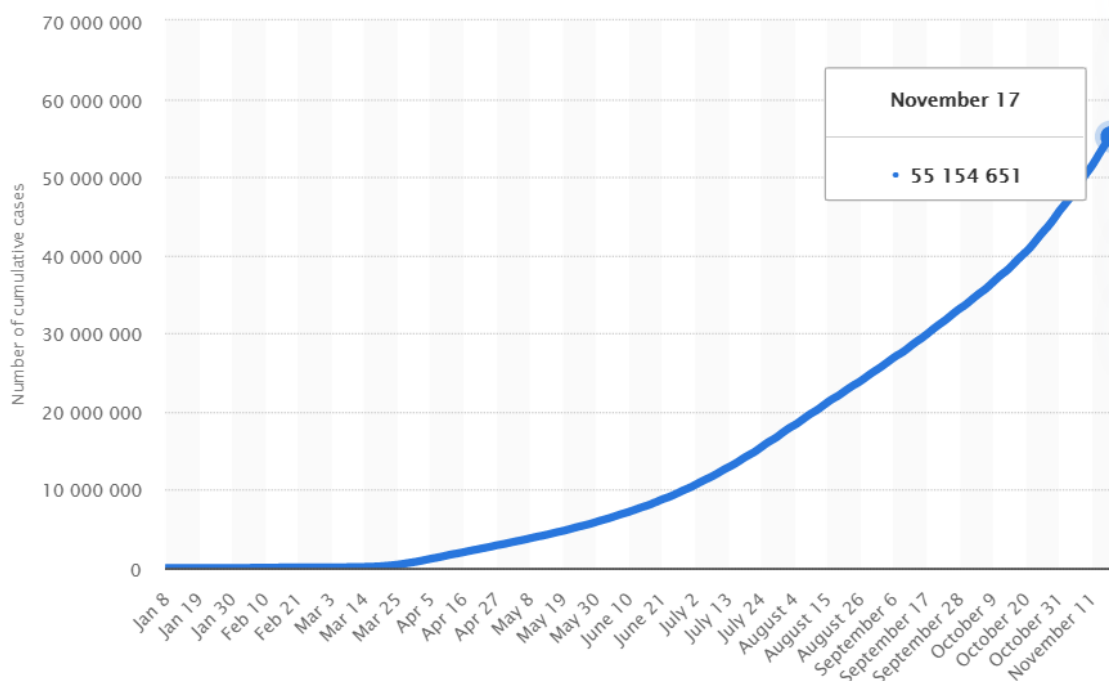
În prezent, cerințele pentru intervenția statului sunt variate și vin din partea diferitelor categorii economico-sociale.

Astfel, dacă cetățenii-consumatori solicită statului să îi protejeze împotriva unor evenimente, considerate fatalități în trecut, cum ar fi catastrofe naturale, schimbări climatice, epidemii etc., dar și împotriva noilor riscuri cauzate de dezvoltarea industrială, precum poluarea, contaminarea alimentelor, efectul de seră etc., producătorii privați pretind ca statul să le asigure viitorul prin reducerea incertitudinilor, respectiv, să fie un „stat strateg”, care trebuie să coordoneze și să sprijine inițiativele private pe diverse căi, precum ar fi: crearea unor rețele de întreprinzători, subvenționarea unor programe de cercetare-dezvoltare ș.a.m.d. [5].

În contextul noii epidemii Covid-19, mulți specialiști urmăresc cu atenție rolul statului în economie, care se pare că s-a amplificat.

Astfel, autoritățile statului sunt responsabile de luarea unor decizii importante prin care se urmărește stoparea răspândirii virusului, dar și înlăturarea efectelor negative generate de acesta, atât la nivel de întreprindere, cât și la nivelul economiei naționale.

Din păcate, evoluția infectării cu noul virus la nivel mondial este una spectaculoasă (de la 59 de cazuri pe data de 08 ianuarie 2020 la 55.154.651 de cazuri pe date de 17 noiembrie 2020), aspect care se observă și în figura 1 [13].



**Figura 1.** Numărul de cazuri cumulative de Covid-19 la nivel mondial în perioada 8 ianuarie - 17 noiembrie 2020.

Extinderea acestui virus cu o viteză uimitoare în întreaga lume a determinat luarea unor măsuri urgente pentru a putea gestiona criza medicală, iar acestea au condus la tulburări pe piețele financiare, cu consecințe grave asupra multor sectoare de activitate din economiile multor țări. Dacă unii autori [12] au sesizat principalele probleme generate de acest virus (întârzieri sau întreruperi tot mai mari în aprovizionare, fluctuații importante ale tarifelor resurselor, scăderea semnificativă a consumului la nivel mondial, diminuarea sau sistarea activității din turism și transporturi), care reprezintă elemente de natură să genereze perspectivele unei potențiale crize, nici previziunile la nivel mondial nu sunt deloc optimiste.

La nivel european, pentru a atenua efectele negative ale acestei pandemii asupra nivelului de trai al populației și asupra economiei, Comisia Europeană a adoptat un set amplu de măsuri economice, a flexibilizat la maximum normele bugetare europene, și-a revizuit normele privind ajutoarele de stat și a instituit Inițiativa pentru investiții ca reacție la coronavirus, în valoare de 37 de miliarde euro [7]. Și la nivel național s-au adoptat decizii pentru a evita oprirea brutală a economiei. Principala măsură adoptată a fost cea de a limita libertatea piețelor.

Conform unor autori [8], tentația guvernelor de a îngreuna libertatea piețelor ca urmare a unei recesiuni severe are două mari determinații, și anume:

- una este aceea că guvernele trebuie să arate că „fac ceva”, pentru a-și dovedi „utilitatea”;
- celălalt motiv este dat de tipul de raționalism practicat predominant în știința economică pe care guvernele își fundamentează politicile economice, respectiv: cel al *ordinii spontane și cel „constructivist”*.

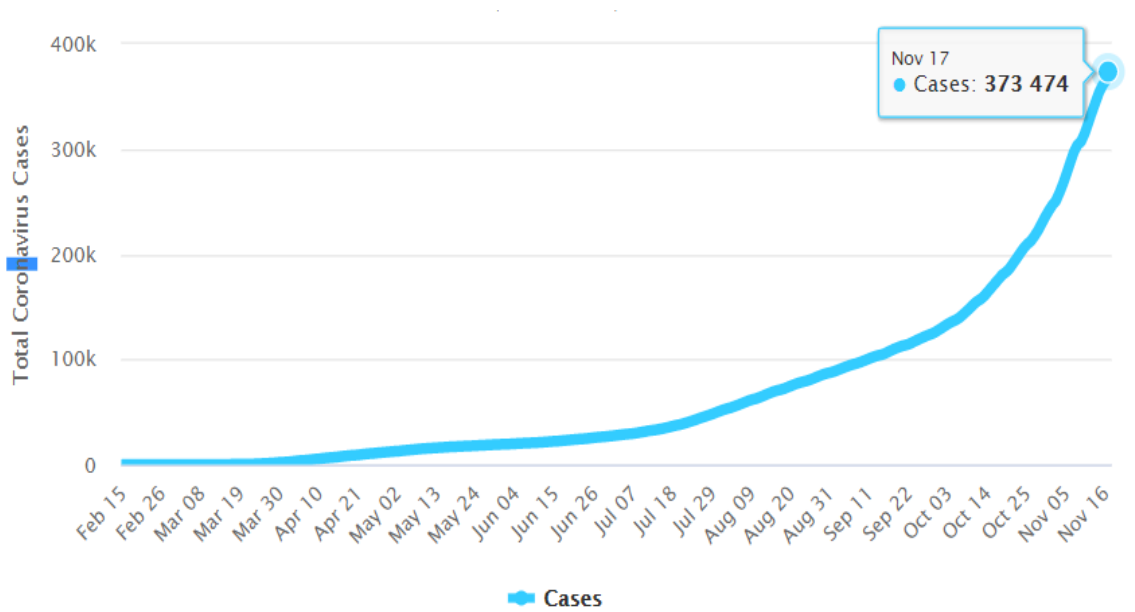
Și România se numără printre țările care sunt afectate de acest nou virus. Dacă pe 15 februarie nu era niciun caz de infectare cu Covid-19, pe 17 noiembrie, numărul cazurilor a ajuns la 373.474, conform figurii 2 [14].

Principalele măsuri adoptate de autorități pentru stoparea răspândirii pandemiei au fost, așa cum am mai precizat, de restricție a circulației persoanelor și de închidere a unor sectoare de activitate prin declararea stării de urgență sau a stării de alertă prin emiterea mai multor ordonanțe de urgență. Acest lucru a avut consecințe grave atât pentru anumite categorii de persoane, cât și pentru multe întreprinderi. Astfel, mulți salariați și-au pierdut locul de muncă sau au intrat în șomaj tehnic (pe data de 11 mai 2020 erau 337.593 contracte individuale de muncă încetate și 908.346 contracte individuale de muncă suspendate, iar pe data de 15 mai 2020 erau 634.709 contracte individuale de muncă încetate și 362.520 contracte individuale de muncă suspendate) [11].

Din categoria întreprinderilor, cele mai afectate sunt cele mici și mijlocii. Acestea au fost nevoite să-și reducă activitatea cu peste **50%** sau chiar să și-o închidă. Dintre cele mai afectate sectoare de activitate sunt **turismul, hotelurile, restaurantele, cateringul (HORECA)**, transportul de persoane, iar într-o oarecare măsură producția industrială, și o parte din servicii.

Cu toate acestea sunt și întreprinderi sau sectoare de activitate care nu au fost afectate. Astfel, companiile care folosesc tehnologia informațiilor și comunicațiilor (TIC), serviciile de retail și curierat, comerțul cu bunuri alimentare nu au suferit în această perioadă; ba mai mult, o parte dintre acestea au înregistrat o creștere a activității în această perioadă.

Un alt efect negativ al acestei pandemii îl constituie afectarea bugetului de stat, atât din punct de vedere al diminuării veniturilor (prin reducerea sau chiar închiderea activității economice a întreprinderilor se va ajunge la o scădere a veniturilor populației și creșterea șomajului, care vor afecta negativ sumele colectate sub formă de impozite și taxe), cât și din punct de vedere al sporirii unor categorii de cheltuieli (creșterea considerabilă a cheltuielilor cu asistența socială și cu serviciile de sănătate publică).



**Figura 2.** Numărul de cazuri cumulative de Covid-19 în România în perioada 15 februarie - 17 noiembrie 2020.

Această situație are ca efect reducerea investițiilor de stat și a altor cheltuieli menite să susțină economia națională, motiv pentru care se impune o rectificare a bugetelor publice astfel încât să se poată evita un blocaj financiar la nivelul autorităților, în perioada următoare.

Dar nu toate deciziile luate de autoritățile publice au avut efecte negative. Unele măsuri, precum alocarea sumei de 6,9 miliarde de lei pentru cheltuieli sociale și 3 miliarde de lei pentru fondul de rezervă de urgență, sprijinirea întreprinderilor printr-un pachet de măsuri (de exemplu, șomajul tehnic și Fondul de intervenție de 15 miliarde lei pentru a oferi garanții IMM-urilor pentru contractarea de împrumuturi pentru finanțarea investițiilor, accelerarea rambursărilor TVA, suspendarea sau neînceperea executării silite a sumelor datorate bugetului de stat, precum și adoptarea altor facilități fiscale) sunt considerate o „oază de speranță” pentru cei afectați de această pandemie.

### Concluzii

Rolul statului în economie diferă de la o țară la alta și a cunoscut modificări în timp, iar cerințele pentru intervenția acestuia sunt destul de variate și vin din partea unor categorii economico-sociale neomogene.

Așa cum am observat și în acest studiu, intervenția statului în economie în stare de pandemie este mai pregnantă, iar măsurile luate au uneori și o serie de consecințe mai puțin plăcute. Pentru a se putea ține sub control pandemia generată de noul virus Covid-19 și pentru a se evita un blocaj economic, care să conducă la o nouă criză s-au luat deja o serie de măsuri, atât la nivel național, cât și internațional, dar este nevoie în continuare de o colaborare eficientă a organismelor internaționale, companiilor, specialiștilor și autorităților.

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## ADVANCING SUSTAINABLE DEVELOPMENT THROUGH ENVIRONMENTAL COMMITMENT OF APPAREL PRODUCERS

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**Abstract.** The sustainability of the enterprise seen in contemporary society is based on the assumption that the economy and the environment must be reconciled and connected through a new and complex approach. In a similar perspective, this article reflects the activity of apparel producers from the Republic of Moldova, mainly oriented towards foreign markets. Thus, the development models of apparel producers must focus on the integration of environmental aspects, based on sustainable growth. In this article, the authors propose to empower producers to adopt the environmental commitment by establishing environmental policy and strategies within an environmental management system. Therefore, these commitments should among the priorities of long-term development business strategies to ensure increased efficiency, nature protection and the achievement of sustainability goals. Environmental actions are essential in creating the image of a responsible producer concerned with the quality of life of future generations.

**Key words:** *sustainability, wearing apparel manufacturers, environment, European Union, environmental management system, corporate ecology, policy, commitment, global competitiveness.*

**Rezumat.** Sustenabilitatea întreprinderii privată în societatea contemporană este fundamentată pe asumția că economia și mediul trebuie reconciliate și unite printr-o abordare nouă și complexă. Într-o abordare similară, în prezentul articol se reflectă activitatea întreprinderilor de fabricare a articolelor de îmbrăcăminte din Republica Moldova orientate preponderent spre piețele externe. În consecință, modelele de dezvoltare a întreprinderilor de confecții trebuie focusate pe integrarea aspectelor de mediu în afacerile realizate, bazat pe creșterea sustenabilă. În prezentul articol autorii propun responsabilizarea producătorilor prin asumarea angajamentului de mediu prin stabilirea politicilor și strategiilor de protecție a mediului și aplicarea acestora în cadrul unui sistem de management al mediului. Prin urmare, aceste angajamente trebuie să se regăsească printre prioritățile strategiilor de dezvoltare pe termen lung astfel încât să se asigure creșterea eficienței, protejarea naturii și îndeplinirea dezideratelor de sustenabilitate. Acțiunile ecologiste sunt esențiale în crearea imaginii de producător responsabil preocupat de calitatea vieții generațiilor viitoare.

**Cuvinte-cheie:** *sustenabilitatea, întreprinderile de fabricare a articolelor de îmbrăcăminte, mediul înconjurător, Uniunea Europeană, sistem de management de mediu, ecologismul corporatist, politica, angajamentul, competitivitatea globală.*

## Introduction

Today, we live in a society that increasingly questions the sustainability of its own models – economic and social. The sustainability of the enterprise seen in contemporary society admits that corporate growth and economic efficiency are important, but they require adaptation to the objectives of sustainable development - environmental protection.

The theme of sustainability and sustainable development have become increasingly relevant because of the following reasons [1 - 2]:

- population growth, urbanization and urban pollution;
- the increase of industrialization, which is the cause of the deficit of essential resources, generating a negative impact on the natural environment and social changes. The increase of industrialization is caused both by the increasing demand to meet the needs of a growing population, as well as the increasing needs for consumption;
- the development of middle classes with high levels of consumption;
- the phenomena of global warming and climate change generated by the increase of pollution levels (especially greenhouse gas emissions), which lead to an increase in the number and frequency of natural disasters, and to health and adaptation problems of the population.

The industrial production has a direct impact on the environment. Increased production leads to increased energy, water and raw materials consumption, generating higher levels of waste and pollution of soil, water and air, which in combination with the use of high-risk materials cause negative effects on the health of the population and limit people's and other species' access to clean water, thus presenting a threat for the biodiversity.

Apparel manufacturing in the Republic of Moldova registers an annual increase in the value of manufactured production. Over 70% of the manufactured production is intended for foreign markets, which impose their own requirements on their business partners. Some of these requirements imply the conceptualization and the implementation of the technological processes for apparel manufacturing in compliance with all laws, regulations, and environmental standards, including those related to waste coming from production facilities. In addition, apparel producers must act in a socially and environmentally responsible manner and show due diligence in their activities to avoid adverse effects on the environment, people, and protect the brand and reputation of the foreign client.

Foreign clients encourage their partner apparel manufacturers from the Republic of Moldova to make ongoing efforts in ensuring optimizations for sustainability and commit to environmental protection, while complying with such requirements as:

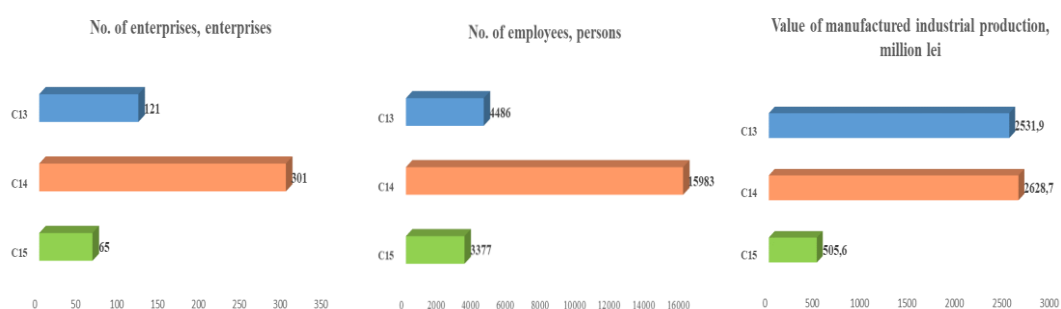
- having a valid environmental permit;
- holding and displaying the environmental policy to address the environmental impact;
- monitoring the impact of the apparel manufacturer's economic activity on the environment;
- setting and approving objectives on environmental issues related to reduction in water consumption and waste disposal, as well as energy consumption and GHG emissions - greenhouse gases;
- providing recycling waste opportunities and monitoring the amount of recycled waste.

All the above requirements have urged Moldovan manufacturers to look for cost-effective methods to improve the industrial waste management and energy efficiency and minimize energy consumption and greenhouse gas emissions.

Therefore, the basic purpose of the article is to address systemic solutions to help the management of the Moldovan apparel manufacturers to capitalize on their commitment towards the environment and generate credible evidence of compliance with all environmental laws, regulations, standards and due diligence requirements pursuing partnerships with famous clothing brand owners.

### 1. Analysis of the Moldovan apparel manufacturers' economic activity

In the Republic of Moldova, the economic activity "Apparel manufacturing" is a component part of the light industry sector. The light industry comprises three economic activities as follows: C13 Manufacture of textile, C14 Manufacture of wearing apparel and C15 Tanning and dressing of leather; manufacture of travel and leather goods, harness and footwear; preparation and dyeing of furs.



**Figure 1.** The structure of the light industry sector of the Republic of Moldova in 2019.

Source: developed by the authors based on the data extracted from the National Bureau of Statistics of the Republic of Moldova [www.statistica.md](http://www.statistica.md)

The information presented in figure no.1 shows that in 2019 the activity C14 obtained the largest share in the light industry sector. This can be explained by the fact that the largest number of enterprises, and namely 301, were concentrated in this activity, employing an average number of 15,983 workers, and manufacturing a production volume worth 2628.7 million lei. In the next stage of the analysis we will proceed to the detailed synthesis of the activity of apparel manufacturers during the years 2014 - 2019. For this purpose, we generated the statistical data compiled in table no. 1. According to the data presented in table no. 1, the interest in manufacture of wearing apparel has registered an ascending increase within the last 6 years (the period between 2014-2019). Thus, we observe an increase in the value of manufactured industrial production during 2014-2019, from 1765.9 million lei in 2014 to 2628.7 million lei in 2019. The indices of the volume of industrial production show the same results, except for 2019, when the manufacture of wearing apparel registered a decrease of 6.5 percentage points compared to the previous year.

Table 1

#### The main indicators of the economic activity C14 Manufacture of wearing apparel

Indicator	2014	2015	2016	2017	2018	2019
1. Value of the manufactured industrial production, million lei	1765.9	1973.3	2257.2	2528.4	2653.4	2628.7
2. Indices of industrial production volume, % previous year=100	110.3	119.9	115.1	102.3	102.1	93.5
3. Indices of industrial production volume, % year 2010=100	131.2	158.4	182.8	186.2	189.5	176.4

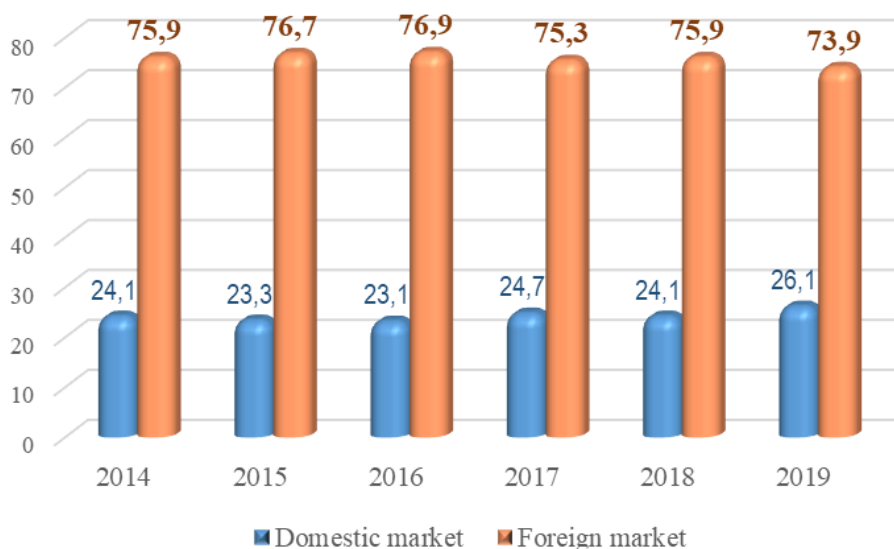
Continuation Table 1

4. The share (structure) of industrial production, %	4.1	4.3	4.7	4.8	4.7	4.4
5. Number of enterprises and production units, enterprises	240	253	255	267	285	301
6. Average number of employees, persons	13,933	14,405	14,802	16,004	15,795	15,983

Source: processed by the authors based on the data extracted from the National Bureau of Statistics of the Republic of Moldova [www.statistica.md](http://www.statistica.md)

The economic activity C14 has a share of about 5% in the structure of industrial production. The increase registered was also generated by the increase in the number of enterprises from 240 in 2014 to 301 in 2019, which led to an increase in the average number of employees that amounted nearly 16,000 people in 2019.

Over 70% of the total value of the manufactured industrial production in the Republic of Moldova is export-oriented, as presented in the figure no. 2.



**Figure 2.** The structure of apparel markets, in %.

Source: developed by the authors based on the data extracted from the National Bureau of Statistics of the Republic of Moldova [www.statistica.md](http://www.statistica.md)

The evolution of the market structure presented in figure no. 2 attests the business models adopted by apparel manufacturers within this activity, which are based on several international collaboration practices: CM, CMT, FOB, Private Label and Own Label:

- The inward processing customs regime "Cut & Make" (CM) or "lohn" is a system that includes the production cycle: tailoring, sewing, moisture treatment and packaging.
- "Cut, Make & Trim" (CMT) or "semilohn" is a more advanced system, which includes the production cycle, plus the supply of accessories and packaging (buttons, thread, cardboard boxes, labels, bags, plastic etc.).
- „Free on Board" (FOB) customs regime is when the foreign customer comes with the sample and places the order, while the goods are shipped by the manufacturer to the destination indicated by the client. In many cases, the customer indicates where the raw materials and accessories can be purchased from, and sometimes negotiates prices on behalf of the manufacturer.
- "Private Label" is the next stage, which involves the actual production, supply of raw materials, design, and the development of patterns.

- "Own Label" is the stage when the company decides to carry out the production cycle, from product design up to the development, production, promotion, development of its own brand, marketing, sales, etc.

The manufactured production is exported mainly to countries from the European Union, including Italy, Germany, France, Belgium, Bulgaria, and Austria. This orientation also calls for Moldovan apparel manufacturers to align their production systems to the sustainable growth models adopted by the European Community. The development of ecological technologies is one of the main competitive advantages of the European Union, which demonstrates the relevance of researching the promotion of Moldovan apparel manufacturers' sustainable development.

## 2. The topicality of industrial ecology

The local apparel manufacturers' desire to establish partnerships with the European Union calls for special attention and concern for the environment for several reasons:

- *The requirement of the foreign client*, who places the order for processing the raw material to obtain the clothing articles. In the Republic of Moldova, there are already registered practices for the client to conduct the audit at his supplier, even before signing the cooperation agreements, both initial and subsequent. However, the process of signing the agreement is preceded by an assessment based on well-defined criteria, which contain a separate section on the assessment of the environmental commitment and the actions taken in this regard. Many apparel manufacturers miss the opportunity to work with a foreign partner due to a lack of evidence of compliance with environmental legal requirements, both local and regional.
- *The legal requirement* – all apparel manufacturers are required to complete the Environmental Authorization from stationary sources of pollution, which is issued by the Public Services Agency of the Republic of Moldova for a period of 5 years. In the most common cases, the impact of economic activity on air pollution includes stationary sources resulting from boiler operation and mobile sources, which include vehicle transport. A better implementation of the environmental legislation and policies at the national level will help ensure a stable regulatory framework for manufacturers.
- *The Environmental Strategy* for the period 2014-2023, approved by Government Decision no. 301 as of April 24, 2014. This is one of the most important policy documents in the field of environmental protection, which establishes the priority development directions in this field. The main goal of the strategy is to guarantee the population of the Republic of Moldova the right to a sustainable unpolluted and healthy environment, in alignment with economic development and social welfare. The general objective is to create an efficient environmental management system, which will contribute to the improvement of the quality of environmental factors and will ensure a clean, healthy, and sustainable natural environment for the population [3].
- *The manifestation of the concern for the future generations* - the economic, financial, and sanitary crises encountered by the apparel manufacturers from the Republic of Moldova confirm the fact that the production systems are not sustainable. The linear economic model - the transformation of raw materials into products that are used, consumed, and then discarded - generates not only accumulations of pollutants and waste, but also a global competition for natural resources. If the current trends continue, regardless of country and income level, future generations will be more

likely to face extreme temperatures and weather events, leading to a decline in the number of species, a growing deficit of resources and more intense pollution.

- *Integration of the Republic of Moldova in the European Union* - the political vector of the Republic of Moldova's integration in the European Union imposed the alignment of the national legislation to the provisions of the European Union directives and the insurance of the sustainable development of the country by promoting the green economy. The "Environment" chapter of the Association Agreement provides concrete commitments and activities of the Government of the Republic of Moldova in the field of environmental protection, such as - the promotion of green economic development and eco-innovations.
- *Low environmental awareness* by the management of apparel manufacturers. Considering the above-mentioned facts about the compliance with environmental legislation and the approval of the Environmental Strategy, the Republic of Moldova has many reservations in terms of environmental awareness, both economically and socially. In this context, the apparel manufacturing management should demonstrate a deep understanding of the complexity of the environmental issues and their consequences, which will allow them to take more conscious decisions, improve their ecological intelligence and promote environmental policies within the society.

To sum up the above, the environmental issue can no longer be addressed separately from the manufacturer's economic issues. Global competitiveness and the increasing use of limited resources are leading to considerable economic change. The policy of the European economy strives towards transformations to produce more with less resources. That is why the sustainable development of enterprises is tightly linked to a responsible environmental management. This calls for regulations, incentives, and public procurement policies, which will promote production and consumption patterns that are compatible with the country's sustainable ecological development [4, p. 116].

### **3. Sustainable development of apparel producers**

The concept of sustainable development with focus on our common future was launched during the presentation of the well-known "Brundtland Report" by the World Commission on Environment and Development. According to the report, sustainable development is the type of is a means of development that meets the needs of the present without compromising the ability of future generations to meet their own needs

A sustainable society is one where economic growth is compatible with planetary boundaries and fairly distributed among its citizens. Sustainable development is not a new concept for the contemporary society, who has broadly discussed it on the international stage in 1987.

As result of the growing importance and exacerbation of sustainable development issues, in 2000, in Friibergh (Sweden), was adopted the Statement on Sustainability Science, which aims to substantially improve the "interactions between nature and society", taking into account the unsustainable development path undertaken by the humanity in recent decades, as well as the need to reconcile the goals of social evolution with the long-term ecological limits of the planet, paying special attention to the way environmental changes affect society [5]. In September 2015, UN members reaffirmed that sustainable development is the way forward for both developed and developing countries.

Sustainability addresses the complexity, time gaps between economic and social actions and their consequences, the development of specific theories and semi-quantitative models, and the performance on three coordinates [6, p. 472]:

- 1) *On the economic level*: increasing the degree of resource harnessing and eliminating the loss of renewable resources.
- 2) *On the ecological level*: avoiding environmental degradation.
- 3) *On the socio-cultural plan*: ensuring living conditions and human achievement.

On the ecological level, the state of the environment in the Republic of Moldova has worsened in the last decade in terms of CO<sub>2</sub> emissions, drinking water quality and firewood consumption. The Government of the Republic of Moldova has identified climate change as a national priority and is approaching it from the perspective of gas emissions, as well as adaptation to climate change and risk management related to climate change. In this sense, the Government approved the Environmental Strategy for 2014-2023, which aims to integrate the principles of environmental protection and sustainable development, the development of the green economy and the adaptation to climate change in all sectors of the national economy [3].

The natural environment represents one of the basic elements of the national and international business environment. Insufficient resources and the phenomena generated by global climate changes call for manufacturers to pay special attention to the natural environment, to protect it and use it as responsibly and efficiently as possible.

The natural environment includes geographical and ecological factors that influence the economic activity. The company and its entire economic activity are part of its environment, the company being obliged to comply with environmental requirements.

The global pressure and environmental sustainability are forcing manufacturers to reconsider their business models. Consumers in both industrialized and developing countries have become aware of the importance of protecting the environment and are shifting towards environmentally friendly products and services. Some companies are pioneering sustainable innovation in the products and services they offer within their business, while others are adapting along the way. In any case, "green" products and services are benefitting from competitive advantages in the fight against competing products and services [7, p. 338].

The general objective of sustainable development is to find an optimal interaction between the four systems: economic, human, environmental, and technological, which are in a dynamic and flexible process of operation, to achieve the objectives. Under these conditions, achieving the goal of sustainable development requires major changes in economic and environmental policies, which will lead to a reduction in resource consumption per unit of useful effect [4].

Sustainability is a phenomenon that manifests itself as a result of the relationship generated by the economic and ecological systems, whereas human life can continue indefinitely as individuals prosper and human species develop with human activities staying within the limits, so as to avoid the destruction of the diversity, complexity and function of the environmental support system. Now, human society operates on the principle of indebtedness to future generations in terms of consumption and effects on the natural and global environment (including financial).

The sustainability process is based on the following components [7, p. 376 - 377]:

- 1) *Connectivity* – involves the existence of interdependent relationships between ecology, social structure, and economy. Sustainability is what can provide opportunities for growth by ensuring equitable access to resources and protection of the environment, universal health, and reproductive care.
- 2) *Equity* – highlights the need to develop a fair relationship between generations and species. From this point of view, sustainability is the result of respect for other individuals and even for life.
- 3) *Security* – supports the need to minimize threats and protects against destructive effects. Security actions are aimed at ensuring the health of the social system and natural capital.



As the main actors of the business environment, companies must ensure together with the decision-making forums the climate of a good collaboration to use the natural resources efficiently and productively, to generate the necessary conditions for humanity. Ensuring good living conditions highly depends on the companies' level of participation, accountability, reciprocity, and transparency, including the fulfillment of basic criteria.

- 4) *Prudence* – emphasizes the requirement to concentrate all efforts to maintain a sustainable planet. This component shows how necessary it is to develop a strategy to maintain the planet as a safe area for all living creatures.
- 5) *Inclusion* – aims for human development in time and space. It refers to global environmental changes, determined by anthropogenic factors influenced by changes in population structure, economic growth or development, technological changes, political and economic organizations, mentality, and behaviors of all actors.

Apparel manufacturers must make a commitment towards future generations to pay special attention to the environment, in each phase of their activity [8].

The level of effort that each apparel manufacturer is willing to invest in sustainable development is highly dependent on the amount of benefits they can receive. They pursue advantages such as: brand consolidation, cost reductions or better risk management. In addition, most international apparel manufacturers are starting to prioritize social and environmental issues over traditional competitive advantages, including price or quality of services [9].

#### **4. Proposed environmental protection policies and strategies**

The apparel manufacturer's ability to achieve real sustainability depends on its environmental and social sensitivity. In other words, producers need to become eco-centric first and then focus on sustainability, all of which require a lot of effort and time. Environmental protection policies and strategies call for the involvement of top management representatives, who need to go beyond compliance and efficiency to avoid risks and minimize costs [10].

Many corporations list environmental protection activities as a priority for the long-term development strategy of their companies, ensuring increased efficiency, protection of nature and fulfillment of sustainability goals [5].

The ecological behavior of apparel manufacturers implies the integration of environmental issues in the strategic management process or in the environmental strategy [11].

In this context, we propose a set of environmental policies and strategies that can be effectively adopted and implemented by apparel manufacturers, such as:

- *Introducing corporate ecology* in the organizational culture. Corporate environmentalism is the process by which companies will address environmental issues and develop appropriate strategies to overcome them. Constant care for the conservation and protection of the natural environment improves the image of the manufacturer and facilitates the establishment of close relationships with customers and suppliers. This strategy is part of the company's identity, which shapes and strengthens the relationship between the company and the representatives of all stakeholders.
- *Carrying out the environmental impact assessment* of the apparel manufacturing activity. Environmental impact assessment is a tool to ensure the prevention or minimization of possible significant effects on the environment that may occur as a result of the development of the apparel manufacturers' industrial activities. It is recommended to determine the environmental aspects of its activities, the products and services that it can control and influence, as well as the associated environmental impacts, from the perspective of the product life cycle [12].

- *Assuming the environmental commitment* by approving the company's Environmental Policy. Environmental policy is a statement made by the company's top management that confirms the management's commitment to protect the environment, including pollution prevention and other commitments relevant to the business, which will strengthen the company's value. The formalization of the environmental policy will be a strong first step in ensuring the sustainable development of the enterprise [13].
- *Developing and approving environmental strategies* - which refer to the discovery, the implementation and the adoption of environmentally friendly technologies that are less harmful for the environment, the launch of environmentally friendly products, the creation of facilities to reduce waste and pollution, and the recognition of the environmental impact of the enterprise. The corporate environmental strategy is approached in three fundamental stages: pollution prevention, product management and sustainable development [7, p. 382].
- *Integrating environmental strategies in the strategic management process* – some activities supporting the reduction of the negative impact on the environment require additional investments in the modernization of technological equipment, as well as the implementation of good waste management practices. In this context, we consider important to include environmental objectives with the reservation of the necessary resources in documents outlining strategies, to ensure their good implementation and therefore the improvement of the environmental performance.

A reasonable solution, which would integrate the proposed policies and strategies would be to apply an environmental management system (EMS) based on ISO 14000 standards.

ISO 14001:2015 - the international standard for the design and implementation of an EMS, internationally recognized and accepted by most countries around the world provides a framework and guidelines for the creation and implementation of the EMS. The standard specifies the requirements for an organization to increase its environmental performance and manage its environmental responsibilities in a systematic manner that contributes to the environmental pillar of sustainability [14].

An environmental management system - consists of policies, processes, plans, practices and monitoring that define the rules governing the interaction of the enterprise with the environment.

Moldovan apparel manufacturers implementing EMS benefit from the following advantages [15]:

- a reduction in their "footprint" on the environment;
- better relationships with customers, the public and the community;
- the development of new business opportunities on markets where organic production processes are important;
- a reduction in production costs;
- a competitive advantage in social and environmental aspects;
- an improved image and increased credibility;
- the spread of an environmentally- responsible culture among their employees.

The application of the recommendations proposed in this article will ensure a sustainable competitive advantage for apparel manufacturing companies in the Republic of Moldova, which can be maintained for a long time. The competitive, sustainable advantage will enhance the sustainability, increasing the value of the enterprise, provided that it becomes an integral part of the overall sustainable strategy of the enterprise.

## Conclusions

The implementation of the sustainable strategies proposed in the article will contribute substantially to future challenges. It provides a comprehensive approach to the environment, laying the groundwork for a greener and more competitive economy that protects natural resources and the health of present and future generations. The article analyzed the priorities aimed at protecting the ecosystems of apparel manufacturers in the Republic of Moldova.

The analysis performed allowed the conclusion of the following remarks:

- apparel companies have a major share in the light industry sector of the Republic of Moldova, registering an upward growth during 2014 - 2019;
- the shift towards exports on foreign markets requires the adoption of a new model of economic development that fully integrates sustainability in all the strategies and operations conducted by the apparel companies;
- the sustainable development of apparel manufacturers is closely linked to the responsible management of the environment, which implies the reconsideration and transformation of the business models adopted;
- the company's focus on the environment, in each phase of its activity, must become a commitment for future generations;
- consumers have become aware of the importance of protecting the environment and are reorienting towards environmentally friendly products and services;
- the purchase of an item of clothing is an investment in the brand of the apparel manufacturer, and the investment that the consumer makes in a responsible brand allows the company that owns it to continue to contribute to sustainable development;
- a good solution for apparel manufacturers would be the implementation of an environmental management system based on the provisions of the ISO 14001: 2015 standard.

Moldovan apparel manufacturers that choose sustainable strategies and practices will obtain value as a result of increased revenues based on new orders from foreign partners, thus reducing costs through eco-efficiency, managing environmental risks and risks arising from strategic environmental strategies. They will also be able to transform intangible assets such as the image and reputation of the brand, and build collaborative networks with customers, competitors, and suppliers, all of which stimulate the process of sustainable development. Green products and technologies have a higher value, while an increased number of consumers favor apparel manufacturers that are implementing sustainable processes. The implementation of the proposals underscored by the authors in this article will ensure that the population of the Republic of Moldova lives in a safe and healthy environment, managed in a way that respects limits and ensures ecological resilience.

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## INFORMATION FLOW REGARDING INVOICES AND OUTSTANDING BENEFICIARIES IN AN “ACCESS” APPLICATION

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**Abstract.** The importance and actuality of the theme are yielded by the increase in the complexity of actions undergone by the economic agents in the context of the development and diversification information instruments aimed at observing the invoice collection pattern and the calculation of work productivity used to manage economic, social and institutional variables in view of fulfilling the organizational objectives. All these evolutions force to re-imagine the strategic role of the information softwares at the organizational level. Together with the human resource they are considered the main competitive advantage modern organizations benefit from. This work consists of the methodology and sequential algorithm to create an information app which can be used to track outstanding invoices by any economic agent. The conclusions drawn from this work emphasize the importance of a proper use of the designed app in the tracking and collection activity in regard to outstanding invoices, generating improvements of the financial flows and turnover increase.

**Keywords:** *data base, decision, information system management, overdue invoices.*

**Rezumat.** Importanța și actualitatea temei sunt cauzate de creșterea nivelului de complexitate a acțiunilor întreprinse de agenții economici în contextul utilizării instrumentelor de informare, dezvoltare și diversificare în ceea ce vizează respectarea tiparului de colectare a facturilor și a calculului productivității muncii. Utilizate pentru gestionarea economică în vederea îndeplinirii obiectivelor organizaționale, aceste variabile sociale și instituționale impun un rol strategic softurilor informaționale la nivel organizațional. Împreună cu resursa umană, acestea sunt considerate principalul avantaj competitiv de care beneficiază organizațiile moderne. Această lucrare abordează metodologia și algoritmi secvențiali pentru a crea o aplicație de informații care poate fi utilizată pentru a urmări facturile restante de către orice agent economic. Concluziile lucrării subliniază importanța utilizării corespunzătoare a aplicației proiectate în activitatea de urmărire și colectare a facturilor restante, generând îmbunătățiri ale fluxurilor financiare și creșterea cifrei de afaceri.

**Cuvinte cheie:** *bază de date, decizie, gestionarea sistemului informațional, facturi restante.*

### Introduction

In the context of present society characterised by an unprecedented information explosion in the history of mankind, the information systems represent one of the fundamental elements, which generate and control the information flows at micro and macroeconomic level.

The theoretical substantiation and the practical examples necessary for the development and use of some database applications, which integrate a lot of new information technologies, impose that the developer or the user of some evolved database systems already know the fundamental aspects of this field: databases, database management systems, relational systems, programming languages, programming techniques. If the expert systems were developed at the beginning in the technical and medical field, we recently witness their extension in the economic field and especially in the financial-banking field [1].

All applications of management information system use the structured information one way or another. Microsoft Visual Basic integrated in Microsoft Access provides us all the necessary instruments for the creation and use of the structured database systems for the management of our own data applications. The logical procedure or the functional unit is the correspondent of the subtask within an application from the computer field. Only at this level the direct transfer from the logical structure of the application to programs can be easily done, which means that a functional unit can be associated with one or more processing units or automatic procedures from the application software. The last situation is necessary especially when also within a processing unit there are more elements of organisational structure involved. In agreement with the opinion of a specialised literature author, I consider that the data represent a crucial organisational resource and have to be managed similar to the management of the important assets of an enterprise [2]. Without data on the internal functioning and on the external environment, the enterprises could not survive or succeed in business. Their volume is unceasingly growing. Their organising and memorising on addressable technical supports (HD, FD, CD-ROM, removable disc) are a lot facilitated by the fact that, we operate mostly with *data structures*. Another solution, dominant at present, consists in organising data in **databases**, defined as a structured set of data registered on supports accessible to the computer in order to simultaneously satisfy more users in a selective manner and in time [3]. Furthermore, this structured set of data contains data structures functionally linked. Databases are unitarily managed through dedicated programs, called database management systems (DBMS).

The database is described independently from the programs that use the data. The description aims at the same time the data structures, the links between them and the rules that assure the data coherence.

The information system objectives at macro level are [4]:

- Supporting the information process, respectively assuring the support for collecting, filtering and conveying the data that characterise the company's activity;
- Supporting the decision-making process, which refers to providing the necessary information for taking decisions in semi-structured or unstructured problems;

A definition closer to the study of information systems considers the system as a set of interrelated components that track a common objective in the process organised to transform the resources into outputs [5]. The study and the research of processes and of economic-social phenomena, characterised through complexity and dynamism, impose the use of system theory, whose object is represented by the research of the surrounding world seen as a set made of subassemblies that strongly interact with each other. The purpose of this research is to identify causal links between economic phenomena and processes in order to substantiate decisions [6].

### **Application design methodology**

Within the current evolution of the economy and society the necessity of the existence of a computer system designed for data organising, for extracting information useful in decision making is needed [7]. Taking into consideration the specialists' position and taking into account the specifics of the activity currently performed, in this chapter we built an excellent computer

system, where the data are presented directly, quickly, synthetically and which allows the executive manager to see and analyse the situation of the outstanding invoices of the enterprise.

Computers and data communication technology alters the parameters for the development of competition in all activity fields. If information technology used to be focused in data storage, nowadays it has to provide a dynamic vision on the organization, facilitating company's adjustment to environment changes and providing its competitiveness. In this way, information technology becomes an extremely efficient competition weapon in achieving the organization's tasks [8].

**Computer application design**

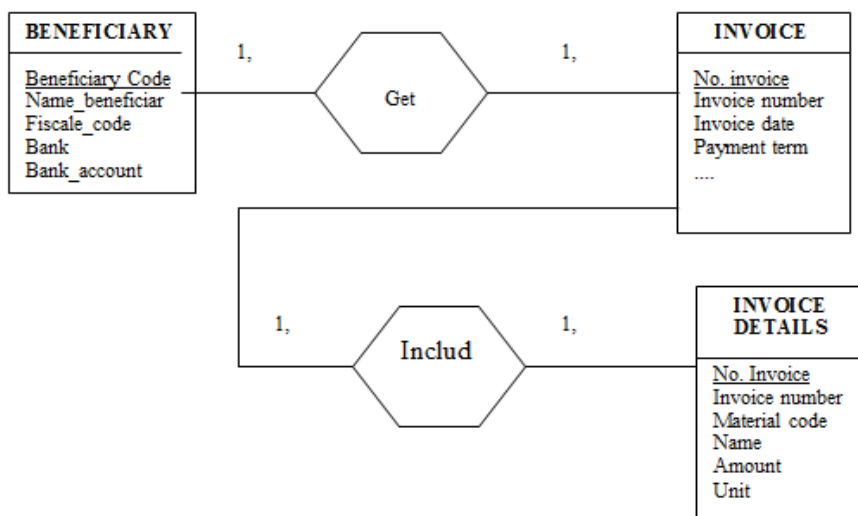
Outstanding invoices tracking application was created using Microsoft Office Access environment. Application tables are: *Beneficiary*, *Invoices*, *Invoice details*, *Delegate*, *Materials*, *Categories*.

Conceptual data modeling for achieving application is shown in Figure 1.

The relational model of data is as follows:

BENEFICIARY(Beneficiary\_code,Name\_beneficiary,Fiscale\_code,Bank, Bank\_account).

INVOICE (Number, Serie1, Serie2, Invoice\_date, Payment\_term, Cashing\_date, Payment\_mode, Number wo accompanying the goods, vat, Beneficiary\_code, Name\_beneficiary, address, city, state, Bank\_account, bank, Fiscale\_code, Delegates from company, delegate Out, Delegate\_code, Delegate\_name, ID, Transport\_ Number, Date\_shipping, Time\_shipping, State document, total payment, comments, date, delegat\_semn\_checked, ex2\_orig\_checked, ex2\_semn\_checked, stamp\_checked, record\_store\_checked).



**Figure 1.** Conceptual data modeling.

INVOICE DETAILS (Invoice\_number, Material\_code, Name, Amount, Unit, Quantity, Product\_price).

CATEGORIES (Category\_code, Category, Coefficient\_added).

MATERIALS (Material\_code, Name, Details, Measurement\_units, Category, Price, Warehouse\_role, last inputs, currency, currency warehouse unit price, unit price recombinant currency).

Corresponding tables relational model are shown in Figure 2.

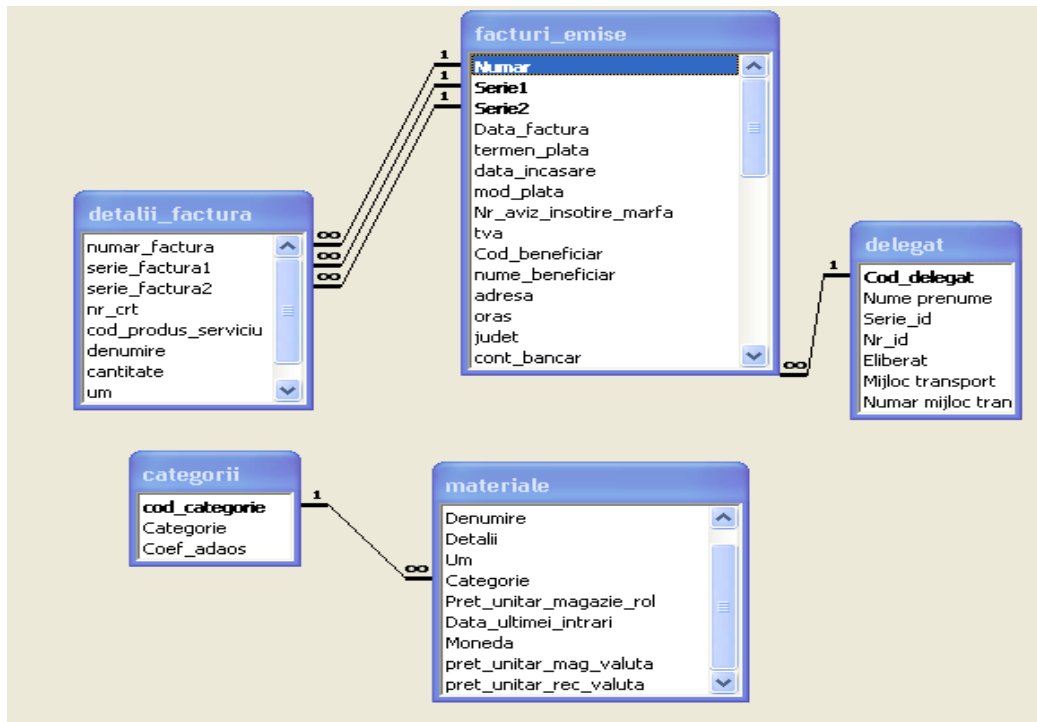


Figure 2. Relationships between database tables created.

Main interface shown in Figure 3, allows access to important database options namely: Add invoices, bills Change, Introduction exchange rate (option Dollar / Euro) output statements (statements), Letters to debtors beneficiaries (recipients addresses).

Box form designed to introduce foreign exchange necessary in pursuing outstanding bills.

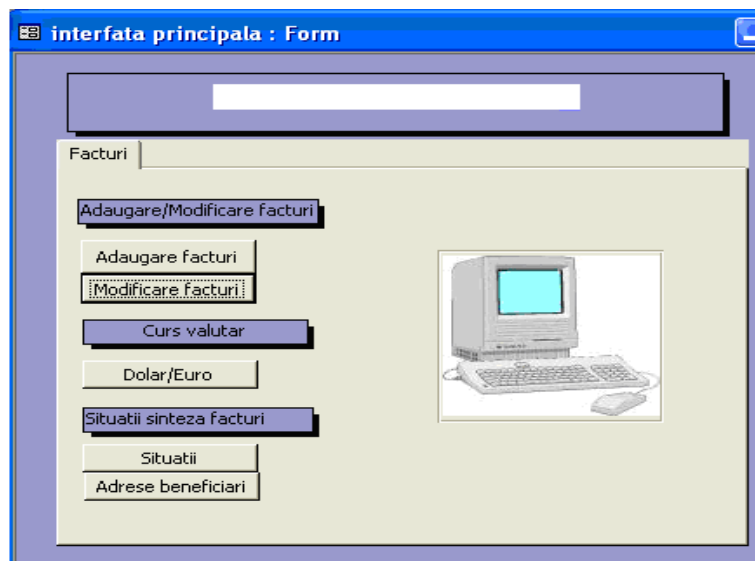


Figure 3. The main interface.

### Invoices form creation

Invoice form is a form that contains a subform complex, combobox box, text boxes, buttons action. We describe all items invoice form. In Figure 4 is shown the section relating to beneficiary selection. Recipient is selected using a combobox type application. After selecting the beneficiary will complete all the fields that are located under selection box buyer.



Serie	CT	Numar	309429	VEB
Selectie cumparator	Petroconst SA			
Nume cumparator				
Nr inregistrare fiscala	R6162290			
Registrul Comertului	J13/3113/1994			
Sediu	IC Bratianu 45			
Oras	Constanta			
Judet	Constanta			
Cont	SV06349861400			
Banca	BRD			
Actualizare modificari		Sterge inregistrare		

Figure 4. Selection box on purchaser.

Event combo box is attached tape after-update and reads:

```
Private Sub Cod_beneficiar_AfterUpdate()
Dim rc As Recordset
Dim baza As Database
Set baza = CurrentDb()
Set rc = baza.OpenRecordset("query1", dbOpenDynaset)
If IsNull(Me!Cod_beneficiar) Then
GoTo sfarsit
End If
rc.FindFirst "cod_beneficiar=" & Me!Cod_beneficiar
If rc.NoMatch = True Then
MsgBox "Eroare de cautare. Beneficiar negasit"
GoTo sfarsit
End If
Me!NUME_BENEFICIAR = rc!NUME_BENEFICIAR
Me!adresa = rc!adresa
Me!oras = rc!oras
Me!judet = rc!judet
Me!cont_bancar = rc!cont_bancar
Me!banca = rc!banca
Me!registrul_comertului = rc!registrul_comertului
Me!cod_fiscal = rc!cod_fiscal
sfarsit:
rc.Close
End Sub
```

Another important element of the form is subform invoice containing materials, the effect of the action, as shown in Table 1.

Table 1

Subform record a bill of materials remaining

	Nr_crt	Cod_produs_servi	Denumire	UM	Cantitat	Pret_prod	Valoarea	Valoare
	1	005E91360	Imprimanta HP 1010	BUC	2	475.00	950.00	228.00
▶	0				0	0.00	0.00	0.00

Subform has fields calculated as follows:

$$\text{Value} = \text{Price} * \text{Quantity} \quad (1)$$

$$\text{Value product VAT} = 24\% * \text{Value} \quad (2)$$

Product code is selected from a list of all available codes. Once the code is complete and the product name and price. Product code field is a combo box and is attached to an event trigger after update after that will use the following code:

```
Set rc = baza.OpenRecordset("materiale", dbOpenDynaset)
rc.FindFirst "cod=" & Me!Cod_produs_serviciu & ""
If rc.NoMatch = True Then
  MsgBox "Eroare de cautare. Produs negasit"
  GoTo sfarsit
End If
valuta = rc!MONEDA
data_calcul_pret = rc!Data_ultimei_intrari
categorie = rc!categorie
pret_magazie = rc!Pret_unitar_magazie_rol
Me!Denumire = rc!Denumire
Me!UM = rc!UM
rc.Close
```

### Module for situations with outstanding invoices

Circumstances module consists of several forms, namely: List\_invoices, summary\_statements, invoices\_search. We describe the List\_invoices form, shown in Figure no. 5.

Numar	Nume beneficiar	Data factura	Total plata	Data incasare
310022	Fundatia Baylor-Marea Neagra	08-Mar-13	798.98	08-Mar-13
309632	Agroalim Distribution	10-Feb-13	19.50	01-Mar-13
309792	Cabinet avocat Cristea Mariana	09-Mar-13	639.07	09-Mar-13
309791	Consulting Engineers Salzgitter 1	09-Mar-13	119.00	09-Mar-13
Total facturat			1576.55	

Figure 5. Form List invoices.

Upper half of the form contains selected invoices by a certain criterion that can be billed on the date of invoice receipt, the invoice recipient. In the bottom half of the form are search options and obtaining totals. For invoices selection criteria can be used options customer name, invoice number, invoice date, invoice and charged options. Once this option is actuated Search button.

Search button is attached code:

```
sir_sql = "SELECT [facturi_emise].[Numar], [Beneficiar].[NUME_BENEFICIAR], [beneficiar].[cod_beneficiar], [facturi_emise].[Data_factura], [facturi_emise].[total_plata], [facturi_emise].[data_incasare] FROM Beneficiar INNER JOIN facturi_emise ON [Beneficiar].[COD_BENEFICIAR]=[facturi_emise].[Cod_beneficiar]"
If Me!numar_factura <> "" Then
  sir_sql = sir_sql & "where [facturi_emise].[numar]=" & Me!numar_factura.Value & ";"
  Me!facturi_emise_cautare.Form.RecordSource = sir_sql
```

Melfacturi\_emise\_cautare.Form.Requery  
 GoTo sfarsit  
 End If

When filling following situations may occur:

- If completed Invoice\_number then do not search other criteria;
- If completed dates and name of the beneficiary then will get a list of beneficiaries that were billed some products;
- If not complete beneficiary name only dates between which you want a summary of invoices then get a list of invoices issued or received between two dates.

On the right side of the bottom half of the total fields are billed and collected. These values are obtained after completion dates and Calculates pushbutton. Using this form you can get reports out on bills received or issued. To obtain such a report does billing report button.

On pressing the button in the main interface addresses beneficiaries generates a query that will result in a table with all debtor's payment of bills. After that, it will generate one Word document for each recipient individually, with the content shown in Figure 6:

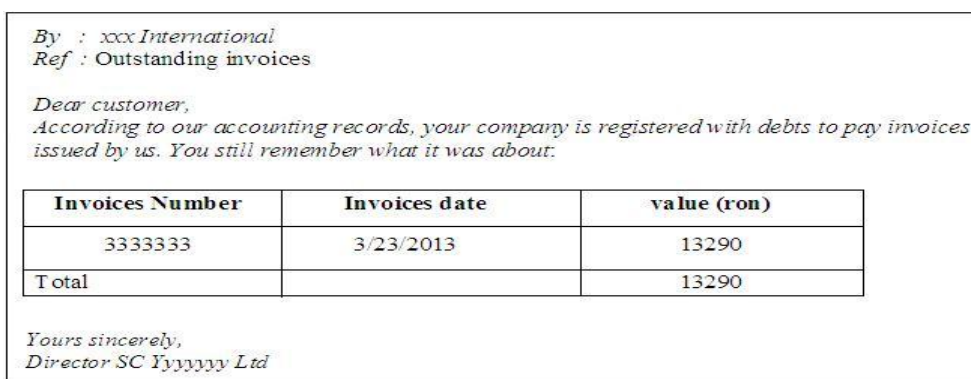


Figure 6. Content letter to each debtors.

Being defined by the values of status variables that characterise the system, its state at a certain moment, becomes a predictable result of the system evolution. The more the probability that the system evolves according to the trajectory for which it was designed is higher, the more the information we have about its state and subsequently, about that system is larger. In order to control the system well, it has to be well known and well organised.

In order to achieve its main goal – assistance for its decision makers in solving the management and organisational problems – a computer system can appeal to one or more information technologies. In this context, more approaches are possible:

- Utilising certain technologies independently in order to solve different aspects of a complex problem;
- Utilising some technologies that communicate with each other for transferring data and information in order to solve some problems;
- Utilising more technologies integrated in a sole system (a **hybrid** system).

The company considered as a dynamic system has a structure that includes the adjustment activities (feedback), leadership, production, circulation, technique and information activities. The connection of all these components can be achieved based on the information flow within the hierarchical levels of leadership. Within each subsystem, part of the dynamic system of the enterprise, the achievement of an organisation (order) strategy, which leads to obtaining an uncertainty degree of phenomena production as smaller as possible, that is to the existence of minimal entropy, is imposed.

## Conclusions

In order to improve the global performance, any company has to react to the evolution of all aspects related to computerising its own activities and be aware of their importance. The research from this paper stays within this logic and contributes to the enrichment of the information concerning the use of computer applications in the management of the outstanding invoices. The actuality and the utility of the research also result from the current concern for the analysis of the computer systems within the management activities generated by the importance that each trader has to give to this strategic resource. I consider that the proper management of the collections by tracking outstanding invoices and their impact on the organisation performances requires a transversal interdisciplinary approach, being necessary to be equally taken into account the economic, financial and information aspects.

Along with the basic software development orientated to optimising the economic activities, such applications started to be used, globally, in simulating the decisional processes, thus assuring the exertion, accompanied by computer, of the **prediction attribute** characteristic for the decision process.

The most significant aspect of these simulations resides in the fact that it warns the decision factor about the possible negative manifestations in the functioning of the leaded subsystem, with an acceptable time horizon before their manifestation. Thus, there is the possibility of predicting these negatives phenomena by taking the right measures in order to totally or partially eliminate them.

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## MECHANISM OF FINANCIAL AND CREDIT SUPPORT OF ENTREPRENEURIAL ACTIVITIES

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**Abstract.** The problematic aspects of the financial and credit mechanism of business activity are considered. Some factors of formation of financial interrelations at the micro level and their interaction at the macro level are investigated. The problem areas of entrepreneurship are emphasized. The systemic factors of sources of financial resources in the business sector are generalized. Attention is paid to the need to develop and improve the financial subsystem of entrepreneurial activity. Peculiarities of supporting potential innovative implementation are investigated.

**Key words:** *resources, assets, financial mechanism, financial flows, financial condition, entrepreneurship, financial support, business activity, financial assistance, financial and economic relations.*

**Rezumat.** În articol sunt examinate unele aspecte problematice ale mecanismului financiar și de creditare a activității comerciale. Au fost investigați unii factori de formare a interrelațiilor financiare la nivel micro și interacțiunea lor la nivel macro. Sunt subliniate domeniile problematice ale antreprenoriatului. Factorii sistemici ai surselor de resurse financiare din sectorul de afaceri au fost generalizați. Se acordă atenție necesității dezvoltării și îmbunătățirii subsistemului financiar al activității antreprenoriale. Sunt cercetate particularitățile sprijinirii unei potențiale implementări inovatoare.

**Cuvinte cheie:** *resurse, active, mecanism financiar, fluxuri financiare, situație financiară, antreprenoriat, sprijin financiar, activitate comercială, asistență financiară, relații financiare și economice.*

### Introduction

Financial and credit support for various enterprises in any industry today is becoming an objective reality in market conditions. Since the need to replenish the working capital of the enterprise, to modernize fixed assets; in attracting the latest technologies, raw materials, manufacturing new products; in raising funds necessary to advance the management process [1]. A financial and credit mechanism that contributes to the development of entrepreneurial activity in these conditions should be a complex of financial methods, such as planning,

management, control, provision, and also act as a lever of influence on its development. A financial mechanism in the narrow sense refers to sources of financial and credit support, such as self-financing, for example, lending and budget financing, as well as a model for regulating financial flows. The financial and credit mechanism includes legal, methodological, organizational, information-software and information-analytical support.

Summing up the results of the dialogue on discussion platforms between government officials and entrepreneurs, we can conclude that there are a number of problems, and one of the most acute problems of most enterprises is the problem of financing various business projects, finding and raising funds, promotion of flows, lending to the business management process. The possibility of developing a financial subsystem to support new activities, especially at the initial stage of innovation, due to the high commercial risk of investing in existing innovations, the need for large financial costs, as well as a long period (result) of return on investment [2].

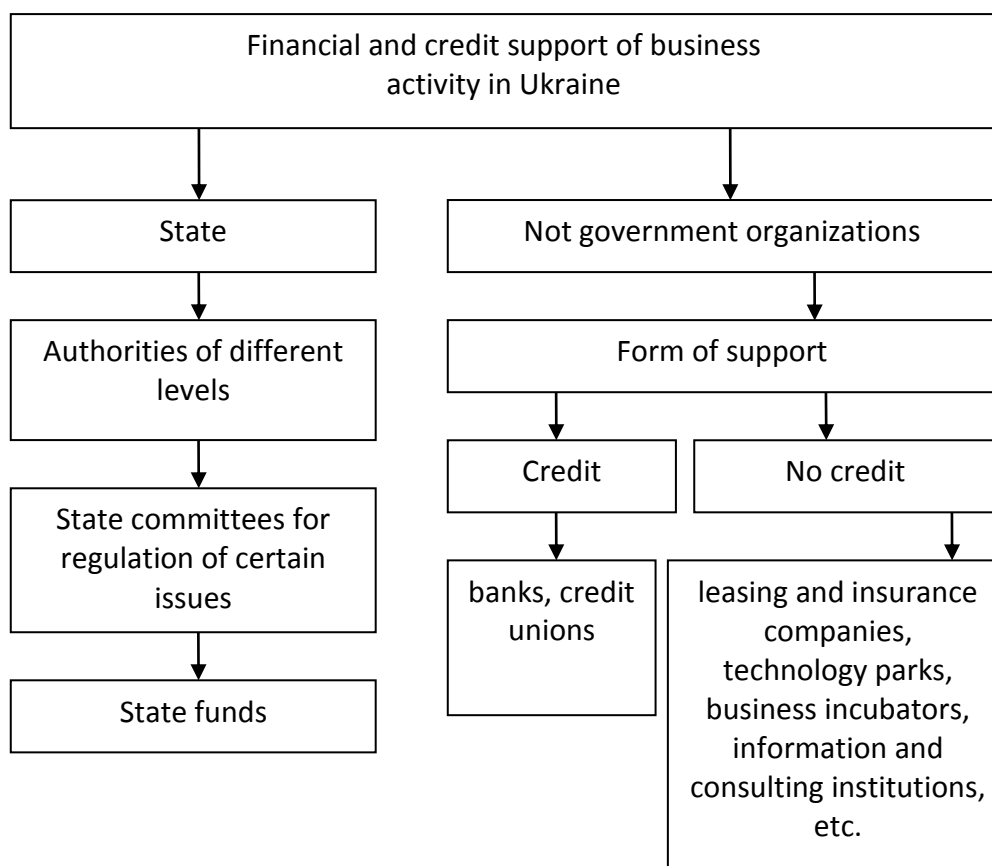
Public financing of entrepreneurship is considered non-market and therefore impractical. But in practice, in many developed countries, subsidies remain one of the most common ways of financial and credit mechanism to promote business development. Direct targeted state support is provided to those enterprises whose activities are important for the development of the state economy or are of paramount importance. If entrepreneurs of different ranks get quick access to various financial, material and technical resources, the process of their functioning will change dramatically in the necessary direction of business development, and many tasks of the state business support program will be solved automatically.

In our country, due to lack of budget funds, there is almost no targeted financial assistance, and for the development of enterprises-firms own funds are not enough, so loans are the main source of replenishment of financial resources. Therefore, the primary task in solving this problem should be to study the situation of the financial and credit mechanism to promote entrepreneurship. In Ukraine, financial and credit support is two-tier, Figure 1.

At this stage of economic reforms in Ukraine, it is necessary to create an effective financial and credit mechanism to promote business development. This requires: have non-profit microfinance institutions that would have the right to provide loans to enterprises of various types of business; create structural subdivisions or small sectors in banking institutions that would study the demand for microloans and the history of enterprises; to active financing of small and medium business enterprises; to form a system of guaranteeing microcredits by local authorities and various funds; to promote lending to business entities that produce products for export or produce products that reduce the number of imports; develop national, and with them regional, business microcredit programs by the non-banking system (for example, credit unions and insurance and leasing institutions, etc.); to expand the system of training and retraining of entrepreneurs in microcredit.

As for the measures implemented in developed countries in the formation of financial and credit regulation, it is a reduction in producer costs or a reduction in the discount rate by the Central Bank. The basic principles of formation of the financial and credit mechanism should be systemic and comprehensive, the principles of sufficiency and diversification, comprehensive validity with predictability and, of course, transparency.

Banking institutions are in no hurry to deal with small businesses. There are many reasons for this. This can be a lack of collateral, a small loan share and a short repayment period, in the medium term it is a significant risk and a small profit in terms of lending to large borrowers. Regarding the types of bank loans, the mechanism for obtaining them is divided into: transfer, overdraft, pawnshop, seasonal, open credit line, revolver, oncol, form, mortgage, consortium. Thus, the rates of credit institutions operating in the markets for a short period of time (for example, a year) are very high for small businesses, which makes bank loans unattainable for this sector of the economy.



**Figure 1.** Two-level system of financial and credit support for entrepreneurship.

*Source: own development.*

The solution is to enter into loan agreements with financial intermediaries related to the non-banking sector, such as credit unions, public and private support funds, international organizations [1]. There is even the concept of «micro-enterprise», but the definition of this term is very heterogeneous, as it depends on the size of the existing enterprise, namely the number of employees, sales and the need for small loans. Taking into account the world experience, micro-enterprise and microbusiness are defined as:

- private property, when the enterprise belongs to one owner or family and has less than ten employees, and, as a rule, it is serviced by the family or owners;
- an enterprise that provides part-time or self-employment to provide additional sources of family income. Thus, according to this definition of a micro-enterprise include most of the existing small enterprises in Ukraine [3]. Microcredit, which is used as a strategy for economic growth and development, stimulates profit-oriented activities, helps businesses balance existing sources of income and helps transform micro-enterprises into the next form of management - small business.

Today there is a need for investment for the Ukrainian economy, including the small and medium business segment. You can attract them with the help of levers in the market of financial services and leasing. Leasing is an alternative form of bank lending. From the point of view of the tax sphere, types of lease transactions and leasing transactions are exempt from value added tax. The introduction of leasing will significantly reduce start-up capital for starting and developing a business. Thus, the increase in leasing operations can become a locomotive for the development of small and medium enterprises in our country. Leasing increases the interest in investing private capital in real production, improves the financial condition of producers, which in turn increases the competitiveness of domestic small and medium-sized businesses [4].

The above problems allow us to define the relationship between the mechanisms of financial and credit support for business, as a way to harmonize the concepts of «mechanism», «bank lending», «government regulation» and «business». In the economic sense, there are different interpretations of the concept of "mechanism", which is defined as a system of communications, devices, methods that determine the direction of a particular activity. Engaged in entrepreneurial activity, the entrepreneur is guided by commercial gain and acts for profit. In this way, it produces products that bring it profit, attract those means of production that require less cost and are more productive. After all, the main thing for an entrepreneur should be the efficiency of production. But in practice there are motives for entrepreneurs to engage in entrepreneurial activity not only the desire to make a profit, but also the opportunity to realize their abilities in practice, to show their skills, ambitions, professionalism, initiative, creativity and more. Today it is necessary to create simple and clear mechanisms for involving the population in the implementation of their business ideas; to create a state of socio-economic and political-legal environment that would contribute to the formation and successful development of entrepreneurship, providing freedom and guarantee of the process, which is especially important in a crisis in the economy [5].

Creating a holistic system of state regulation of business relations is a complex and lengthy process. The big role here is the regulatory policy of the state. In a market economy, the introduction of financial regulation is at the forefront, lending is regulated by the relevant vector of state regulatory policy, and the main use of budget funds can be not only direct investment, but also insurance and loan guarantees. Prospects for further research into the mechanisms of financial and credit security of business activities are studies of small and medium business support.

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## FOUND: A DEFINITION OF INTELLIGENCE

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**Abstract.** Intelligence has come to play a pivotal role in the affairs of states and non-state actors in the 21<sup>st</sup> century. It not only determines the outcome of conflict when it breaks out but also provides critical edge and foresight in military planning and engagements. However, the effective utilization and deployment of intelligence in any strategic environment may be hampered by the lack of a holistic and generally accepted definition of it. The search for a robust definition has not also been helped by the differing views on what should constitute the basic elements of it. To overcome these challenges, this work argues for and provides a holistic definition of intelligence. It uses both qualitative and quantitative methodologies to provide a more robust and holistic definition of intelligence. The work concludes that any acceptable definition of intelligence must contain five key elements: process, data, actionable information, political group and security.

**Keywords:** Intelligence, Definition, Process, Data, Actionable information

**Rezumat.** Inteligența a ajuns să joace un rol esențial în treburile statelor și ale actorilor nestatali în secolul XXI. Nu numai că determină rezultatul conflictului atunci când izbucnește, ci oferă și avantaje critice și previziune în planificarea și angajamentele militare. Cu toate acestea, utilizarea și desfășurarea eficientă a informațiilor în orice mediu strategic poate fi împiedicată de lipsa unei definiții holistice și general acceptate a acesteia. Căutarea unei definiții solide nu a fost, de asemenea, ajutată de opiniile diferite asupra a ceea ce ar trebui să constituie elementele de bază ale acesteia. Pentru a depăși aceste provocări, această lucrare susține și oferă o definiție holistică a inteligenței. Utilizează atât metodologii calitative cât și cantitative pentru a oferi o definiție mai robustă și holistică a inteligenței. Lucrarea concluzionează că orice definiție acceptabilă a informațiilor trebuie să conțină cinci elemente cheie: proces, date, informații acționabile, grup politic și securitate.

**Cuvinte cheie:** *inteligență, definiție, proces, date, informații acționabile.*

### Introduction

What is intelligence? This looks like a simplistic question that should have a straightforward answer. However, this is not the case. Creating an acceptable definition for intelligence has been as difficult as framing acceptable definitions for other concepts in international relations. Intelligence, especially of the military variety, has come to a play crucial role in the affairs of states and non-state actors in the 21<sup>st</sup> century. In the 20<sup>th</sup> century, intelligence played crucial role in determining the outcomes of both the First and Second World Wars. The rise and ability of non-state actors like Al-Qaeda, Islamic State and Boko Haram to challenge and dominate established states in often violent asymmetric conflicts have further heightened the need of intelligence to effectively counter such hostile non-state groups. This brings to the fore the need for a generally accepted definition of intelligence. It is this author's considered opinion that for intelligence to be effectively and optimally wielded and deployed, there is the need to create a universally acceptable definition for it.

### **Search for a Definition: Old Wine, Old Bottle**

Although, there is no universally accepted definition of what intelligence is or should be, there is general agreement on what its purpose should be: to give an edge to one over an adversary or, put differently, to provide relative security and minimize risk. A qualitative and quantitative content analysis of the definitions of intelligence shows that an acceptable definition contains 15 key terms that must include words like information, end-user, actionability, foreign groups, collecting, analysis, threat and objectives [1, p. 201]. Most definitions of intelligence have adhered to the highlighted terms in one form or the other. Dokman defines intelligence as actionable knowledge of foreign countries that is disseminated in the form of information towards end users [1, p. 202]. This definition is problematic on many fronts. The first is that it assumes that intelligence activity is restricted to states, thereby neglecting the important role of non-state actors in the 21<sup>st</sup> century. Second is the confusing use of the words 'actionable knowledge' and 'information.' This is understandable to an extent since one can deduce that the author is trying to avoid the use of the word 'intelligence' in the definition of intelligence.

Milton Diaz adheres to these by emphasizing that a definition of intelligence must contain the core elements of process, knowledge, decision-making, actor and national-security [2, p. 59]. Diaz, it should be noted, did not advance any rigid definition of intelligence. Jensen, McElreath and Graves argue that intelligence is meant to provide critical edge in decision-making that shifts the balance in favour of decision-maker [3, p. 2]. According to the authors, intelligence is meant to provide a decision advantage where one knows more than a competitor or an adversary [3, p. 3]. This is seen as the ultimate purpose of the intelligence product. Here again, rather than give a solid definition, the authors only emphasized the purpose of the intelligence.

Michael Warner, an oft cited and respected security scholar, sees intelligence as a secret state-directed activity designed to understand or influence foreign entities [4]. It has some basic elements that include secret sources and covert method, foreign targets and production and dissemination of information [4]. One should reject this definition out of hand because of the emphasis it places on secret sources, covert method and the utility of intelligence by just the states, among others. His definition fails to acknowledge the use of intelligence by non-state actors and OSINT (open-source intelligence) as an important source of intelligence in the 21<sup>st</sup> century. Bilandzic and Mikulic defines intelligence as the gathering, organizing and analysis of information with the ultimate aim of providing actionable product to decision-makers [5, pp. 27-43]. Two critical problems with this definition are the use of 'information' and the failure to mention the name of this 'actionable product.' It is assumed the end-product will be the information and this should be the actionable product. The 'information' in the definition creates a level of ambiguity: is it as the end-product or as source of the end-product? These are not clearly stated in the definition. To Loch Jonson, intelligence is the foreknowledge sought by nations in response to external threats and to protect their well-being [6, p. 366]. True, but then, the threats to states are not always external in the 21<sup>st</sup> century, especially when one considers what is going on between Nigeria and Boko Haram and Somalia and Al-Shabaab. Alan Breakspear defines intelligence as a corporate capability to forecast change in time to do something about it [7, p. 1]. However, apart from the fact that the definition did not conform with any of the elements in Dokman's database, it also fails to mention the specific process that is involved in gathering this intelligence. According to Mark Lowenthal intelligence refers to information that meets the stated or understood needs of policy makers and has been collected processed and narrowed to meet those needs [8, p. 23]. The author further shows that it covers four broad but interconnected activities: collection, analysis, covert action and counterintelligence. While one readily agrees with some of the elements of intelligence in the definition, the conflation of the end-product

(intelligence) with the process that births this (information) creates a level of ambiguity. Sherman Kent sees intelligence as a knowledge-gathering process meant to enhance a nation's foreign policy posture [9]. This process has three different iterations within it: unique knowledge, knowledge-collecting organization and an activity. Though, one readily agrees with Kent's use of 'process', however, restricting the use of intelligence to just nations or states renders the definition provided inadequate.

Gill and Phythian define intelligence as the range of activities conducted in secret and aimed at ensuring the security of a state [10, p. 7]. These range of activities, according to the authors, can be both active (covert actions) and passive (collection, analysis and dissemination of information). Again, one needs to emphasize that the conduct of intelligence in the 21<sup>st</sup> century encompasses both overt and covert action. The failure to clarify this renders this definition inadequate. The United States Department of Defence (USDD) defines intelligence as a product of collecting, evaluating, analyzing, integrating and interpreting all available information relating to one or more aspects of other countries or areas of operations that is potentially useful for future planning [11]. This USDD idea is simply an explanation of the *process* of intelligence and it also fails to clarify the end-product.

### Methodology

This research relies on both qualitative and quantitative methodologies. The qualitative aspect involves the extensive collection, collation, analysis and interpretation of secondary materials like textbooks, journal articles and internet articles on definition of intelligence. This ensures that the works of leading international specialists and scholars in the field of intelligence such as Michael Warner, Loch Johnson, Alan Breakspear and Milton Diaz were consulted and parsed in the course of the research. The quantitative methodology used made it possible, through systemic and critical content analysis of 36 definitions to identify the key elements that an acceptable definition of intelligence must contain. One should note here that 35 of the 36 definitions of intelligence used relied heavily on the intelligence database created by Tomislav Dokman. The 36<sup>th</sup> definition is Dokman's definition of intelligence. Dokman identified 15 core elements of intelligence that include information, actionability, processing, analysis, threat, foreign countries, knowledge, confidentiality, collecting, request, dissemination, enemy, objectives, end user and national security. However, by using the quantitative methodology and content analysis, this research has been able to synthesize the core elements that an acceptable definition of intelligence must contain to just nine words: process, collection, collation, analysis, interpretation, conversion, data, political group and relative security. Three of these elements that I consider to be the core of any eventual acceptable definition of intelligence - conversation, data and political group - are missing from all the other earlier definitions of intelligence.

### Found: New Wine, Old Bottle

From the foregoing, one can argue that intelligence is a tool and a means to an end. As a tool, it is used to ensure the creation of a desired favourable outcome in any environment and the end is the creation of a relatively secured environment. Since an environment, by its nature, is always dynamic and constantly in flux, that means any good intelligence must be abreast of this inconsistency. This is why an acceptable definition of intelligence must see it as a *process* without prejudice to the other elements highlighted by intelligence scholars. Thus, **intelligence can be defined as the process of collection, collation, analysis, interpretation and conversion of raw data into actionable information by a political group with the aim of ensuring its relative security.** This definition meets most of the criteria earlier arrived at through the qualitative and quantitative content analysis of the definitions of intelligence by Dokman [1]. It has five key elements: process, data, conversion, political group and relative security.

Let me quickly explain here the use of data in the definition. The use of 'data' in the definition is particularly apposite and timely. Intelligence here is not just information, as is found in most definitions: but, processed or distilled data. Every bits of information cannot be termed as intelligence. Using information, part of the process of intelligence, interchangeably for the end-product (intelligence or actionable information), as most scholars had done, has always been problematic and obfuscatory. This has created avoidable confusion in trying to provide an acceptable definition of intelligence. To get around this, I have substituted data for the initial use of the word 'information' at the beginning of most definitions. Information in the context of this work simply means intelligence or the end-product or actionable information. Data are the bits and pieces of unprocessed or unfiltered datum collected through the techniques of intelligence. This cannot be referred to as intelligence or information or actionable information until it has been sieved. Hence, the use of the word 'data' in the definition. The raw data is obtained using the different techniques of intelligence such as HUMINT (human intelligence) or OSINT (open-source intelligence) to string datum into a coherent whole for analysis. The political group here is the end-user and could be the decision-maker, operational or theatre commander, military command, security forces, a non-state actor or the state in more concrete form. Since it is a process, it will have to be done on a continuous rolling basis to provide real-time assessment to enable the end-user take optimal decision in every situation. The distilled and converted data, now intelligence (actionable information), is obtained through the processes of collection, collation, analysis, interpretation and conversion. Of course, the result of the whole process (intelligence) is to guarantee the relative security of the end-user. One should stress here that the strategic environment and the operational capability of the state will determine the optimal intelligence-gathering techniques to be used.

### Conclusion

The role of intelligence in ensuring the security of political actors in the 21<sup>st</sup> century cannot be overemphasized. The international environment is in a constant state of flux, with unprecedented number of maligned non-state actors. Conventional methods of combating the various threats that these maligned non-state actors pose have been shown to be inadequate. The asymmetric nature of most conflicts has further put the state under increasing pressure. Intelligence is an important tool that provides political actors, especially the state, with a critical edge that ensures the preservation of its security. Hence, the need for the provision of a robust and holistic definition of intelligence to enable the end-user create a relatively secure environment.

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## CYBERSECURITY OF THE REPUBLIC OF MOLDOVA: A RETROSPECTIVE FOR THE PERIOD 2015-2020

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**Abstract.** The process of implementing information technologies in all areas of economic, political, social life, etc. in the Republic of Moldova has also determined the evolution of cybercrime. New “virtual” dimensions of national infrastructure are being formed, which are becoming more and more important for local and international politics. As a result, in recent years it has been found that computer systems, networks and data are being used more and more frequently for criminal purposes, and the materials that could be evidence of these crimes are also stored and transmitted through these networks by perpetrators. Cybercrime, espionage, propaganda, diversion and excessive exploitation of personal data through electronic communications networks are used as basic tools at all stages of designing a hybrid security threat. Cyberspace-specific threats are characterized by asymmetry and accentuated dynamics and global character, which makes them difficult to identify and counteracted by measures proportional to the impact of the materialization of risks. Moldova is currently facing threats from cyberspace at the address of critical infrastructures, given the increasing interdependence between cyber infrastructures and infrastructures such as those in the financial banking, transport, energy and national defense sectors. The globality of cyberspace is likely to amplify the risks to them by affecting both the sector to the same extent private as well as public. Threats to cyberspace can be classified in several ways, but the most commonly used are those based on motivational factors and the impact on society. In the prevailing conditions cybersecurity is becoming one of the most important areas for ensuring internal security and the effective operation of state institutions in all spheres of social and economic life.

**Keywords:** *CERT-GOV-MD, computerization, concept, cyber-attack «Digital Moldova 2020», law, National Program, risk management, strategy.*

**Rezumat.** Procesul de implementare a tehnologiilor informaționale în toate domeniile vieții economice, politice, sociale etc. din Republica Moldova a determinat, de asemenea, evoluția criminalității cibernetice. Se formează noi dimensiuni „virtuale” ale infrastructurii naționale, care devin din ce în ce mai importante pentru politica locală și internațională. Drept urmare, în ultimii ani s-a constatat că sistemele de calcul, rețelele și datele sunt utilizate din ce în ce mai frecvent în scopuri penale, iar materialele care ar putea fi dovezi ale acestor infracțiuni sunt, de

asemenea, stocate și transmise prin aceste rețele de către făptași. Criminalitatea informatică, spionajul, propaganda, diversiunea și exploatarea excesivă a datelor cu caracter personal prin intermediul rețelelor de comunicații electronice sunt utilizate ca instrumente de bază în toate etapele de proiectare a unei amenințări hibride de securitate. Amenințările specifice spațiului cibernetic sunt caracterizate prin asimetrie și dinamică accentuată și caracter global, ceea ce le face dificil de identificat și contracarat prin măsuri proporționale cu impactul materializării riscurilor. Moldova se confruntă în prezent cu amenințări din spațiul cibernetic la adresa infrastructurilor critice, având în vedere interdependența crescândă dintre infrastructurile cibernetice și cele din sectoarele bancar, financiar, transport, energie și apărare națională. Globalizarea spațiului cibernetic va amplifica riscurile, afectând atât sectorul public, cât și cel privat. Amenințările la adresa spațiului cibernetic pot fi clasificate în mai multe moduri, dar cel mai frecvent sunt clasificate pe baza factorilor motivaționali și impactul asupra societății. Astfel, în condițiile actuale securitatea cibernetică devine unul dintre cele mai importante domenii pentru funcționarea eficientă a instituțiilor de stat în toate sferele vieții sociale și economice.

**Cuvinte cheie:** *CERT-GOV-MD, computerizare, concept, atac cibernetic «Digital Moldova 2020», lege, Program național, managementul riscurilor, strategie.*

### **Introduction**

In international practice cybersecurity is defined as a set of tools and principles for ensuring and guaranteeing security, which is a single concept of risk management, mean the application of the necessary technologies and actions to protect the information system and the user's environment. When the state acts as this user, the problem of cybersecurity becomes one of the key elements of ensuring national security. At the same time, it is obvious that cybersecurity should be considered as one of the main components of national and international security in general, and crime in this area is often closely related to other types of threats, including industrial espionage, activities of foreign intelligence services, international terrorism, etc.

Another feature of cyber threats nowadays is the rapid development of information technologies, which provides more and more tools for committing crimes, they are becoming more sophisticated, more technological, and in this regard, the damage they can cause increases many times over. This also requires government agencies involved in countering cybercrime to be prepared for new challenges and constantly improve methods and ways to combat cyber threats. An additional difficulty for them is created by the fact that cyberspace has no borders, and interested players (special services of various states, criminals, terrorists, cyber fraudsters, hackers, industrial spies, etc.) can create threats from anywhere in the world and of a very different nature. This creates difficulties in identifying the source and nature of threats in cyberspace.

In fact, today in the world there is already a real war in cyberspace for political, economic and criminal purposes. Even more dangerous, this war is being fought without a clearly defined "battlefield" and without rules. In this context, the Republic of Moldova, as a state, should build its cyber security strategy taking into account all these factors and features.

### **1. Information security concept of the Republic of Moldova**

The small size of the territory and the rather developed internet infrastructure of the Republic of Moldova facilitate the activities of special state bodies to counter cyberattacks. But this also creates additional problems associated with the growing level of internet penetration and the assimilation of information technologies by an increasing number of users. In these conditions, ensuring cybersecurity becomes one of the key tasks of the state.

For the first time at the legislative level, the issues of information security and conditions of activity in the information space were established by Law No. 467 of November 21, 2003 "On Informatization and State Information Resources [1] with subsequent amendments and additions. In this document, the interpretation of the basic terms used in the field of information security appeared. However, Moldova really began to deal with cybersecurity issues after 2009, when protests and riots after the April 2009 elections were called by many a "Twitter-revolution". In 2010, a state body, the Center for Cybersecurity (CERT-GOV-MD), was created, which became part of the State Enterprise Center for Special Telecommunications - a structural unit of the Information and Security Service of the Republic of Moldova.

The creation of CERT-GOV-MD entailed a number of other actions to ensure comprehensive protection of state interests from cyber threats. In the same year 2010, the General Prosecutor's Office of Moldova created a specialized Cybercrime Investigation Unit, and the Information and Security Service created a Cybercrime Unit. Then in 2012, the Ministry of Internal Affairs also created its own Cybercrime Unit. Thus, was created an institutional hierarchy to ensure cyber security in Moldova and counteract attacks on the information resources of the state. However, the legislative base required further improvement. And in the period 2015-2020, serious steps were taken in this direction, which created the current regulatory framework for the integrated support of cybersecurity in the Republic of Moldova.

This regulatory framework was set by the Government Decision No. 857 of October 31, 2013, which approved the National Strategy for the Development of the Information Society "Digital Moldova 2020" [2], as well as the Action Plan for its implementation. The strategy describes in detail the current situation in the field of information security at that time and refers to the legal framework governing this area. In paragraph 10 of Art. 2.1 of the document is underlined; "In the international ranking of the level of ICT development (IDI index), the Republic of Moldova ranks 62nd among 155 countries (4th among the CIS countries), and in terms of the level of e-government development (e-GRI index), it ranks 69th among 159 countries, moving up 11 positions compared to 2010, but at the same time taking the last place among the countries of Eastern Europe" [2].

In the same document in paragraph 36 of Art. 3.4 "The threat of growing cybercrime and the risk of decreasing confidence in networks and online services" states the following: "Currently, there is no state body in the Republic of Moldova directly responsible and empowered with powers, functions and responsibilities in the field of cyber security. At the moment, there are a number of institutions involved in this process, each of which is responsible for relevant issues in its segment of activity. In this regard, it is necessary to fill the existing gap in the regulatory framework in the field of cyber security.

In chapter 4.3 of the Strategy, entitled "Safe and Secure Digital Environment", among the specific tasks under the first item is: "increasing the level of cybersecurity of critical national infrastructures (government agencies / institutions, electronic communications networks, water pipelines, energy systems, transport networks, etc.).

The document provides a wide range of government actions to increase the level of cybersecurity of national infrastructures. Including the addition and harmonization of the regulatory framework, the interchange of information at the public and private level about information threats and risks, the introduction of electronic identity management to ensure cybersecurity, etc. Among other things, it is also envisaged to "strengthen the CERT-GOV-MD team (creation CERT-GOV-MD structures / commands at national level) [2].

The adoption of the National Strategy "Digital Moldova 2020" and the Action Plan for its implementation became the starting point that significantly intensified the activities of state bodies to improve the cybersecurity of the Republic of Moldova and the introduction of information technologies in all spheres of public administration. Moreover, in the Action Plan, all

activities, funding sources, responsible authorities and implementation dates were phased out, which stimulated activities to implement the goals and objectives of the National Strategy.

Of course, the implementation of this document in full demanded a significant update of the regulatory framework in the field of cybersecurity, especially since the rapid development of information technologies and growing threats in cyberspace required an adequate response from government institutions.

The most significant documents on ensuring information security in Moldova include, first of all, the Concept of Information Security of the Republic of Moldova [3], approved by Law No. 299 of December 21, 2017 and which came into force after being officially published in February 2018. In art.8 of part 1 of the document clearly sets out the national interests of the Republic of Moldova in the field of information security: "8. National interests in the field of information security are: ensuring the observance of rights and freedoms regarding access to information resources; development of the spheres of information technology and electronic communications and the expansion of their use; ensuring the protection of the information space, vital and strategically important facilities, critical infrastructure, information classified as state secrets, and information of limited access; prevention, detection and suppression of risks and threats to the information security of the Republic of Moldova, as well as protection of the national information space and society as a whole from the impact of external and internal propaganda and media aggression".

In the same document, in part 2, among the basic concepts used in relation to the Concept of Information Security, the following is emphasized: "the policy of ensuring information security of the Republic of Moldova is a set of activities of public administration bodies, their duties and responsibilities for protecting national interests in the information space, based on maintaining the balance of interests of the individual, society and the state" [3].

## **2. Strategic goals and objectives of ensuring cybersecurity in the Republic of Moldova**

No matter how timely and voluminous the documents adopted by the Parliament and the Government of the Republic of Moldova in the field of cybersecurity are, the rapid development of information technologies and the growth of related cyber threats force us to constantly improve the regulatory framework in this area.

Moreover, the signing in 2014 of the Association Agreement between the Republic of Moldova and the European Union set new tasks for the country to harmonize its domestic legislation with European directives in this area. In this context, a significant role was played by the Government Decision No. 811 of 29.11.2015 "On the National Cybersecurity Program of the Republic of Moldova for 2016-2020" [4]. The document clarifies the key terms and concepts in the field of cybersecurity and their meanings, as well as defines the basic principles on which the concept of ensuring the country's cybersecurity is based.

Also, for the first time in the document, the term "management" appears in relation to cybersecurity systems. In particular, the first article of the Program emphasizes: "The goal of the National Cybersecurity Program of the Republic of Moldova for 2016-2020 (hereinafter - the Program) is to create a cybersecurity management system in the Republic of Moldova by ensuring the security of information society services, thus contributing to the development of an economy based on knowledge, which in turn will stimulate the growth of the level of economic competitiveness, social unity, as well as ensure the creation of new jobs".

Assessing the current situation with cybersecurity and countering threats in the information space at that time, the Program points to the existing problems with identifying and accounting for such threats. In particular, clause 7 of Section II of the document reads: "7. So far, not a single cybersecurity audit has been performed, there are no studies or reports detailing the situation regarding information crime in the Republic of Moldova, cyber threats and risks, cyber-



attacks and incidents, other events that have occurred in cyberspace, the number of victims and economic losses due to their materialization” [4], [5].

Further, the document analyzes in detail the reasons why the cybersecurity system in Moldova does not yet meet the challenges of the time. In particular, the Program notes that the main problems in this area include the lack of a cybersecurity management system, as well as the identification of vulnerabilities and risks due to audit. As a result, Moldova does not have a complete picture of the crimes committed in cyberspace, which makes it difficult to develop effective countermeasures. But one of the main problems in ensuring cybersecurity is indicated in paragraph 15 of the same section: “15. Until now, there is no legal framework regarding the delineation and coordination of the competences and responsibilities of public and private institutions in the field of cybersecurity, a mandatory cybersecurity audit mechanism is not applied, through which cyber vulnerabilities, risks and threats can be identified in order to prevent or mitigate using special measures attacks, incidents and other events that have occurred in cyberspace, the origin of which is difficult to determine”.

The measures to be taken to improve the situation and bring the regulatory framework of Moldova in line with the European directives in this area are set out in section IV “Actions to be taken to achieve the goals”. It notes that all actions and measures should be systematized and reflected in the Action Plan for the implementation of the National Cybersecurity Program of the Republic of Moldova. For each of the specific tasks contained in the Program, various implementation mechanisms are provided.

Among them, paragraph 24 says: “24. The specific task “Development of capacity for prevention and emergency response at the national level (national CERT network)” will be achieved by creating a National Cyber Security Incident Response Centre (CERT) and departmental centers in central public authorities management, local public administration authorities, other structures that have state information systems, establishing obligations for mandatory operational reporting and accounting of cyber security incidents for central and local public administration authorities and the business environment in the field of information technology and communications, developing and applying methods for early prevention of incidents cyber security of the Republic of Moldova, conducting practical exercises and trainings to strengthen the ability to respond to cyber incidents and attacks with their blocking, including through other activities in accordance with the Action Plan ” [4].

This position has been developed in other conceptual documents in the field of cybersecurity. The Parliament of the Republic of Moldova, by its Resolution No. 257 of 22.11.2017, approved the new "Information Security Strategy of the Republic of Moldova for 2019-2024" and the Action Plan for its implementation [6]. This document also focuses on the need to create an integrated system for reporting and assessing information security threats and developing rapid response measures. The following are named as priority actions for the implementation of this provision:

- 1) Establishment of the National Cybersecurity Incident Response Centre (national CERT);
- 2) Designation of a body to act as the Governmental Cyber Security Incident Response Centre (CERT Gov);
- 3) Strengthening collaboration between National CERT, Governmental CERT and private CERTs [6].

In order to implement these priorities and develop the institutional system for ensuring cybersecurity, the Government of the Republic of Moldova adopted Resolution No. 414 of 08.05.2018 “On measures to consolidate data centers in the public sector and rationalize the administration of state information systems” [7]. The key decision of this decree was the reorganization of the state enterprise "Center for Special Telecommunications" into the Public

Institution "Information Technology and Cyber Security Service". The state enterprise "Center for Agricultural Information" also became part of this institution by way of takeover. By this resolution, the Government also approved the Charter of the Service and its areas of competence. In particular, the following are named among the functions of the Public Institution:

- 1) creation, management, maintenance and development of information technology infrastructure and telecommunications system of public authorities as part of a special communication network;
- 2) creation and management of centralized telecommunication infrastructure and data transmission centers and their development;
- 3) implementation of technical and technological duties of state electronic services;
- 4) implementation and provision of cybersecurity of information technology infrastructure and telecommunications system of public authorities in accordance with the mandatory minimum cybersecurity requirements established by the Government and the best international practices in this area;
- 5) implementation of policy documents in accordance with the established objectives and regulations in the field of cybersecurity [7].

The implementation of the provisions of this Government Decree allowed in a short time to radically rebuild the entire cybersecurity infrastructure of the country and build a clear hierarchical line of responsibility of various state bodies for the creation and development of information resources. In addition, the document made it possible to centralize the management of the telecommunications infrastructure and create a single technological platform for the provision of electronic services by public services. However, two years later, the Cabinet of Ministers of Moldova was forced to adopt amendments and additions to this Decree in order to further specify the functions and responsibilities of the Information Technology and Cyber Security Service, as well as expand the list of measures to ensure the cyber security of the Republic of Moldova. By Government Decree No. 482 of 08.07.2020. the "Measures necessary to ensure cyber security at the government level" were approved, as well as amendments were made to Resolution No. 414/2018, which was mentioned above. By this document, the Public Institution "Information Technology and Cyber Security Service" is designated as the Governmental Centre for Response on Cybersecurity Incidents [8], [9]. In addition, in order to fulfil the measures specified in the Resolution, the following definitions are introduced:

**CERT Gov** - Governmental Centre for Response on Cybersecurity Incidents, an entity that serves as a single point of communication and reporting of cyber security incidents of the Government and has the capacity necessary to prevent, analyse, detect and respond to cyber incidents at the government level;

**Departmental CERT** - a subdivision or responsible person appointed within public entities that own the infrastructure / systems of information technology and communications and that have the capacity necessary to maintain mandatory operational records and reporting of cyber security incidents.

CERT Gov is responsible for: ensuring the implementation of incident prevention and response policies in cyber infrastructures according to its competence; providing an organizational basis and technical support for the exchange of information between various groups such as CERT, users, public entities; interaction with structures of the CERT type within the framework of public entities with regard to the procedure for reporting, storing and processing information related to incidents and threats to information security; identification, registration, classification and analysis of cyber security incidents, etc.

At the same time, clause 13 of Section IV of the Government Decree specifically stipulates that, as part of the implementation of the measures provided for by the document, CERT Gov

and public entities process personal data in accordance with the legislation on the protection of personal data.

### 3. Cybersecurity threats and needs in Moldova in 2020

As a society that runs more largely on technology, we also as a result depend on it. The Republic of Moldova is in a continuous process of strengthening cyber security at the national level, both from a legal, institutional and procedural point of view, and efforts are being made in this regard by the authorities with responsibilities in the field.

In the general context of cyber security discussions, at national level it is important to conceptually separate the main directions of action: cyber defence, cybercrime, national security, critical infrastructure and emergencies, international cyber diplomacy and Internet governance. Since the establishment of a governmental CERT structure took place only in 2020, the annual record of cyber incidents so far has been executed by the department of cyber incident response center within ITSec, only for national analysis and study.

From the data collected in the past 5 years, we could identify the vectors of attack changing through the years in the same trend with the nearby regions, a fact confirmed by the reports published by ENISA regarding the threats landscape. For example, in Moldova there was identified a tendency of malware infestation of business and corporate e-mails which aim at compromising security systems by exploiting the human factor. According to a study from 2019 [10] by ENISA, 94% of all malware types were delivered via e-mail [11]. The top five strains of malware targeting businesses were: Trojan.Emotet, Adware, InstallCore, HackTool. WinActivator, Riskware. BitCoinMiner and Virus, Renamer (Figure 1). Ransomware attacks targeting the public sector increased in 2019 because of its ability to pay higher ransoms.

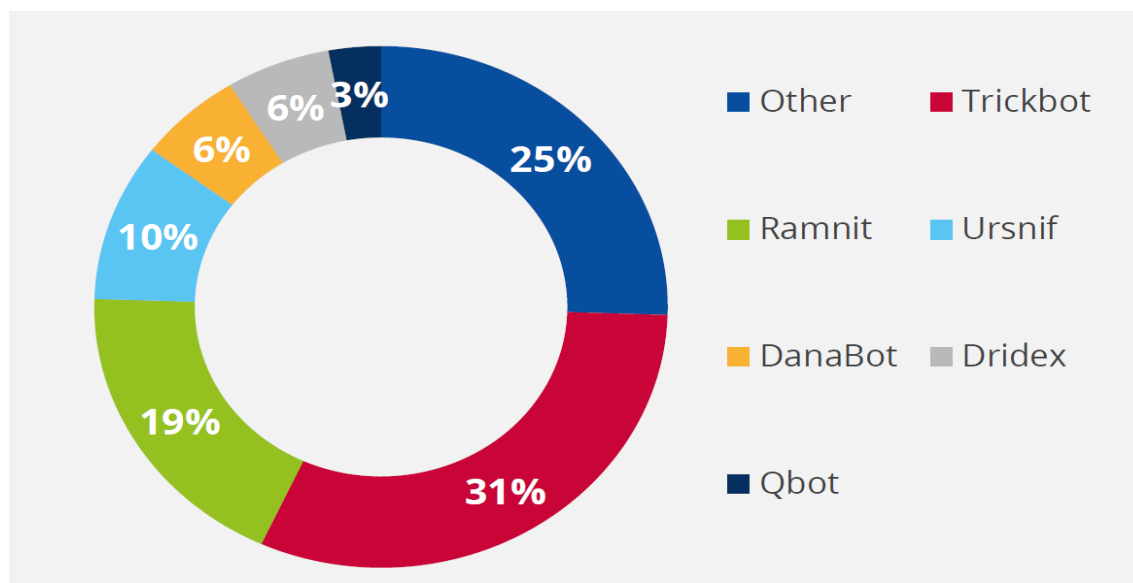


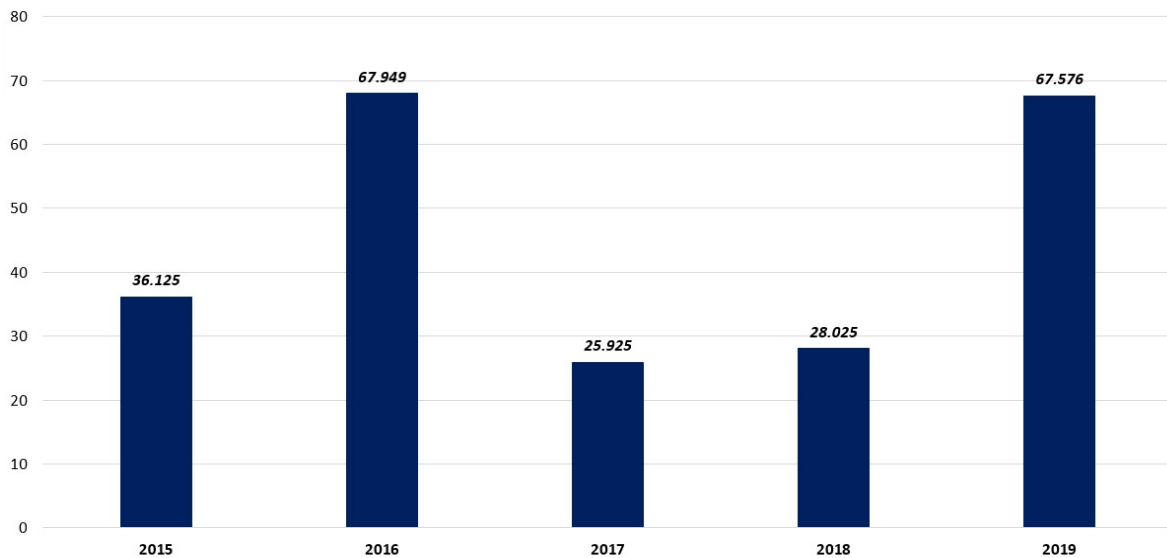
Figure 1. Global malware detections in 2019 CheckPoint [12].

From the data collected by CERT-GOV-MD in cooperation with Shadowserver Foundation and CERT-Bund [13], [14] processed at least 43334 reports on malware activity in the country, including 27879 reports being government networks which represent 64,33% from the total of malware activity, this rate indicates that the attack vectors targeted the government infrastructures.

Lately in 2018, for example the trend of cyber-attacks in Moldova, could be classified in 5 most common incident classes in order of frequency of alerts: vulnerable system, compromise system, botnet, malware, attack. In Figure 2 represented below is a data chart, indicating the

number of malware files identified as attachments to corporate emails that were blocked between 2015-2019.

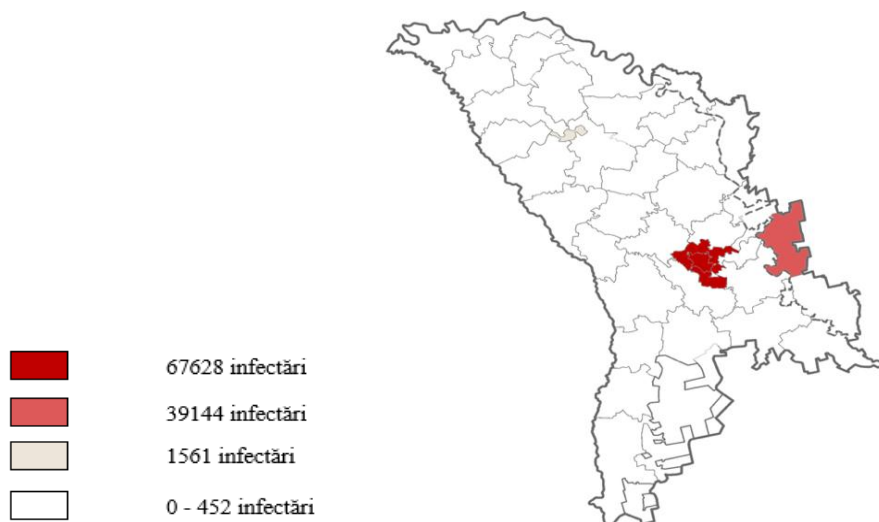
Ransomware attacks have been dethroned by unauthorized cryptocurrency mining activities, mainly by exploiting vulnerabilities in websites or network equipment (cryptojacking). However, the risks associated with cyber-attacks on IT & C infrastructures with critical values for national security remain largely exacerbated by the existence of technical, procedural and human vulnerabilities [15].



**Figure 2.** Malware detections in emails attachments between 2015-2019.

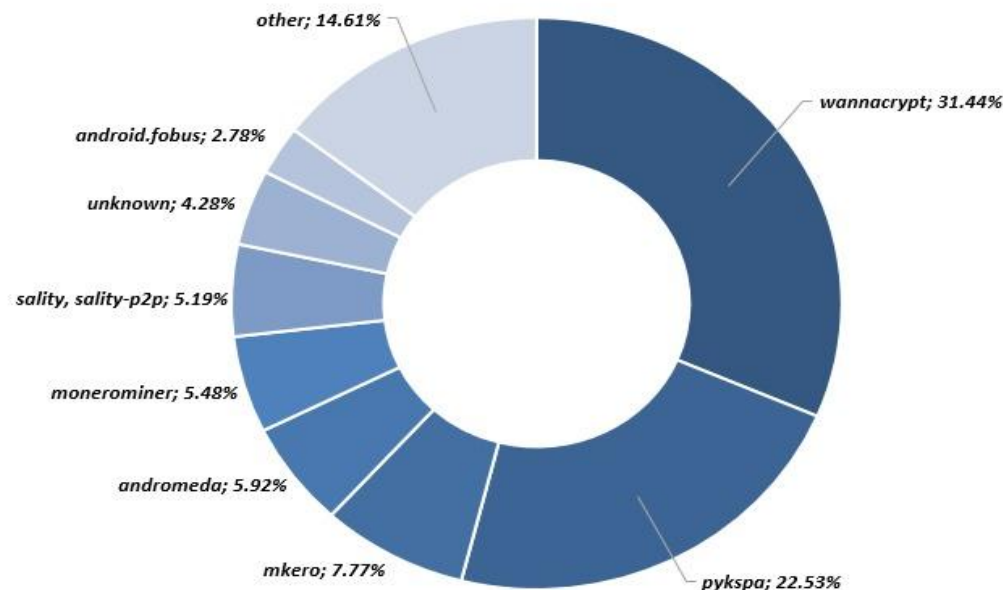
For example, during 2018 (Figure 3) in cyberspace allocated to public authorities and private companies of the Republic of Moldova were registered 127 418 information systems and telecommunications networks infected with various types of malware that form a malicious botnet information infrastructure (level 4 and 3).

Most infected information systems are located in Chisinau (58.92%), Tiraspol (30.72%), Bendery (3.38%), Balti (1.36%). These were directed by approx. 764 control and routing (C&C) servers located in 44 countries around the world. Most routing servers were located in: United States (30%), Germany (19%), Sweden (14%).



**Figure 3.** Location of information systems and telecommunication networks infected by regions on the territory of the Republic of Moldova in 2018.

The main objective of the offensive actions carried out by these actors, remains the exfiltration of information of strategic interest, the type of attack through which it realizes this being Advanced Persistent Threat (APT). Elements of modus operandi such as social engineering, spear-phishing, multiple levels of command and control servers or vulnerability scanning, continue to be some of the most used techniques to meet the objectives of these actors [16]. Analyzing the infected information systems and telecommunications networks were identified cca.108 different families of malware. The most dominant were: wannacrypt (31%), pykspa (22%), mkero (7%), andromeda (6%), monerominer (5%), sality + sality-p2p (5%), android.fobus - 3540 (3%) infections (Figure 4).



**Figure 4.** Family of registered malware.

Many of the cyber defense systems used by critical infrastructure operators in the Republic of Moldova are outdated and inefficient to prevent possible attacks. In the absence of adequate measures and coordination of critical infrastructure security efforts, these systems remain extremely vulnerable, with unauthorized persons gaining control over systems vital to the functioning of a state. In this sense, it is absolutely necessary that the field of critical infrastructures be periodically analyzed, monitored, evaluated and optimized, starting a process of identification of critical infrastructures at the level of public administration.

In order to ensure a strong cybersecurity in Moldova, we need to invest resources in many segments as following:

- Harmonizing the legislative framework with european and international requirements and tendencies on cybersecurity;
- Professional training in the field and the realization of some actions of awareness / understanding of the field at the level of the decisional factors within the public organizations;
- Improving both national and international collaborations in order to mitigate risks;
- Setting balance and boundaries between privacy and security;
- Ensuring and developing security by design for governmental and national services;
- Establishing a national CERT and ensure mobile groups for incident response;

- Opening up communication channels, setting up working groups and public consultation, involving civil society and public-private partnerships are becoming key directions on which public policies must focus.

### Conclusions and recommendations

Cyberspace became increasingly important both for the functioning of states and for the provision of public services to citizens. It is crucial to realize that cyberattacks cause economic damage, undermine public confidence in online services, and cause real harm to government, business, citizens, their property and privacy.

Proceeding from this, any state is obliged, in order to ensure cyber security, to take comprehensive and consistent measures to develop the state cybersecurity system. This also involves conducting an audit and creating a mechanism for updating requirements and recommendations for cybersecurity in relation to state and municipal information systems, telecommunications networks, and other infrastructure. It is necessary to constantly and systematically improve the legislation of the Republic of Moldova in the field of cybersecurity, including on the basis of adapting the legal norms of European states, bringing the regulatory framework in full compliance with the international agreements ratified by Moldova.

Given the fact that cyber threats are constantly evolving, becoming more sophisticated and unpredictable, the country must have a flexible and time-sensitive cybersecurity strategy. In addition, due to the cross-border nature of threats, all countries are forced to enter into close international interaction and take into account in their national strategies the possibility of cooperation and exchange of information in order to combat cybercrime at the regional and international level. Such cooperation is necessary not only for effective preparation for cyber-attacks, but also for timely response to them.

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## ENSURING INFORMATION SECURITY IN PUBLIC ORGANIZATIONS IN THE REPUBLIC OF MOLDOVA THROUGH THE ISO 27001 STANDARD

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**Abstract.** Data protection in public organizations in the Republic of Moldova (RM) is ensured by implementing mandatory cyber security controls (MCSR) adopted by the Government. In order to analyze the completeness of the controls, a comparative study was conducted between MCSR and the cyber security standard ISO 27001. The intention to comply with international cyber security standards is reflected in the Strategy on Information Security in the RM for 2019-2024. Compliance with national cyber security controls to international standards will ensure the security of the organization's data and resources by implementing effective, time-verified security controls. Another benefit is the confidence of foreign partners in public organizations of the country, because there will be guarantees that the data provided is confidential, complete and available. It is very important to increase the number of public organizations, certified with the ISO 27001 standard in Moldova in order to ensure the level of compliance with international cyber security requirements. The gap method, which was used in this study, measures the completeness of the MCSR, which is mandatory for public institutions in the Republic of Moldova, compared to the international standard ISO 27001. Based on the results obtained, a series of recommendations were developed which include: the creation of information security management systems (ISMS); performing internal and external audit of systems to meet trends; alignment of the MCSR, issued by the Government of the Republic of Moldova to the security controls of the ISO 27001 standard. It is very important to ensure an acceptable level of cyber security in public institutions in the Republic of Moldova, therefore implementation and certification with international standards is mandatory.

**Keywords:** *control, ISO 27001, ISMS, MCSR, public organization, security, standards.*

**Rezumat.** Protecția datelor în organizațiile publice din Republica Moldova (RM) este asigurată prin implementarea controalelor obligatorii de securitate cibernetică (MCSR), adoptate de guvern. Pentru a analiza exhaustivitatea controalelor, a fost realizat un studiu comparativ între MCSR și standardul de securitate cibernetică ISO 27001. Intenția de a respecta standardele internaționale de securitate cibernetică este reflectată în Strategia privind securitatea informațiilor din RM pentru 2019-2024. Conformarea controalelor naționale de securitate cibernetică, la standardele internaționale, va asigura securitatea datelor și resurselor organizației, prin implementarea unor controale de securitate eficiente, verificate în timp. Un alt beneficiu este încrederea partenerilor străini în organizațiile publice ale țării, deoarece vor exista garanții că datele furnizate sunt confidențiale, complete și disponibile. Este foarte importantă creșterea numărului de organizații publice, certificate cu standardul ISO 27001 în Moldova,

pentru a asigura nivelul de conformitate cu cerințele internaționale de securitate cibernetică. Metoda decalajului, care a fost utilizată în acest studiu, măsoară completitudinea MCSR, care este obligatorie pentru instituțiile publice din Republica Moldova, în comparație cu standardul internațional ISO 27001. Pe baza rezultatelor obținute, au fost elaborate o serie de recomandări, care includ: crearea sistemelor de management al securității informațiilor (ISMS); efectuarea auditului intern și extern al sistemelor pentru a îndeplini tendințele; alinierea MCSR, emisă de Guvernul Republicii Moldova, la controalele de securitate ale standardului ISO 27001. Este foarte important să se asigure un nivel acceptabil de securitate cibernetică în instituțiile publice, prin urmare implementarea și certificarea cu standarde internaționale sunt obligatorii.

**Cuvinte cheie:** *control, ISMS, ISO 27001, MCSR, organizație publică, securitate, standarde.*

### **Introduction**

In the new global conditions, the need to ensure information security is growing, in the context of the massive migration of data from different organizations in the virtual space. The impact of the Covid-19 epidemic has significantly influenced organizations, which use ICT technologies in their work, as more companies have started to operate remotely and the vulnerability of data increases. The complexity of the data management process has increased considerably, thus ensuring data security is an ongoing challenge for ICT specialists.

To meet the new challenges, organizations need certification based on international information security standards, which contain procedures, methods and tools, capable, as a whole, of ensuring data security.

According to the annual report on monitoring the evolution of the global information society "Measuring the information society 2017", launched by the International Telecommunication Union, the Republic of Moldova ranks 59th out of 176 countries in the ranking. At European level, the Republic of Moldova has advanced compared to the global and regional average, being among the top 10 countries with the most dynamic developments in the world [1].

Under these conditions, the Information Security Strategy will be implemented in the period 2019-2024, which aims to increase information security at the state level, by achieving specific objectives in the field. Adapting national security controls to international security standards will undoubtedly increase electronic security, but also the confidence of foreign partners.

Currently, within the international cyber security standards of the ISO 27000 suite, certification is achieved through the ISO 27001 standard, which certifies the compliance of organizations with the provisions of this standard and the creation of Information Security Management System (ISMS), to ensure IT security [2]. Thus, ISMS allow the implementation of a complex mechanism that determines the security areas of organizations, sets objectives and determines controls, which will increase the credibility of both business partners and their own employees.

According to Decision no. 201 of 28.03.2017 of the Government of the Republic of Moldova [3], on the approval and implementation of mandatory minimum requirements for cyber security (MCSR) for all public institutions, in which the ministry or other central administrative authority is a founder, are required to implement the minimum requirements mentioned above.

The purpose of the research is to identify the degree of compliance of the requirements mentioned in Government Decision (GD) 201/2017, with the international security standard ISO 27001, on the approval of mandatory minimum requirements for cyber security, level 1 (use of ICT in the institution).



### 1. ISO/IEC 27001:2013

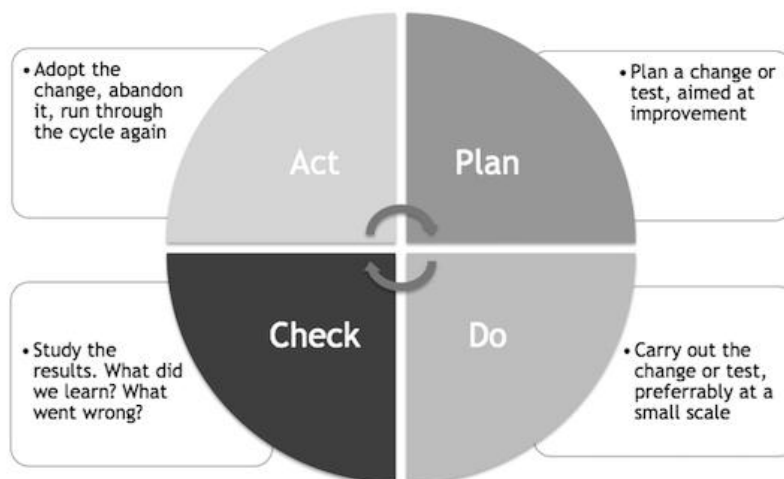
ISO 27001 is the international standard that allows the implementation of ISMS. The specifications of the ISO 27001 standard allow the protection of the company's assets, by creating an ISMS. To ensure information security, ISO 27001 addresses systematic processes, technologies and human resources, as needed, through risk assessment and assistance in the information management process [3].

Cyber security is ensured on the basis of the ISO 27001 standard, in accordance with the following three principles:

- The first is the principle of confidentiality of information, which confirms that only authorized persons have access to information.
- The second is the principle of information integrity, it determines the accuracy with which the data is processed.
- The third is the principle of availability of information, which ensures that authorized persons access the data on request [4].

ISO 27001 guarantees that information in all its forms is secure, and ISMS protects all forms that information can take: transport, processing or storage. Regardless of where they are stored: physically or in the cloud, taking into account security risks [5].

The Plan-Do-Check-Act chain is used by the ISO 27001 standard, for the implementation of ISMS and is based on the idea of a continuous process of implementing information security [6].



**Figure 1.** Plan-Do-Check-Act [6].

Certification, according to the ISO 27001 standard, is possible after performing the actions described in Figure 1, which is a closed cycle of actions, designed to support the information security management process.

Also, through the implementation of ISMS, it will increase the resistance to attack, as a result of continuous changes, depending on objectives, controls and security clauses.

According to the annual survey conducted by the International Organization for Standardization ISO [7], the number of valid certificates of ISO management standards (including ISO 27001) are reported for each country, each year. In 2019, the number of organizations certified with ISO 27001, at international level, was 36,362, while in 2018 there were 31,910 organizations. Thus, the number of certified organizations showed an annual increase of over 12%. The result of the survey showed that developed countries have widely implemented certification with the ISO 27001 standard, so that in Germany there are 1332 certified organizations, Japan - 6015 organizations, in China - 9508, in Romania the number of certified organizations is 668 organizations. While in the Republic of Moldova only 4 organizations are ISO 27001 certified [7].

### ISO 27001 controls

As information security is not only strictly related to the IT field, the ISO 27001 standard also contains provisions for human resources management, legal framework, organizational management and physical security, for a complex approach to information security. Thus, the security controls contained in Annex A to the standard are organized into 14 sections, 35 objectives and 114 security controls, reflected in Table 1. Each section focuses on a specific aspect of information security [8].

Table 1

**Security areas, objectives and controls in Annex A, ISO 27001**

No.	Security domains	Objectives	Controls
A.5	Information Security Policies	1	2
A.6	Organization of Information Security	2	7
A.7	Human Resource Security	3	6
A.8	Asset Management	3	10
A.9	Access Control	4	14
A.10	Cryptography	1	2
A.11	Physical and Environmental Security	2	15
A.12	Operations Security	7	14
A.13	Communications Security	2	7
A.14	System acquisition, development and maintenance	3	13
A.15	Supplier Relationships	2	5
A.16	Information Security Incident Management	1	6
A.17	Information Security Aspects of Business Continuity Management	2	4
A.18	Compliance	2	8

In order for an institution to be certified with ISO 27001, it is necessary for it to meet the basic regulatory requirements, mentioned from clause 4 to 10, which are otherwise key clauses [9]. The elements of the main clauses are reflected in Table 2.

Table 2

**Main clauses of ISO 27001**

No clause	Main clause	Sub-clause
4	Context of Organization	Understanding: The organization and its context, The needs and expectations of interested parties, Determining the scope of ISMS, Information security management system.
5	Leadership	Leadership and commitment, Policy, Organizational roles, responsibilities and authorities.
6	Planning	Actions to address risks and opportunities, Information security objectives and planning to achieve them.
7	Support	Resources, Competence, Awareness, Communication, documented information.
8	Operation	Operational planning and control, Information security risk assessment, Information security risk treatment.
9	Performance Evaluation	Monitoring, measurement, analysis and evaluation, Internal audit, Management review.
10	Improvement	Non conformity and corrective action, Continual improvement.

The standard requires organizations to review the measures implemented with the controls in Annex A and, if they are lacking, to implement or document them as inapplicable [8].

**2. MCSR**

MCSR adopted by the Government of MD and apply to the State Chancellery, ministries, other central administrative authorities subordinated to the Government, including organizational structures within their sphere of competence (subordinate administrative authorities, decentralized and subordinated public services, public institutions in which the State Chancellery, Ministry or another central administrative authority as founder), of the autonomous administrative authorities and of the units with financial autonomy [3], for the following:

- Devices and software
- IT systems and resources existing in the institution, as well as those that are being developed, tested and implemented.

MCSR have been classified as follows:

- level 1: basic cyber security (use of ICT in the activity of the institution);
- level 2: advanced cyber security (use of ICT in the institution's activity and provision of ICT-based services).

The research will be performed for level 1, MCSRs. MCSR level 1, have been classified into 4 security domains:

1. Access Control
2. Physical security
3. Operational security
4. Secure exchange of data and communications

**3. Research method**

Consequently, it was examined compliance of the MCSR level 1 and the reference controls contained in the international standard ISO 27001.

The research was conducted using the gap analysis method, between GD 201/2017 and the international standard ISO 27001. The gap analysis is a tool or technique that allows an organization to compare the actual performance (or proposed, as in this case) with the standard international, taken as a reference example [10]. Thus, the gap analysis evaluates the response to "where are we?" in relation to "where we want to be" [10].

Based on the content of the MCSR level 1, in Table 3, the alignment to the controls from the ISO 27001 standard was performed, only the security domains were taken into account, which coincide in both documents. In order to identify security areas and controls related to ISO 27001, Annex A of this standard has been analyzed.

Table 3

<b>Alignment of MCSR (level 1) with the controls in Annex A ISO 27001</b>	
<b>MCSR, level 1</b>	<b>Annex A ISO 27001</b>
15. Access Control	A.9 Access control
16. Physical security	A.11 Physical and environmental security
17. Operational security	A.12 Operations security
18. Secure exchange of data and communications	A.13 Communications security

**4. Results and discussion**

Table 4, shows those security controls of the ISO 27001 standard, which were partially or totally reflected in the MCSR (level 1), access control.

Table 4

<b>Access control</b>		
<b>No</b>	<b>MCSR level 1</b>	<b>A.9 Access control</b>
1	The rights, obligations, restrictions and responsibilities of users are established by the person in charge of the process and communicated to the cybersecurity manager / subdivision;	A.9.1.1 Access Control Policy
2	The person performing system administration activities uses different accounts for administration functions and user functions;	A.9.1.2 Access to Networks and Network Services
3	Each user account is associated with a specific person. If the system does not allow the use of these accounts by other persons, then the system must include special technical means that do not allow the use of these accounts by third parties;	A.9.2.2 User Access Provisioning
4	If the system is not used for multifactor authentication, system users must use a password;	A.9.2.3 Management of Privileged Access Rights
5	The system user must use a password that is a combination of numbers (0-9), Latin characters (lowercase and uppercase) and special symbols (! #%), Consisting of the minimum number of characters, established by the internal security regulations, but not less than 7 characters;	A.9.2.4 Management of Secret Authentication Information of Users
6	Electronic storage and encryption of system users' passwords, including the user authentication process, is prohibited. It is allowed to transport them through an unencrypted public network only in the case of using a single-use password, with a validity of 48 hours from the moment of their transmission;	A.9.2.5 Review of User Access Rights
7	The system must have password management mechanisms, as well as ensure user authentication and identification for a limited period of time;	A.9.3.1 Use of Secret Authentication Information
8	The use of default passwords in equipment and software products is not permitted	A.9.4.2 Secure log-on Procedures
9	Data on activities in the system (logging) are stored in real time and kept for the period established by the internal security regulation, but not less than 6 months;	<b>A.9 Access control</b>
10	Any activity in the system must be identifiable in a specific user account or IP address;	A.9.4.3 Password Management System
11	User rights management must ensure that each user can only use his or her rights. The verification of the activities in the system is performed periodically, at time stages established according to the internal security regulations, but not less than once every 6 months;	
12	Access control management must be set to allow authorized access from the external network via the Internet with only a single-use password, including the electronic signature of the government electronic service of authentication and access control (MPass).	

Assessing compliance, can make the following recommendations related (missing or incomplete in paragraph 15):

- User registration is a good practice related to the security of human resources, which provides for the establishment in the shortest possible terms of the registration / deletion of users from the system, according to control A9.2.1. Registration and deregistration of users.

- The access rights of all external employees and users who have access to information processing, must be eliminated / restricted at the time of dismissal / change of job. Control A.9.2.6. Removing or adjusting access rights.

- The conditions for complying with the policies and keeping the secrets related to authentication must be stipulated from the moment of employment, implementation of control A9.3.1. Use of secret authentication information.

- Access to systems and applications must be controlled by a secure connection procedure to prove the identity of the user provided by A.9.4.2. Secure connection procedures, because the MCSR lacks clarification in case of successful / unsuccessful connection / disconnection and setting alerts for failed attempts and possible blockages. Depending on the nature of the system, access should be limited to certain times of the day or time periods and possibly be restricted depending on the location.

- Utilities must be monitored, as they can overwrite system rights, be easily found and downloaded, so it is very important to restrict the installation of software by users, according to control A.9.4.4. Use of privileged utilities.

- Access to the source code of programs used within the organization must be restricted to eliminate the risk of unauthorized modification. Control 9.4.5. Access to the source code of the program.

Table 5 shows the security controls of the ISO 27001 standard, which were partially or totally reflected in the MCSR, point 16, physical security.

Table 5

Physical security		
No	MCSR level 1	Annex A.11: Physical & Environmental Security
1	Clear delimitation of the perimeter reserved for different groups of IT equipment, drawing up the plans of the server rooms and networks;	A.11.1.1 Physical Security Perimeter A.11.1.2 Physical Entry Controls
2	Ensuring the heating, ventilation and air conditioning conditions of the specialized rooms;	A.11.1.3 Securing Offices, Rooms and Facilities
3	Ensuring access to specialized spaces strictly according to the competencies;	A.11.1.5 Working in Secure Areas
4	Ensuring energy security by using devices in accordance with current regulations and with overload protection;	A.11.1.6 Delivery & Loading Areas A.11.2.2 Supporting Utilities
5	Ensuring adequate maintenance, according to technical requirements;	A.11.2.4 Equipment Maintenance
6	record of equipment and program products, use within the institution.	A.11.2.9 Clear Desk & Screen Policy

In point 16 of GD 201/2017, does not reflect how the physical protection against internal and external threats should take place, according to control A.11.1.1. But it is important to describe and stipulate how the company's assets will be physically protected against accidents, unauthorized actions and natural disasters.

Another aspect of physical protection is the security of cables, which must be adequately protected to limit access by unauthorized persons and thus minimize the risk of interception, interference or damage, as controlled by A.11.2.3. Wiring safety.

A very important role not covered by the MCSR (Level 1) is how the disposal of assets will take place, according to control A.11.2.5 Disposal of assets. It refers primarily to classified, valuable assets for which there must be processes to request and authorize their disposal or return. Limit the time in which assets can be removed depending on risks.

Security controls should also be applied to off-site assets (A.11.2.6), taking into account the different risks involved in remote work. This is a common area of vulnerability.

A final recommendation to ensure adequate physical security is to protect unattended equipment. Especially in workplaces, where exist a large flow of visitors, the frequent change of staff holding different roles, or when the equipment stays on overnight in spaces where other people have access.

Table 6 shows the security controls of the ISO 27001 standard, which were partially or totally reflected in the MCSR, point 17, operational safety.

Table 6

<b>Operations security</b>		
<b>No</b>	<b>MCSR level 1</b>	<b>Annex A.12: Operations security</b>
1	Equipment and software products must be protected to ensure operability of systems;	A.12.1.1 Documented Operating Procedures
2	The following must be: a) an operating system with the current updates applied; b) antivirus program; c) firewall activated; d) installation of automatic locking features;	A.12.1.4 Separation of Development, Testing & Operational Environments A.12.2.1 Controls Against Malware A.12.3.1 Information Backup
3	The technical control is performed periodically, according to the internal security regulation	A.12.4.1 Event Logging A.12.4.2 Protection of Log Information
4	Application of cyber security requirements for the use of networks.	A.12.4.3 Administrator & Operator Logs
5	Elaboration of the continuity plan	A.12.5.1 Installation of Software on Operational Systems
6	Establishing the mechanism for decommissioning the equipment, destroying the data containing it and reusing it;	A.12.6.1 Management of Technical Vulnerabilities
7	Establishing security requirements and restrictions for personal equipment used within the institution.	

Implementing change management control, A.12.1.2, is essential in most environments to ensure that changes are appropriate, effective, authorized and carried out in a manner that minimizes the likelihood of unauthorized or accidental action.

It is necessary to take into account capacity management, control A.12.1.3. Identify future requirements that will meet the objectives of the organization and for which it is necessary to ensure the performance of the system. Such as the ability to: data storage, processing, communications. It is also necessary for capacity management to be proactive (capacity considerations as part of change management) and reactive (alert triggers, for the moment when capacity utilization reaches a critical level).

Another critical aspect is the implementation of control A.12.4.4, clock synchronization. The clocks of all relevant systems involved in processing information within an organization or security domain, to sync with a single reference time source for possible investigation.

Restriction of software installation, control A.12.6.2, especially on local devices. The installation of software by users raises a number of threats and vulnerabilities, including the

threat of malware and the potential violation of software licensing laws. Ideally, users could not install any software on the organizational equipment, however, there may be commercial or practical reasons why this is not possible.

Table 7 shows the security controls of the ISO 27001 standard, which were partially or totally reflected in the MCSR, point 18, the secure exchange of data and communications.

Table 7

Secure exchange of data and communications		
No	MCSR level 1	Annex A.13: Communications Security
1	Applying the guidelines of Service e-mail system;	
2	To prohibit: automatic forwarding of messages; send or transmit messages considered obscene and other antisocial messages; transmission/retransmission of irrelevant content; usage of the e-mail service for obtaining a material gain, for personal, political or other purposes; distribution of copyrighted materials; transmission of confidential information by unsecured electronic messages; the use of the e-mail service for spread malware; hiding and attempting to hide identity when a message is sent by e-mail;	A.13.2.1 Information Transfer Policies & Procedures  A.13.2.3 Electronic Messaging
3	Limiting staff access to irrelevant content.	

For this security domain, MCSR is different from the international security standard ISO 27001. Although this domain has a great impact on the security of information in communications networks. Even those controls, which were mentioned in Table 7, are partially specified in the MCSR.

It is not specified how the network controls for information protection take place, referring to the indications in A.13.1.1 Network controls. Depending on business requirements, risk assessment, classifications and segregation requirements, it is necessary to design and implement balanced network controls. Examples of technical controls are: access control lists, intrusion detection and prevention systems, network-level firewalls, physical, logical or virtual segregation.

To secure network services A.13.1.2, as a first step it is necessary to assess the risks. Subsequently, it is determined whether the relationship between business and security requirements was taken into account when designing the network. It is also advisable to include security measures in agreements for the provision of network services.

It has not been stipulated exactly how the organization's network is segregated (A.13.1.3). Information service groups, users and information systems should be separated into virtual networks (VLANs). The design and control of the network must support information classification policies and network segmentation requirements.

At the same time, it is important to create agreements for the transfer of information (A.13.2.2) within the organization, but also with third parties. Often, communication and transfer procedures are implemented without a real understanding of the risks, which therefore creates vulnerabilities and data compromise.

It is necessary to take into account confidentiality and non-disclosure agreements (A.13.2.4). Good control describes how the requirements for confidentiality or non-disclosure agreements should be identified, reviewed periodically and documented, reflecting the organization's information protection needs. Agreements are usually organization-specific and should be developed taking into account the value of the assets, through risk analysis. These include:

- General non-disclosure agreements.
- Agreements with customers using standard terms and conditions.
- Association/provider/partner agreements used for small and independent service providers that the organization uses to provide services.
- Conditions related to employment.
- Privacy policies.

### **Conclusion**

Cyber security has become a priority for institutions in the Republic of Moldova, through the development of information technologies and their application more and more in daily activities. Moreover, the Republic of Moldova ranks among the top 10 European countries, with the most dynamic developments of the information society.

The results of the annual ISO survey, for 2019, showed that globally, the number of organizations certified with ISO 27001, increased by more than 12%, compared to 2018. Countries with developed economies have aligned with the ISO 27001 standard, on while in Moldova the number of certified companies is very low and this is necessary to increase the number of certified organizations, for two important reasons:

- Information security at the state level to protect services and assets;
- Increasing the trust of foreign partners that the organizations in the Republic of Moldova have complied with international standards.

In the conditions of the pandemic with Covid 19, the need to use ICT tools in business has increased even more, using new technologies to ensure the continuity of processes and the functioning of state and private enterprises.

According to the National Information Security Strategy, for the years 2019-2024, there is a tendency to align with international standards. Creating an information security management system (ISMS), depending on the value of the organization's assets, is an important step. ISMS guarantee by approaching information security as a whole, that implemented controls will increase the resistance of organizations to information attacks.

If certification to ISO 27001 is not possible because it is a very costly process, it should be aligned with the mandatory requirements of cybersecurity for organizations at the state level, taking into account the objectives and security controls of ISO 27001. This would ensure a high level of security for organizations, which is in line with international trends and is not outdated.

Thus, gap analysis, between mandatory cyber security requirements (MCSR) reflected in GD 201/2017 and controls ISO 27001 may be proposed following recommendations:

- To analyze security risks, at the organizational level, to classify assets and information, for more effective security.
- Creation for the level 1 organizations (uses ICT in its activity) an ISMS, which will allow the implementation of complex mechanisms, distributed on security domains, according to the prescribed objectives.
- The approach to information security within the organization is a complex process, constantly changing, for which the internal or external audit of the information system is



a key process, with the identification of the path to follow for assure information security.

- MCSR compliance, level 1 with the ISO 27001 standard controls, to ensure that information is secure, regardless of its status: processing, transport or storage (physical or in the cloud).

The method used in this paper, such as the method of analyzing the gap between MCSR level 1 and ISO 27001 controls, allows us to determine "where are we?" in relation to "where we need to be", in order to adjust the process of ensuring information security, in public organizations in the Republic of Moldova, to the modern trends described by international standards.

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## HEALTH INSURANCE IN THE US: OBAMA VERSUS TRUMP

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**Abstract.** The article elucidates the history of US law, known as Obamacare. Usually you find out that you are eligible for Medicaid when you fill out a health insurance application on the Affordable Care Act (ACA), which passes the information to Medicaid. Because you applied for health insurance on an Obamacare health insurance scholarship, you may be surprised to receive Medicaid instead of a private Obamacare plan. Following the inauguration, Donald Trump signed an order repealing the Affordable Care Act (the Obamacare Act). The decree is symbolic, being the first signed by Donald Trump when he officially took office. This repeal is perceived as a break with the previous government. However, in the face of opposition from the House of Representatives, the text aimed at repealing Obamacare was finally withdrawn on March 24th, 2017, at the request of the new president, who is thus suffering his first major political setback. On May 4th, 2017, the House of Representatives narrowly passed a bill to repeal Obamacare, but the bill was rejected by the Senate on July 28, following a decisive vote by Republican Sen. John McCain, who joined two of the two his fellow Republicans in the vote against repeal. On October 13th, 2017, Donald Trump issued a new decree to circumvent Obamacare. Finally, Donald Trump changed his tactics to repeal the Affordable Care Act, supporting legal initiatives against it, especially in Texas. On the other hand, he made a hobby for the 2020 US presidential election, promising an effective repeal if re-elected, which did not happen.

**Keywords:** *Health insurance, Tea Party, repeal, amend, vote, veto, Obamacare, constitutionality of the law, debt ceiling, health insurance policy, Medicaid, private insurers.*

**Rezumat.** Articolul elucidează istoria legii SUA, cunoscută sub numele de Obamacare. De regulă, aflați că sunteți eligibil pentru Medicaid atunci când completați o cerere de asigurare de sănătate în bursa de asigurări de sănătate Affordable Care Act (ACA), care transmite informațiile către Medicaid. Deoarece ați depus cererea inițială de asigurări de sănătate la o bursă de asigurări de sănătate Obamacare, s-ar putea să vă surprindă că veți primi Medicaid în loc de un plan Obamacare privat. După învestire, Donald Trump a semnat un ordin de abrogare a Legii privind îngrijirea accesibilă (Legea Obamacare). Decretul este simbolic, fiind primul semnat de Donald Trump când a preluat oficial funcția. Această abrogare este percepută ca o ruptură cu guvernul anterior. Cu toate acestea, în fața opoziției din partea Camerei Reprezentanților, textul care vizează abrogarea Obamacare a fost în cele din urmă retras la 24 martie 2017, la cererea noului președinte, care suferi astfel primul său major recul politic. La 4 mai 2017, Camera Reprezentanților a adoptat în mod restrâns un proiect de lege pentru abrogarea Obamacare, dar proiectul de lege a fost respins de Senat la 28 iulie, în urma unui vot decisiv al senatorului

republican John McCain, care s-a alăturat la doi dintre colegii săi republicani în votul împotriva abrogării. La 13 octombrie 2017, Donald Trump a emis un nou decret de eludare a *Obamacare*. În cele din urmă, Donald Trump și-a schimbat tactica pentru a abroga *Actul de îngrijire accesibilă*, sprijinind inițiative legale împotriva acestuia, în special în Texas. Pe de altă parte, a făcut hobby pentru alegerile prezidențiale din SUA din 2020, promițând o abrogare eficientă dacă va fi reales, ceea ce nu s-a întâmplat.

**Cuvinte cheie:** *asigurare de sănătate, Tea Party, abrogare, modificare, vot, veto, Obamacare, constituționalitatea legii, plafon de datorie, poliță de asigurare de sănătate, Medicaid, asiguratorii privați.*

### **Policy context of *Obamacare***

One of the flagship measures of Barack Obama's 2008 election campaign was the introduction of a major reform of the health system allowing the creation, at the federal level, of a "universal health insurance", without imposing compulsory health coverage except for children [2]. One of the aims of this desire to change the health system was to prevent around 45,000 deaths per year, attributed to inadequate health coverage [3]. After the legislative and senatorial elections of November 2010, marked by the push of the *Tea Party*, the most right-wing tendency of the Republican Party, a proposal to repeal the law was tabled in Congress, but rejected by the Democratic majority. Thus, in February 2011, the Senate voted against the repeal of the law by 51 votes to 47, with all Democrats supporting the law while Republicans opposed it [8]. The fight against the law has nevertheless continued, and since January 2011, 56 votes to repeal, amend, or reduce the law have taken place in the US Congress. The most recent vote took place in February 2015, during which a bill repealing *Obamacare* was passed by the House of Representatives by 239 votes to 186. However, this vote is likely to be inconsequential like the previous 55, as President Obama has indicated that he would veto the text if the Senate also passes it [9].

The battle against the law has also taken place at the legal level. More than 20 cases have been filed challenging the constitutionality of the law, with two federal judges in Florida and Virginia upholding the complaints [8]. One of the rulings opposing the Act challenged the constitutionality of compulsory insurance, a device introduced by the new Act to balance the insurance obligation imposed on private insurers, who no longer have the right to refuse files or to raise fees disproportionately because of the client's state of health. The *Supreme Court* was finally asked to rule on the dispute and on 28 June 2012, to the great surprise of the Republicans, the *Supreme Court* upheld the constitutionality of *Obamacare* by 5 votes to 4 [archive].

The Republican Party's blocking of the US federal budget, whose *Patient Protection and Affordable Care Act* they want to see dropped, means that, for the 18th time in its history and the first time since 1996 [10], [11] the US federal administration will be "shutting down" on 1 October 2013 [12]. On 17 October, an agreement is finally reached between the Democrats and Republicans that puts an end to the shutdown while raising the debt ceiling. The *Obamacare* was therefore not modified. But the agreement only extends until 15 January 2014 for the federal budget, and 7 February for the authorisation given to the Treasury to borrow on the markets (debt ceiling) [13]. In December 2013, the Obama administration finally watered down its health care reform because of numerous malfunctions, postponing for millions of Americans by one year the obligation to take out a health insurance policy [14].

Technically *Obamacare* is just a nickname for the *Affordable Care Act*. It was first used in a pejorative sense by opponents of the Act, but President Obama adopted the terminology in 2012, and it has since been used by opponents and both ACA supporters.

Since *Obamacare* is synonymous with ACA, it includes all regulatory changes that apply to the individual health insurance market (both on- and off-exchange, all new major medical plans are ACA-compliant), as well as changes that apply to small group and large group markets.

It also encompasses the expansion of *Medicaid*, which is a cornerstone of the ACA. And it includes the individual and employer mandates – the ACA "sticks" to encourage people to get coverage - with the premiums "the carrots" that make coverage more affordable in health insurance exchanges.

Although legislators and the Trump administration pushed for the repeal of many parts of the CBA in 2017, the only part of the law that was ultimately repealed was the individual term penalty, and that repeal will not take effect until 2019. The GOP tax bill (the *Tax Reduction and Employment Act*) that was enacted in December 2017, will finally remove the individual mandate penalty, but the penalty will still be assessed (early 2019) on the tax returns of uninsured people in 2018.

The ACA remains fully intact in 2018 and most of its parts will likely remain intact in 2019 and beyond.

### **Typical use of *Obamacare* = plans sold in the stock exchange**

Although the term *Obamacare* technically covers the entire ACA, people generally use it to refer to individual health insurance plans sold in health insurance exchanges. So, for the purpose of this article, we will go with this use of the word and take a look at the difference between these plans and *Medicaid*. *Obamacare* plans which are private plans; *Medicaid* is a government-run coverage.

*The most important difference between Medicaid and Obamacare is that Obamacare health plans are offered by private health insurance companies, while Medicaid is a government program.*

*Medicaid*, the government health insurance program for low-income residents of the United States, is a "welfare" program like *SNAP food stamps* or temporary help for needy families.

The term *Obamacare* is generally used to describe private health insurance purchased through *Affordable Key Act* health insurance grants. *Obamacare health insurance plans* are offered by health insurance plans such as *Blue Cross, Kaiser Permanente, Molina, Aetna, Cigna Wellpoint*, and others. *Obamacare health plans* are not run by the government but have to comply with various government regulations.

It should be noted, however, that more than three quarters of *Medicaid* affiliates nationwide are on *Medicaid* managed care plans, which means that their insurance is administered by private insurers who also sell commercial insurance to individuals and businesses.

These plans operate through a contract with the state government to provide *Medicaid* benefits. This can be confusing for people, and it is compounded by the fact that in most states the *Medicaid* program does not have "*Medicaid*" in its name (*Apple Health* in Washington, for example, and *BudgetCare Plus* in Wisconsin).

### **Who gets *Medicaid* vs. who gets *Obamacare***

Getting *Medicaid* is harder than getting an *Obamacare health plan*. If you are a legal resident of the United States you can purchase a private health insurance plan through your ACA health insurance scholarship as long as you are not eligible for health insurance.

If your income is between 100% and 400% of the federal poverty line you can receive a grant to help you pay a portion of your monthly health insurance premiums (note that the lower eligibility threshold is 139%). (*Medicaid* is available for people whose income reaches 138% of the poverty line).

### Patient Protection and Affordable Care Act

The Patient Protection and Affordable Care Act, dubbed "Obamacare", was passed by the 111th Congress and signed into law by President Barack Obama on March 23, 2010 [1]. It is the main component of the reform of the social welfare system in the United States, along with the Health Care and Education Reconciliation Act.

In return for this obligation, the state provides tax incentives to those who cannot afford the coverage. This law has thus made it possible to cover around twenty million Americans who previously lived without insurance, causing the proportion of the latter to fall from 16% to 8.9% between 2010 and 2016.

However, in the United States, care is far from being "affordable": for example, a consultation for simple angina or gastroenteritis with a general practitioner costs in principle 80 dollars, i.e. around 75 euros.

The health system in the United States is nothing like the one we know in France. On the other side of the Atlantic, there is no universal coverage and only a quarter of Americans benefit from a service. Since a 1965 law, the poorest citizens have benefited from *Medicaid*. The income limit above which a sick person cannot benefit from it, as well as the reimbursement rates, vary from one state to another. The other *American public insurance*, also created in 1965, is called *Medicare* and only covers people over 65 years of age.

Those under 65 and those who do not live below the poverty line, i.e. three-quarters of Americans, must take out insurance from private organisations. In the majority of cases, this coverage is financed by the employer. Until 2014, insurers could even refuse to insure a person with a medical history or chronic illness (known as a "pre-existing condition"). But *Obamacare* prohibited this discrimination.

In addition, companies with more than 50 employees that do not finance their employees' insurance must now pay penalties. Finally, with *Obamacare*, children can remain covered by their parents' insurance until the age of 26, which was not the case before.

In fact, the three devices overlap and complement each other. For example, *Obamacare* has made a number of screening tests free of charge, previously paid for, even for those with public coverage. For example, seniors (*Medicare* beneficiaries) still had to pay \$275 (255 euros) out of their own pocket to undergo a colorectal cancer screening colonoscopy. With *Obamacare*, the exam is free for all *Medicare* beneficiaries and thousands of lives have been saved, according to a *University of Virginia* study cited by *NBC*.

Finally, *Obamacare* has instituted a policy of *Medicaid* expansion, encouraging US states to broaden the eligibility criteria for this public insurance. However, 19 states (out of 51) refuse to apply this part of the law, according to the *Kaiser Family Foundation*. Why is this? Because the program is funded partly by the federal government and partly by the states. However, the more beneficiaries a state has, the greater the share of health cares spending in its budget.

Republicans have been waging a relentless war against *Obamacare* since its promulgation. Although the text is only 6 years old, it has already received 60 votes in Congress. Each time, Republicans have tried to prevent its implementation. The *Supreme Court* has even been seized four times! Not only do they consider the reform too costly, but they also denounce the redistributive logic according to which the contributions of healthy people must compensate for the costs of the sickest. For them, the obligation to take out insurance means restrictions on individual freedoms and state interference.

However, in addition to these ideological principles, they believe that *Obamacare* serves many Americans. The insurers - who, it should be remembered, can no longer refuse customers - believe that this market is no longer profitable enough. As a consequence, they either refuse to play the government's game and withdraw from private insurance catalogues compatible with *Obamacare*, or they increase their premiums (in 2017, Americans have paid on average 25%

more for their insurance than the previous year), details *The Washington Post*. In addition, each of these insurers offers different services: sometimes an insurer does not cover consultations in this or that hospital, or with this or that doctor. Opponents of *Obamacare* are therefore outraged to pay more and more for an increasingly limited service.

Now that the *Patient Protection and Affordable Care Act* (henceforth "the Act" or "*Obamacare*") is law, "what is in it" is revealed by 3,256 pages of legislative text, counting the 858 pages of the Reconciliation Bill.

### **The great rules of *Obamacare***

The general principle is to ensure that almost all US citizens have adequate health coverage. Those who did not comply with this obligation were liable to a corresponding fine.

This law obliges all citizens to take out health insurance with a private insurer listed on the healthcare.gov website as "ACA compliant". In return, the state provides tax incentives to those who cannot afford this coverage.

Those who did not comply with this obligation were liable to a fine corresponding to either USD 695 per adult and USD 347.50 per child, or 2.5% of their "Adjusted Gross Income" (annual income after subtraction of the "minimum threshold", i.e. 10.15 per adult in the household).

Since 1 January 2019, US residents no longer incur penalties if they do not have health insurance, or if they choose insurance that does not meet the *ACA Compliant Criteria*. Some states, such as Massachusetts, Washington D.C., New Jersey and Vermont, have nevertheless maintained the health insurance requirement.

### **New obligations for insurers**

*Obamacare* has also introduced new rules for insurance companies, which must now: Provide the insured with an easily understandable summary of his or her coverage.

Respecting the *Medical Loss Ratio*: 80% of the client's premium must be used to make reimbursements and improve the quality of care, and only 20% to cover administrative and marketing costs.

Refund part of the customer's premium in the event of non-compliance with the *Medical Loss Ratio*.

Justify any fare increase of 10% or more.

To give the insured the possibility of appealing in the event of a dispute concerning a refund.

Cover dependent children up to 26 years of age under their parents' policy.

To cover any person wishing to take out insurance, regardless of their state of health and without applying an additional premium.

Covering free preventive care.

In addition, they are now prohibited from:

Cancel a contract due to excessive consumption on the part of the insured person.

Put in place annual ceilings as well as ceilings per contract on the 10 guarantees considered essential.

### ***Obamacare* in practice**

The coming in to force of the CBA has had a number of consequences for the US health care system.

Increase in the number of insured people.

*Obamacare* has partly achieved its main objective: the number of people without insurance fell from 16% in 2010 to 8.5% in 2018.

**Obamacare explained for expatriates**

Is it necessary to take out insurance in the USA?

The ACA had made it compulsory for all US residents, including expatriates, to take out health insurance.

Since January 2019, President Trump has abolished this obligation, which remains in force in five states, under penalty of financial penalties: Massachusetts, New Jersey, Washington DC, California and Vermont).

In any case, when you reside in the United States, it is essential to take out insurance. With the highest health care costs in the world (a simple consultation can cost \$80), paying for hospitalization can be very complicated without health coverage.

**Expatriates can take out an Obamacare-compliant insurance policy.**

The American health care system relies almost exclusively on private medical insurance, which is poorly regulated and expensive in most cases. Choosing to take out "Obamacare compliant" or "ACA compliant" insurance offers a guarantee that the rules laid down by the authorities for the protection of the insured and the contract will be respected: no ceiling for 10 essential guarantees, prohibition of termination of the contract in the event of consumption deemed excessive by the insurer, etc.

It is also possible, under certain conditions, to benefit from coverage for medical history, particularly at the time of arrival in the United States.

**The limits of Obamacare insurance**

However, ACA-compliant insurance also has serious flaws for expatriates, first of all that it is only valid on American territory.

This means that there is no possible coverage for care received during stays abroad, and that repatriation to the expatriate's country of origin will be at the expense of the expatriate.

Choosing American insurance also requires understanding and accepting the specificities of the American health care system: you need to be familiar with certain specific notions such as "coinsurance", "copay" or "out of pocket maximum" in order to be able to foresee your real expenses, and to be able to manage your contract and procedures in English.

Moreover, certain reimbursements are only possible if the patient has been treated in a health network approved by his insurer or with the agreement of a referring doctor.

**Obamacare insurances are, therefore, often not the most adapted to the needs of expatriates.**

International insurance for expatriates is often more attractive than Obamacare insurance for expatriates in the USA.

The contracts taken out are easier to understand than ACA compliant contracts because they are written in a simplified manner that does not require extensive knowledge of the American health system.

All procedures are carried out in French, with contacts that have a good knowledge of the health system and local healthcare networks, as well as of the issues specific to expatriates.

These contracts have been specially developed to meet their needs, and are available in a number of formulas, which are more flexible than Obamacare contracts.

They allow you to be covered anywhere in the world, including during stays in France, and cover at least the essential benefits of hospitalisation and repatriation assistance.

It is also possible to add additional guarantees that do not exist in Obamacare insurance (civil liability, legal assistance, protection of identity papers, plane tickets or luggage in the event of loss, theft or flight cancellation, etc.).

Expatriates preferring international health insurance to *Obamacare* insurance can choose between CFE insurance and a complementary insurance (for example the *Well Away complementary insurance*, which is ACA compliant), or first dollar insurance, which is often the most advantageous solution.

Be careful, however, for residents of states that still apply financial penalties for taking out health insurance outside the *Obamacare* system: you will have to think about adding these penalties to the contribution of the health insurance taken out to find out the total cost of your health coverage.

### **International insurance for expatriates often more attractive**

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### **Policy context**

The US Congress had been debating this health issue for almost a century. Republican President Theodore Roosevelt had already mentioned it in his program, but was defeated in the 1912 presidential election by Democratic candidate Woodrow Wilson. In 1965, Democratic President Lyndon Johnson signed into law Medicare and Medicaid insurance for the elderly and the poor respectively, after winning half of the Republican vote in Congress. Democratic President Bill Clinton also tried to pass an ambitious bill in 1993, but failed.

### **Donald Trump's attitude**

Donald Trump wanted to abolish and replace this emblematic law of the Obama era. But with the particularly complex healthcare system in the US, this campaign promise will be difficult to keep.

Unsurprisingly, Donald Trump asked Congress to enact a law to "replace" *Obamacare*, the health law emblematic of Barack Obama's mandate. "Tonight, I call on this Congress to repeal and replace *Obamacare* with reforms that will expand choice, provide better access (to care) and reduce costs", the US president said in his first State of the Union address on the night of Tuesday 28 February to Wednesday 1 March.



A logical statement for this president who, as soon as he was installed in the Oval Office on Friday, January 20, signed a decree marking the very first step in the dismantling of *Obamacare*.

The president went to war against this measure, which allowed a few millions Americans to access health coverage. Back on an ambitious and imperfect reform, deeply hated by Republicans, including those who benefit from it.

During the campaign, Donald Trump promised to "repeal and replace" *Obamacare*. As soon as he entered the White House, he signed an executive order which, in the words of his spokesman, instructed the various federal agencies to "relieve the burden" of the law pending its repeal and replacement. But more than a month after his inauguration, in his speech to Congress, he still has not detailed his plan. For the law itself cannot be erased with the stroke of a pen: Congress, with a Republican majority, will have to vote, according to a timetable that has not yet been announced. The American press, for its part, is counting on a complete repeal within two or three years. In the meantime, both houses can act on *Obamacare* through budget votes, which require only a simple majority.

Initially, Trump wants to unravel *Obamacare* by using a fast-track procedure "allowing all aspects of the reform affecting the budget to be changed," explains *Courrier International*. It could thus "eliminate the penalties that currently apply to people who do not insure themselves and to employers who do not provide coverage for their employees" and remove "the aide intended to extend the *Medicaid* program (...).

Finally, the Republican plan should prohibit patients from receiving *Obamacare* when they go to certain clinics, such as *Planned Parenthood*, the American equivalent of *Family Planning*. Such a measure would amount to depriving millions of women of free access to contraception.

Donald Trump has been hammering home the fact that no American citizen would be deprived of his or her insurance, which implies the preparation of a plan to replace *Obamacare*. In an interview with the *Washington Post* shortly before his inauguration, he assured that he was putting the finishing touches to his health reform, promising simply "great insurance, simplified in form, cheaper and much better".

While some, including in the Republican camp, fear that the president has not grasped the magnitude of the task ahead of him, touting an "imaginary" plan, *Slate* reports, he can rely on the alternatives prepared by the Republicans. For example, the Republican Speaker of the House of Representatives, Paul Ryan, has advocated a plan that would remove the insurance requirement as well as the income requirements for aid, which would be lowered. According to this plan, "at-risk" patients would be grouped together in state-subsidised insurance groups in order to disengage the federal government, *Le Monde* details. "On the other hand, the Republicans do not want to touch the possibility for children to remain on their parents' insurance until the age of 26," the daily continues.

Finally, this new plan should also provide for a transition for Americans who are beneficiaries of *Obamacare*, so that they don't lose their coverage between the two systems. And for good reason, "a rapid repeal without the slightest replacement would create a situation, at least temporarily (...), of great uncertainty for those concerned, as well as for Republicans, who are under enormous political pressure," reports *National Review*. For the GOP is playing a big game: by keeping, even for a while, a version of *Obamacare* emptied of its substance (for example, by abolishing the taxes that finance it), the Republican party is taking the risk of seeing one insurer after another leave the ship, leaving citizens without the possibility of insurance and therefore of treatment. A return to the pre-*Obamacare* era that nobody, not even Donald Trump, wants.

Increase in the number of insured people. The number of uninsured people fell from 16% in 2010 to 8.5% in 2018.

For people who need to take out health insurance, the government has created online "markets" where they can consult and compare different private insurance options.

The number of insurers in these markets has declined since they were set up, and premiums have tended to rise steadily each year.

### **Donald Trump wants to abolish and replace this emblematic law of the Obama era**

However, with the particularly complex healthcare system in the US, this campaign promise will be difficult to keep.

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### **Process of adoption and parliamentary and legal challenge of the law**

Demonstration by supporters of the *Tea Party*, a movement fiercely opposed to health care reform, in Washington D.C., in front of Capitol Hill on 12th September 2009.

Nevertheless, once elected president, Obama was forced to make concessions in order to get his proposal through Congress. On November 7th, 2009, almost 11 months after his inauguration and, despite a comfortable majority in the House of Representatives, he narrowly won passage of a health care reform bill by 220 votes to 215. Only one Republican, Joseph Cao, had voted for the reform at the time.

After a long debate and multiple amendments, the Senate voted the bill on 30th December 2009 by 60 votes to 39, with all Democrats and Independents voting "for" and Republicans "against".

Finally, after many vicissitudes, on 21st March 2010, despite unfavorable opinion polls, an aggravated polarization of the political class and American citizens, a presidential popularity at half-mast symbolized by the victory of a Republican in Massachusetts to succeed Ted Kennedy and the reluctance of some Democrats, the text voted by the Senate was adopted as is by the House of Representatives by 219 votes to 212 (178 Republicans and 34 Democrats).

As soon as Barack Obama signed the law into law on 23th March 2010, the attorneys general (ministers of justice) of twelve (and then fourteen) American states will declare that they are initiating a federal legal procedure to challenge the constitutionality of the new law for violation of state sovereignty [4] while the legislatures of 37 states are beginning debates to adopt a derogatory status so as not to have to apply the reform [5]. Then, on 24th March, after two Republican amendments to the Senate regarding procedural flaws were passed by the Senate, the *Conciliation Act*, passed by the House of Representatives to implement the new law, which included an extension of federal subsidies, increased state support for the *Medicaid* program, a broadening of the tax base, and reform of the student loan program, was sent back to the House for a new vote, delaying implementation of the law. *The Conciliation Act* was in turn adopted by the Senate on 25th March 2010 [7]. The reform then becomes one of the main

themes of the 2010 mid-term election campaign, the Republicans having promised to repeal or amend it.

The battle against the law has also taken place at the legal level. More than 20 cases have been filed challenging the constitutionality of the law, with two federal judges in Florida and Virginia upholding the complaints [8]. One of the rulings opposing the *Act* challenged the constitutionality of compulsory insurance, a device introduced by the new *Act* to balance the insurance obligation imposed on private insurers, who no longer have the right to refuse files or to raise fees disproportionately because of the client's state of health. The *Supreme Court* was finally asked to rule on the dispute and on 28th June 2012, to the great surprise of the Republicans, the *Supreme Court* upheld the constitutionality of *Obamacare* by 5 votes to 4.

The Republican Party's blocking of the US federal budget, whose *Patient Protection and Affordable Care Act* they want to see dropped, means that, for the 18th time in its history and the first time since 1996 [10], [11] the US federal administration will be "shutting down" on 1st October 2013 [12]. On 17th October, an agreement was finally reached between the Democrats and Republicans that put an end to the shutdown while raising the debt ceiling. The *Obamacare* was, therefore, not modified. But the agreement only extends until 15th January 2014 for the federal budget, and 7th February for the authorization given to the Treasury to borrow on the markets (debt ceiling) [13]. In December 2013, the Obama administration finally watered down its health care reform because of numerous malfunctions, postponing for millions of Americans by one year the obligation to take out a health insurance policy [14].

### **Main provisions of the law**

Described as historic, the text, which received no votes from the opposition (a historic first for this type of legislation), guarantees health coverage for 32 million Americans who do not have it. It nevertheless falls far short of Barack Obama's electoral promises, as it does not include, in particular, a universal public scheme or even public insurance, and will leave 5% of American residents (23 million people) without any health cover (compared with 15% before the reform) [15].

Under the text thus adopted, most Americans will be obliged to take out insurance before 2014, failing which they will be subject to penalties [16]. Subsidies will be provided by the federal government to help lower-income families pay their contributions (incomes below \$88,000 per year [16]). Companies with more than 50 employees (SMEs and traders) that do not provide coverage will also have to pay penalties [17].

In addition, the text prohibits insurance companies from refusing to cover people because of their medical history. Parents will also be able to protect their children up to the age of 26.

Nevertheless, in order to achieve his goals and pass the law, Barack Obama responded to requests from Nebraska Senator Ben Nelson, announcing that he would sign an executive order guaranteeing that the reform would not alter the restrictions on the use of federal funds for abortions [18], which he did on 24 March, the day after the law was enacted [19].

Several corrective measures have yet to be adopted in a budget law by both chambers. The reform is expected to cost \$940 billion (695 billion) over ten years [16]. It should be financed by taxes on high income and lower care expenditure [16] but also by additional taxes on business and investment income.

### **List of main measures**

Many of the provisions of the law do not come in to force until 1st October 2013 for application from 2014 [20].

Insurers must provide the same level of protection, at the same cost, at national level, to any client of the same age, sex and place of residence, regardless of their state of health at the time of signing the health insurance contract. *Medicaid* is extended to individuals and families living on an income equivalent to 133% of the poverty rate.

Establishment of a health insurance exchange system: each federal state sets up a kind of regulated insurance market, selecting private contracts that comply with the rules protecting consumer rights and therefore benefit from financial support from the federal state. People with modest incomes, but above the ceiling for *Medicaid* assistance, receive state budgetary support when they take out insurance via contracts supervised by this exchange system.

Establishment of a health insurance mandate or insurance obligation, aimed at balancing the obligation of insurers to provide the same level of protection to similar clients, regardless of their health status. The principle of this obligation aims to prevent clients from taking out insurance at the last minute, when their condition is critical, at a lower cost, while benefiting from equal protection and avoiding the fair distribution of health costs to the community through the insurance system. This obligation, which already existed, at certain levels, in some states, notably Hawaii, is one of the most contested provisions of the law by Republicans.

Establishment of the *Community Living Assistance Services and Supports Act* (CLASS Act), incorporated as Title VII of the Act. The bill was championed in particular by the late Senator Ted Kennedy, one of the representatives of the left-wing of the Democratic Party. This provision creates a federal public insurance fund to protect individuals from the hazards of life. Membership in this kind of mutual insurance is voluntary. Each insured person receives a sum of money, particularly in the event of disability, to meet his or her daily subsistence needs (between \$50 and \$75 per day). The *Congressional Budget Office* has estimated that this provision could save *Medicaid* \$2 billion in the first decade, since it allows it to be partially replaced (volunteers who have contributed to the fund are guaranteed by the fund rather than by *Medicaid* to which they would have been entitled).

By incorporating the *Biologics Price Competition and Innovation Act* of 2009, drafted by Senator Ted Kennedy, into the *Patient Protection and Affordable Care Act*, the *Food and Drugs Administration* (FDA) becomes competent to authorize bio-generics. Patented bio-drugs retain this exclusive right for 12 years (effective immediately). Generics are reimbursed more than patented drugs by *Medicaid*. In November 2010, Socialist MEP Françoise Castex pointed out that Art. 2.2 of the *Anti-Counterfeiting Trade Agreement* (ACTA), currently under negotiation, contradicted provisions of the *Patient Protection and Affordable Care Act* establishing caps on damages for infringement of drug patents [21].

In addition, a *Patient-Centered Outcomes Research Institute* (POCI), an independent non-profit organization, is being established to conduct comparative analyses of the efficacy of medicines. The institute has only advisory powers, and cannot impose certain medicines or set reimbursement rates. Unlike the UK National Institute for Health and Clinical Excellence, the Institute is legally prevented from developing a QALY (Quality Adjusted Life Year, relating life expectancy to quality, i.e. taking account of dependency or disability) index in its assessment of the comparative value of treatments.

Extension and amendment of the *Indian Health Care Improvement Act* specifically concerning Amerindians living on tribal reserves.

### **Provisional balance sheet**

The reform, after a difficult start, led to a sharp fall in the proportion of Americans without health insurance, which fell from 20.3% to 13.2% of the population between 2013 and 2015 [22]. This rate falls to 10.9% in 2016, but rises to 12.3% after Donald Trump's various attempts to abolish *Obamacare* or reduce its scope.

### **Launching the program**

The reform, which is launched in October 2013, is facing serious difficulties [24].

The website opened on 1 October, where the uninsured had to go to find insurance, was unable to cope with the number of connections. The many warnings previously issued about these problems were ignored; 5% of Americans who already had private insurance saw its cost increase, having to take out new insurance.

Obama was then forced to acknowledge the mistakes that accompanied the implementation of his reform. He had to delay cancelling insurance policies for a year.

### **Rising**

After its initial difficulties, the reform proved to be a success, leading to a 7 percentage point drop in the number of uninsured people. Thus, in March 2015, the American administration highlighted a "historic reduction" in the number of Americans without health insurance: "the proportion of uninsured fell from 20.3% to 13.2% of the population between the third quarter of 2013 and the first quarter of 2015 [22]".

All states have seen a decline in the proportion of uninsured. But the decline has not been uniform. It has been much greater in those states that decided to extend *Medicaid* access as part of the reform and sought to encourage their uninsured residents to take out insurance, such as West Virginia, where the proportion of uninsured people fell from 20 per cent in 2013 to 6.8 per cent in 2016. On the contrary, the proportion of uncovered individuals has declined little in the southern, highly republican states, which have implemented the reform with great resistance [25].

Often, you learn that you are eligible for *Medicaid* when you fill out a health insurance application on your ACA health insurance exchange. If the exchange determines that you are eligible for *Medicaid* in your condition, it will forward this information to *Medicaid*, beginning the *Medicaid* application process. Since you submitted your initial health insurance application to an *Obamacare* health insurance exchange, it can be confusing when you end up receiving an *Obamacare* private plan.

The Trump administration is asking the *Supreme Court* to repeal *Obamacare* (health insurance - introduced by former President Barack Obama - which provided additional insurance for nearly 20 million Americans).

### **Failed repeal by Donald Trump then retry**

After his investiture, Donald Trump signed an order-in-council to repeal the *Affordable Care Act*, commonly known as the *Obamacare Act*. This decree is all the more symbolic as it is the first one signed by Donald Trump since he officially took office. This repeal is symbolically perceived as a break with the previous government [26]. However, in the face of opposition from the House of Representatives (although with a Republican majority), the text aimed at repealing *Obamacare* is finally withdrawn on Friday, 24 March 2017, at the request of the new president, who is suffering his first major political setback. On 4 May 2017, the House of Representatives narrowly passed a bill to repeal *Obamacare*, but the bill was rejected by the Senate on 28 July following a decisive vote by Republican Senator John McCain, who joined two of his Republican colleagues in voting against the repeal of *Obamacare*. On 13 October 2017, Donald Trump issued a new decree to circumvent *Obamacare*.

Finally, Donald Trump changed his tactics to repeal the *Affordable Care Act* by supporting legal initiatives against it, particularly in Texas. On the other hand, by making a hobbyhorse for the US presidential elections of 2020, promising an effective repeal if he is re-elected.

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UDC 328.185:339.19:159.9(498)



## THE RELATIONSHIP BETWEEN CORRUPTION, SHADOW ECONOMY AND HAPPINESS. SURVEY ON ROMANIA

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**Abstract.** In this paper we address the relationship between happiness and acts of corruption and shadow economy in Romania. From our survey conducted on a sample of 101 respondents from Romania (on March 2020), we find that Romanian people do not link happiness to material issues in particular, but rather they see it as a consequence of having families, professional and spiritual fulfillment, while money and property are last in this ranking. The average income that would make the respondents happy is on average of 5,223 lei (about 1,100 Euro) per month, an amount that they consider necessary to cover the basic needs that influence their development. Our findings reveal that the most corruption practices encountered in the public institutions refer to receiving money and gifts for services to which people are entitled followed by receiving money and gifts to favor someone. However, corruption and shadow economy are not perceived as being very relevant in fully influencing the level of happiness they perceive.

**Keywords:** *happiness, corruption, shadow economy, impact.*

**Rezumat.** În această lucrare este abordată relația dintre fericire, acte de corupție și economie ascunsă în România. Din sondajul realizat pe un eșantion de 101 respondenți din România (în martie 2020), constatăm că românii nu leagă fericirea de problemele materiale în special, ci mai degrabă o văd ca pe o consecință a unei împliniri profesionale și spirituale a familiilor, în timp ce banii și proprietățile sunt ultimele în acest clasament. Venitul mediu care i-ar face fericiți pe respondenți este în medie de 5.223 lei (aproximativ 1.100 euro) pe lună, sumă pe care o consideră necesară pentru a acoperi nevoile de bază care le influențează dezvoltarea. Descoperirile noastre arată că cele mai multe practici de corupție întâlnite în instituțiile publice se referă la primirea de bani și cadouri pentru servicii la care oamenii au dreptul, urmate de primirea de bani și cadouri pentru a favoriza pe cineva. Cu toate acestea, corupția și economia ascunsă nu sunt percepute ca fiind foarte relevante pentru a influența pe deplin nivelul de fericire pe care îl percep.

**Cuvinte cheie:** *fericire, corupție, economie ascunsă, impact.*

### 1. Introduction

Various studies have suggested that the corruption affects economic development being an impediment for increasing the investments [1 - 2], the absorption of European funds [3], business development and performance [4], and finally affects the economic growth [5 - 6]. The

phenomena of corruption and shadow economy generate negative effects on economic and sustainable development [7], on the physical and mental health of the population [8 - 11].

In the literature, few studies have investigated the relationship between corruption and happiness or life satisfaction, and the results are quite contradictory [8, 9], [12 - 14].

Thus, the studies of [12], and [13], did not identify any relationship between the level of corruption and the level of mental health. Thus, Bjørnskov et al. investigated a wide range of life satisfaction factors, using a sample of over 70 countries, but did not identify corruption (along with other institutional components, such as freedom of the press) among the significant factors of satisfaction with life. Some similar results were found by [13], for Latin American countries, which also did not identify corruption as a possible determinant of happiness. Graham claims that "the people of Afghanistan, for example, are as happy as Latin Americans and are 20% more likely to smile one day than Cubans," and the explanation is only a matter of adjustment.

On the other hand, the study of [14], comes to document the existence of such a relationship. Therefore, the study of Arvin and Lew conducted in countries around the world, in the period 1996-2010, partially contradicts the conclusions of [13]. Thus, Arvin and Lew empirically point out that acts of corruption reduce happiness, but only for high-income countries. As for low-income countries, they document that happiness is not correlated with corruption. Similar results are obtained by the study of [11], conducted for 185 countries for the period 2005-2017. They find that happiness (mental health) is more pronouncedly affected by corruption in high-income countries than in low-income countries while a high level of corruption more deeply affects the physical health of population in low-income countries than in high-income countries while. In other words, they found that in low-income countries under the low level of life satisfaction, people are more interested to assure the basis needs, which are best related to the physical health and secondary. In this context, corruption does not sting so hard.

Based on the above, we aim to investigate the effects of corruption and shadow economy for the Romanian population as an emerging country.

For our study, we use questionnaires that were sent to 101 respondents from Romania. We find that the average income that would make the respondents happy is on average of 5,223 lei (about 1,100 Euro) per month, an amount that they consider being enough to cover the basic needs. In addition, we find that corruption and shadow economy did not affect the level of people happiness.

Our paper is structured as follows: The next section reflects the working methodology, then section 3 presents results and discussions regarding our main results. The paper ends with the conclusions including a summary and a brief discussion of policy implications, limitations and the avenues for future research.

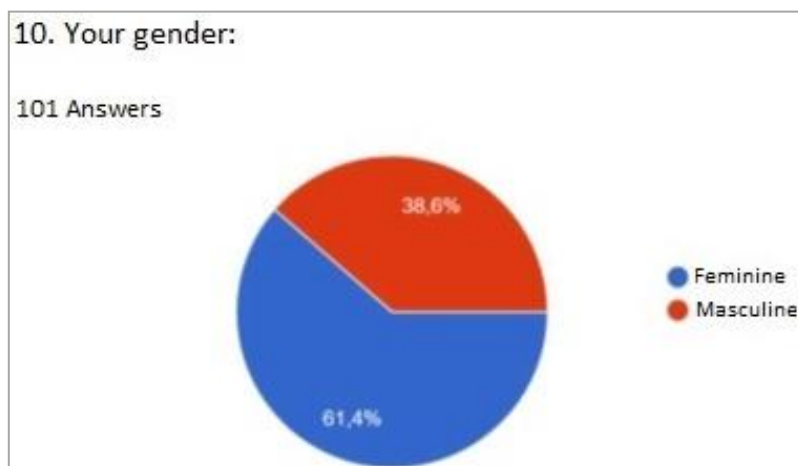
## 2. Methodology

This study involved 101 people, who voluntarily chose to participate and complete the questionnaire anonymously, on March 2020. These persons are 100% Romanian citizens and domiciled in Romania. Regarding the distribution by gender, the female gender predominates, in a percentage of 61.4%, while the male gender is present in a percentage of 38.6% (Figure 1).

Regarding the grouping by age categories, they were chosen so as to include both young and mature population, or seniors, the respondents not being limited by this aspect. Thus, according to the statistics in the questionnaire, the predominant respondents are between 21 and 30 years old. Being followed by those aged between 41 and 50 years, in a percentage of 10.9%, then those aged between 31 and 40 years, which are found in a percentage of 9.9%.

Furthermore, 8.9% of respondents are between the ages of 51 and 60, being followed in a percentage of 3%, equally, by those under 20 years, and those over 60 years (Figure 2).

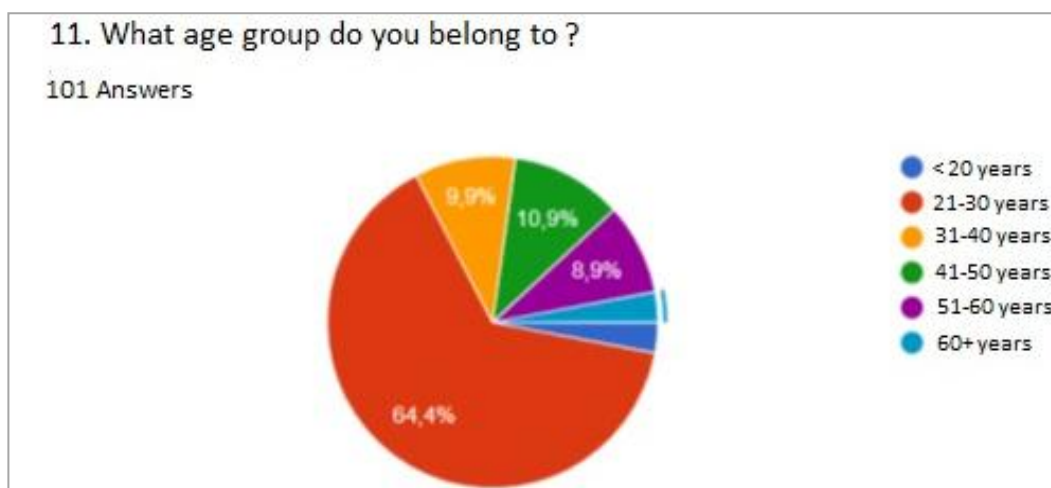




**Figure 1.** Gender distribution of respondents.

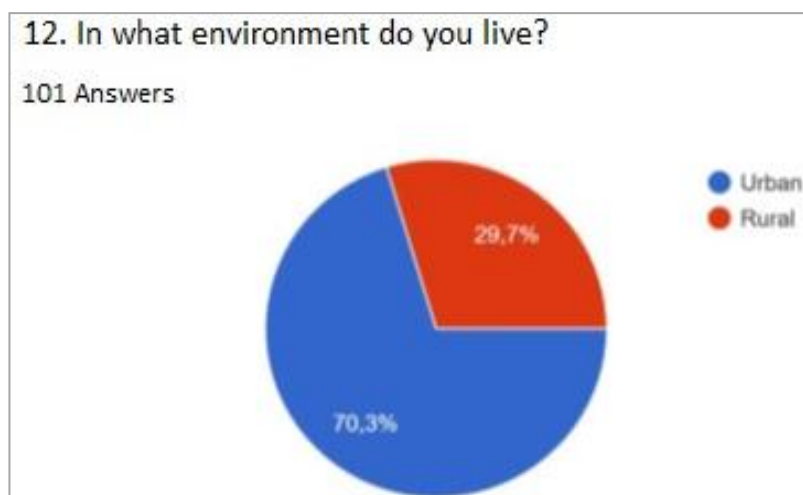
Source: own processing.

According to the distribution regarding the respondents' domicile, the urban environment is predominant, with a weight of 70.3%, while the rural respondents have a weight of only 29.7% (Figure 3).



**Figure 2.** Distribution of respondents by age categories.

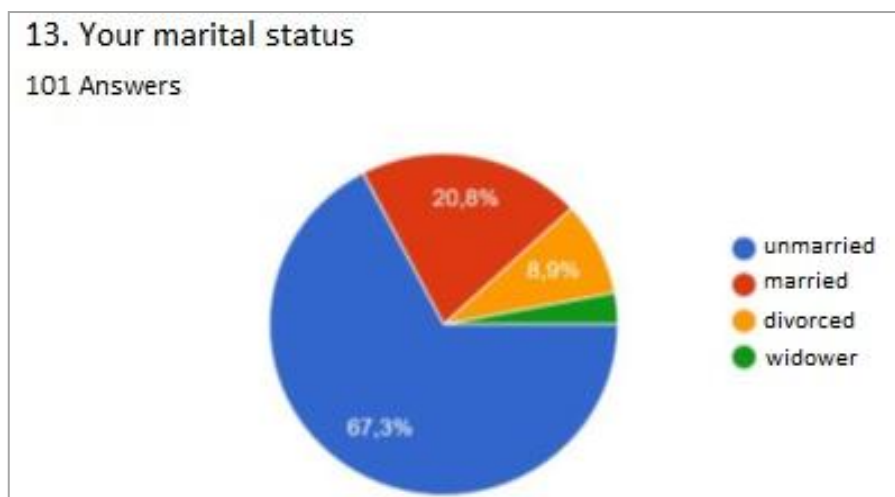
Source: own processing.



**Figure 3.** Distribution of respondents by area of origin.

Source: own processing.

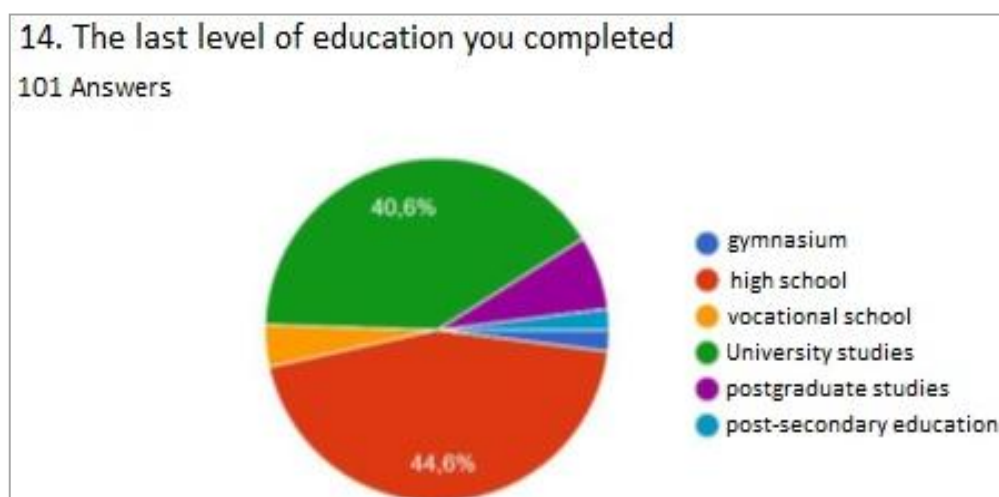
Regarding the marital status, the respondents are divided into 4 such categories, which we will present in the order of their predominance. Thus, 67.3% of respondents are unmarried, followed by married people, with a percentage of 20.8%. Next, on the 3rd place are the divorced persons, in percentage of 8.9%, and the widows come in percentage of 3% (Figure 4).



**Figure 4.** Distribution of respondents by marital status.

*Source: own processing.*

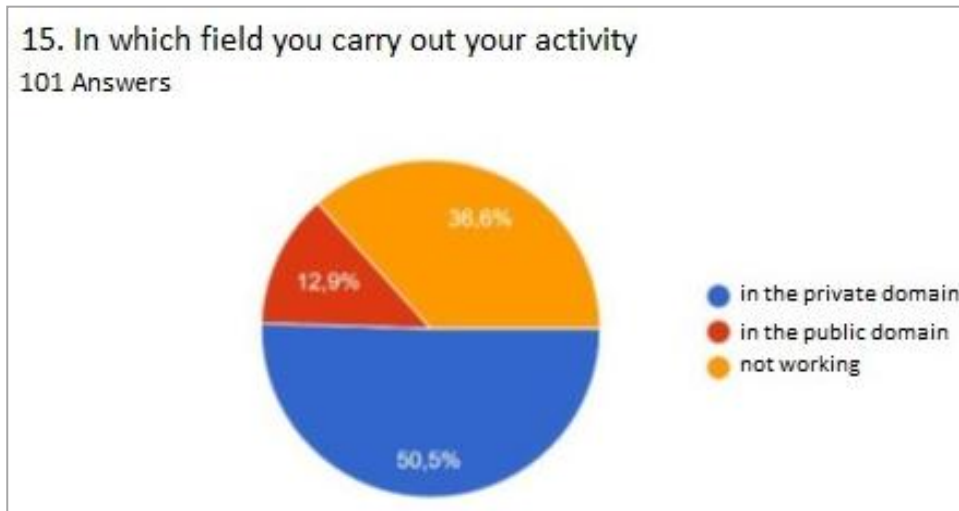
As for the level of institutionalized education that the respondents present, it varies from middle school to postgraduate studies. The most predominant level of education is that of completing high school, existing in a percentage of 44.6% and holds the supreme majority. On the 2nd place is the level of university studies, which materializes in a percentage of 40.6%. Those who graduated postgraduate studies are in a percentage of 6.9%, followed by people who graduated vocational school in a percentage of 4%. The last 2 positions are occupied, equally by those with secondary and post-secondary education, in a percentage of 2% (Figure 5).



**Figure 5.** Distribution of respondents by institutionalized education.

*Source: own processing.*

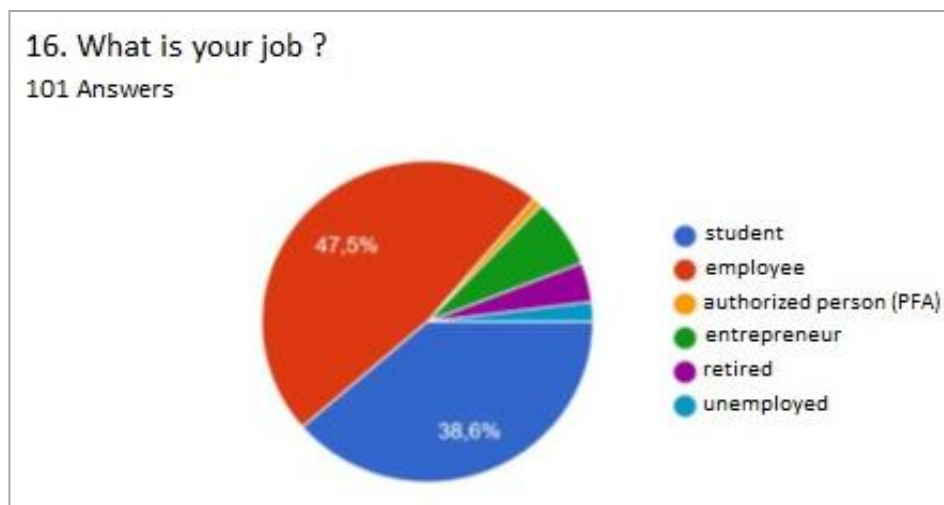
If we refer to the distribution of employees according to the environment in which they operate, the vast majority work in the private sector, in a percentage of 50.5%, while activists in the public environment are distinguished by a percentage of 12.9%, and people who do not have a job at the moment are in a percentage of 36.6%. This percentage largely includes students, pensioners and the unemployed (Figure 6).



**Figure 6.** Distribution of respondents by activity environment.

*Source: own processing.*

Finally, regarding the occupation of the respondents, according to the statistics, it appears that a percentage of 47.5% are employed, followed by the category of students, which are in a percentage of 38.6%. On the 3rd place follow the entrepreneurs, with a percentage of 6.9%, then the pensioners, with a percentage of 4%. On the 5th place are the unemployed with a percentage of 4%, and on the last position, the PFAs in proportion of 1% (Figure 7).



**Figure 7.** Distribution of respondents by occupation.

*Source: own processing.*

The questionnaire consists of 16 questions, with multiple choice answers. Within it, the answers were anonymous, out of the desire to respect the identity of the participants. Returning to the 16 questions, they are divided into questions about happiness, then about corruption, it continues with the underground economy, and the questionnaire ends with questions about demographics, age, status, etc. 101 answers were received, from people of all ages, from young people to seniors, with occupations in both public and private sectors, etc.

Below we will present the 16 questions contained in the questionnaire given for completion, namely:

1. What makes you happy?
2. From what level of income would you become happy and satisfied?
3. Which of the following can promote corruption?

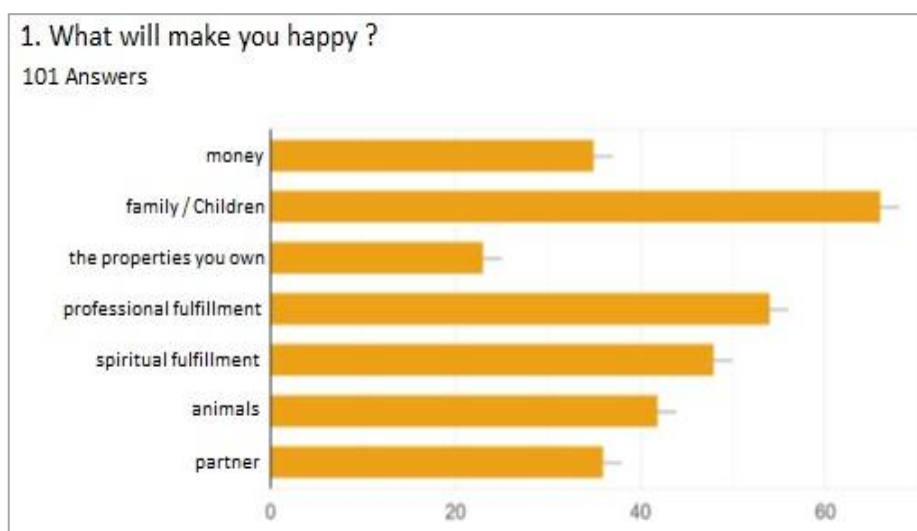
4. Which of the following practices do you think are most frequently encountered in public institutions in your town / county?
5. Which of the following would you categorize as acts of corruption?
6. How do you think the relationship between corruption and the shadow economy works?
7. On a scale of 1 to 7, what is your level of happiness, given the society in which you live?
8. Have you faced at least one situation regarding corruption / tax evasion / undeclared work?
9. If Yes, on a scale of 1 to 7, to what extent did these facts affect your well-being (happiness)
10. Your gender is...
11. What age group do you belong to?
12. In what environment do you live?
13. Your status is ...
14. The last level of study you completed:
15. Where do you work?
16. What do you do for a living?

Based on the answers in the questionnaire, we conducted an analysis to determine the level at which people perceive corruption and the underground economy, but also the extent to which they can be happy in a state that brilliantly combines the two acts. Thus, the results and conclusions that emerged from this study will be presented in the subchapter for the development of the analysis.

### 3. Results and discussions

In this stage of development of the analysis, we will present the relevant aspects related to our study. Namely, we will reveal both the way in which happiness is perceived by participants and how they see the corruption and the shadow economy, what is the connection between them, what practices influence them, or to what extent these practices of society affect their level of happiness. Regarding the first aspect of the questionnaire, which addresses the reasons for the happiness of the population, a percentage of 65.3% of respondents say that family and / or children are the main reason for their happiness, followed immediately by professional fulfillment, with a percentage of 53.5 % (Figure 8).

The last two places according to the respondents' preferences are occupied by the owned properties (with a percentage of only 22.8%) and money (which hold a percentage of 34.7%). That being said, we can state that these people relate their happiness to a greater extent to their loved ones and achievements than to personal property or money.



**Figure 8.** Ranking of the reasons that determine happiness.  
Source: own processing.

The second aspect of the questionnaire concerns the relationship between satisfaction and people's salary level (Figure 9).

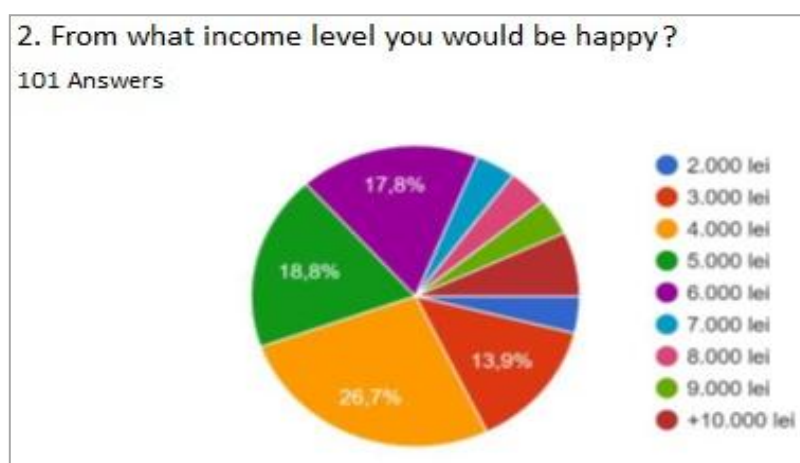
Thus we find that there are four amounts of income that prevail among the respondents, namely: 4000 lei (26.7%), followed by income of 5000 lei (18.8%), then 6000 lei (17.8%) and the fourth place belongs to the income of 3000 lei (13.9%).

Making an average of all incomes taking into account the percentage allocated to each, we obtain an average income of 5,223 lei (about 1,100 Euro/month).

Thus, we can say that the average level of satisfaction of the respondents is around 1,100 Euro.

Also, what we notice is the fact that the respondents do not link their satisfaction with some very high incomes, but are satisfied with amounts that will bring them comfort and well-being, as evidenced by the small percentages they obtained the highest incomes.

For comparison, an average for European Union of the income at which people is financial satisfied is about 2,326 Euro/month (about double than the level for Romania) [14].



**Figure 9.** Percentage of income that brings satisfaction.

Source: own processing.

As for the factors that can influence the occurrence of corruption, they can be seen in the Figure 10. We find that most of the respondent (about 72.3%) consider that the factor that determines the most corruption consist in the deficiency of legislation.

The second place is hold the inadequate salary (61.4%) and the third place is held by the lack of transparency in the relationship of institutions with citizens. The last places in the top created by the respondents are held by religion (15.8%) and a suggestion of the respondents regarding general ignorance and lack of information.

The fourth aspect of the questionnaire refers to possible acts of corruption that may occur (Figure 11).

Thus, the respondents were given to choose from the list proposed by us the most frequent such practices that they consider common in the locality / county where they live. We find that, the first two practices proposed by us lead detached, in very similar percentages, and it is about receiving money and gifts for services to which you were entitled (72.3%), followed by receiving money and gifts to favor someone (69.3%).

The other types of corruption proposed by us are practiced, according to the answers obtained, in approximately equal percentages of 40%.

According to these answers, we notice that it is most common to offer attention in order to obtain certain benefits or favoritisms or even to benefit from some rights that should have existed for free.

## 3. Which of the following may favor the occurrence of corruption?

101 Answers

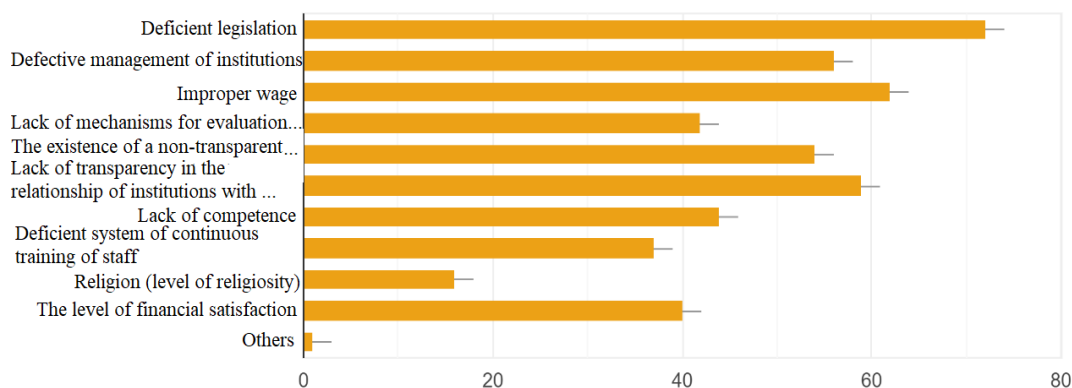


Figure 10. Proponents of corruption.

Source: own processing.

## 4. Which of the following practices do you think are most frequently encountered in public institutions in your locality / county?

101 Answers

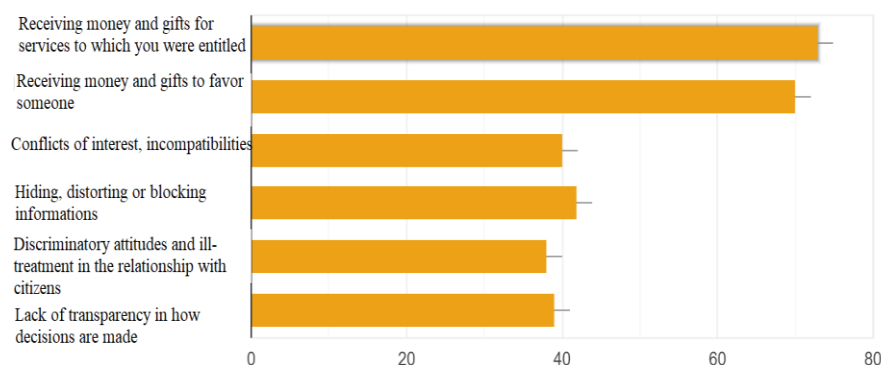


Figure 11. Corruption practices.

Source: own processing.

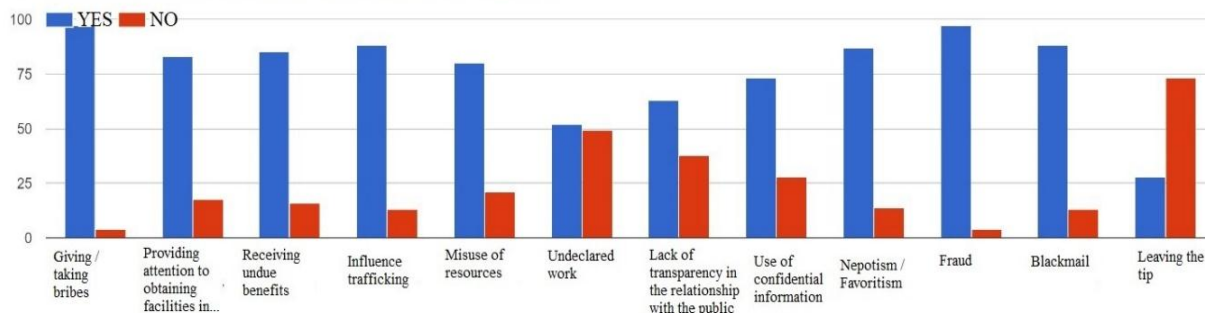
Another aspect covered by the questionnaire is related to acts of corruption and the public's perception of them. Specifically, respondents had to choose which of the items from the list are considered acts of corruption. We must mention that all these practices are essentially acts of corruption, but according to the figure 12 the respondents evaluated them according to their own beliefs.

Thus, the results are as follows: the first place is occupied by frauds and giving or taking bribes (about 97%); the second place goes to influence peddling and blackmail (both with 88%) and on the 3rd place is nepotism / favoritism (87%).

What we may note from our findings is the fact that 73 responses denied tip as an act of corruption, which would be expected, given that it is a fairly common practice everywhere and people don't generally perceive it as something negative. Also, in the graph we see that undeclared work is controversial, so it receives almost equal values for both "yes" and "no". As we can see, opinions are divided, so that half of the respondents see it as a fact that does not have a negative impact on society.

The sixth aspect of the questionnaire is related to the relationship between the shadow economy and corruption, but more than that, about the perception of the population on this subject. According to the results presented in Figure 13, the opinions are divided.

5. Which of the following would you categorize as acts of corruption?

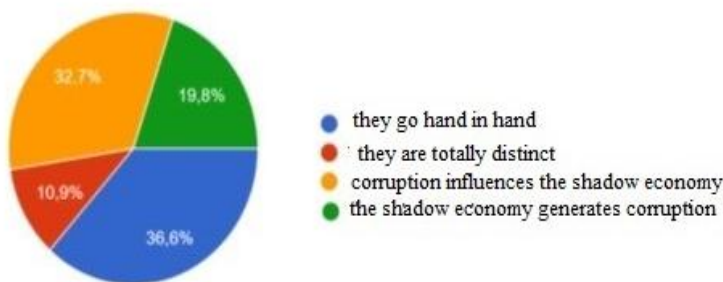


**Figure 12.** Respondents' perception on acts of corruption.  
Source: own processing.

Thus, 36.6% of respondents believe that these two crimes go hand in hand, 32.7% believe that corruption influences the shadow economy, 19.8% believe that the shadow economy generates corruption, and the remaining 10.9% go on the premise that the two concepts are totally distinct. In this case, there is no right or wrong answer but it goes on what people think about the relationship between the two concepts. In this case, as we can see, people are of the opinion, to a large extent, that these two concepts go hand in hand. Thus, we can say that the two components of crime depend on each other and influence each other, causing this flawed relationship.

6. How do you think the relationship between corruption and the underground economy works?

101 Answers

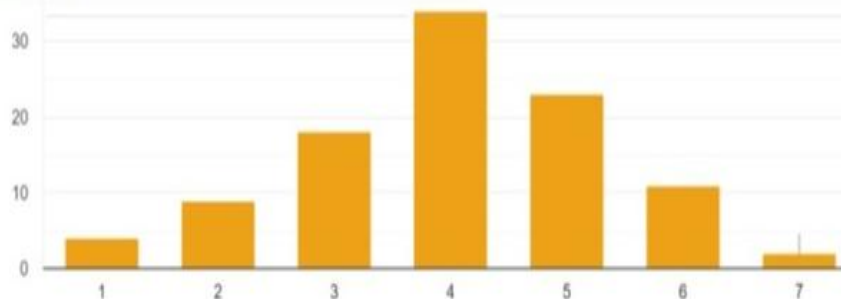


**Figure 13.** The relationship between corruption and the shadow economy.  
Source: own processing.

The next aspect found in the questionnaire is the level of happiness of the respondents, in relation to the society in which they live. Figure 14 shows that most people (a majority of 33.7%) perceives this level of happiness around 4 (which means that they are neither unhappy nor happy).

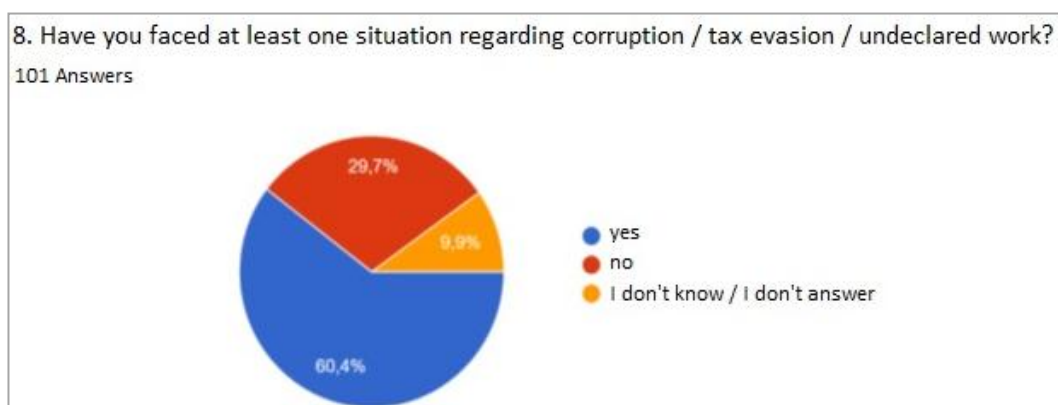
7. On a scale of 1 to 7, what is your level of happiness, given the environment in which you live

101 Answers



**Figure 14.** The level of happiness of the respondents.  
Source: own processing.

If we calculate an average of all the levels of happiness, we obtain an average value of 4.04 which reflects that the level of happiness of the respondents is an average one. As we can see in the figure 7, few people are considered to be very unhappy (4%) but even fewer are considered to be very happy (2%). The eighth aspect of the questionnaire concerns the extent to which respondents faced at least one situation regarding corruption / tax evasion / undeclared work. According to the figure 15, the vast majority has faced such practices, namely 60.4% of respondents, a percentage of 30% from the respondents claims that they have not encountered any of the phenomena presented, and the remaining 9.9% does not know or does not want to answer this question. We may see that the phenomena of corruption, tax evasion or undeclared work are present in our society, a fact confirmed by the high percentage of respondents who came into contact with these facts in one way or another.

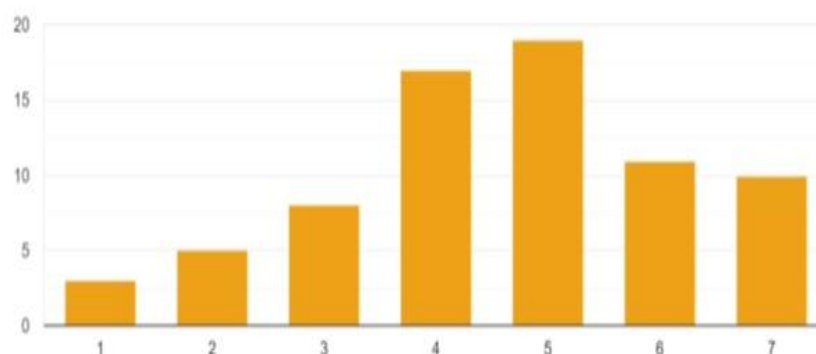


**Figure 15.** Distribution of respondents in relation to contact with economic and financial crime.

*Source: own processing.*

The last aspect of the questionnaire aims at the influence that the practices of corruption / tax evasion / undeclared work have on the level of happiness of the population. The Figure 16 shows the situation of the 101 respondents and how much their happiness was influenced by this practice. As we may see, most votes are given to values of 5 and 4, which means that 26% of respondents say that their happiness has been affected by level 5, according to a scale from 1 to 7. Another 23.3% say that their happiness was affected by level 4, a value related to the same scale. What we also notice is the fact that few respondents claim that their happiness has been affected very little or little, as evidenced by the low percentages of 4.1% and 6.8% attributed to these levels (1 and 2).

9. If Yes, on a scale of 1 to 7, to what extent did these facts affect your well-being (happiness)?  
73 Answers



**Figure 16.** The level of happiness resulting from the interaction with corruption / shadow economy.

*Source: own processing.*



The average of all values offered by the respondents to the extent that their happiness was affected by crime is 4.62. This value is medium but it tilts the balance slightly towards higher values.

According to this result, respondents' happiness is influenced by crime, but not to a very large extent, but to an average, which makes us say that respondents are not so bothered by acts of corruption / shadow economy in society, in which they live but nevertheless there is some influence of these facts on general happiness. These findings are in line with those of Arvin and Lew (2014) and Achim et al. (2020) who also find a weak influence of the level of corruption on the level of happiness for the low-income countries.

#### **4. Conclusions**

In this paper we analyze how the acts of corruption and shadow economy affect happiness (well-being) of the Romanian people.

For this purpose, we sent questionnaires to 101 people, who voluntarily chose to participate and complete the questionnaire anonymously, on March 2020. Our study reveals that Romanian people does not link happiness to material issues in particular, but rather see it as a consequence of having a families, professional and spiritual fulfilment, while money and property are last in this ranking. The average income that would make the respondents happy is on average 5,223 lei (about 1,100 Euro) per month, an amount that they consider necessary to cover the needs of basis and activities that influence their development. Our findings reveal that the most corruption practices encountered in the public institutions are receiving money and gifts for services to which people are entitled followed by receiving money and gifts to favour someone.

A majority of respondents (about 1/3) perceives this level of happiness around 4 (which means that they are neither unhappy nor happy). About 60% of respondents face at least one situation of corruption, tax evasion or undeclared work. Also, the participants in the study were aware of existing corruption and shadow economy in Romania, most of them having the opportunity to meet with such acts. However, corruption and shadow economy are not perceived as very relevant in fully influencing the level of happiness they perceive.

Regarding the level of awareness of people in relation to acts of corruption and shadow economy, we found that the most respondents easily recognized the acts of economic and financial crime, they even identified the institutions most likely to use the illicit methods and they are aware of the relationship between corruption and shadow economy. Based on this, we may conclude that most of them have met at least once in their lives with such aspect regarding the two illegal acts or have been affected by them.

Even if the Romanian people is aware of what is happening, our study highlights that people do not perceive these aspects as seriously as we would expect. In other words, they are indifferent to the illicit practices that happen in Romania and do not let these aspects to affect their happiness (well-being). Another important factor may be the ignorance of the population regarding the daily reality, so that although some aspects displease them, they refuse to get involved based on the remaining mentality of the communist current.

These findings are important for the Romanian policymakers to understand the way in which people understand how the institutional quality is affected by corruption, and the extend in which the people's happiness could be impacted. Under this basis, policymakers will understand the way in which adopted anticorruption and tax policies function.

Our research has some general limitations among these the size of the sample may be invoked. Therefore, in order to reduce this limit and substantiate our findings, in future studies we intend to extend this sample.

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## MODELING COMPETENCIES FROM THE PERSPECTIVE OF TALENT MANAGEMENT

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**Abstract.** Competence is a concept commonly used by both researchers and practitioners to describe performance. The use of competency models was created to describe the selection processes, identify the training needs or succession planning. Skills are the basis of talent management. Talent management is considered to be a method that allows organizations to respond to the requirements associated with increased competencies. Competencies serve the basis of any integrated talent management strategy and facilitate the connection between the business strategy and the talent management philosophy of an organization. Skills modeling gives talent leaders the information they need to design a clear and efficient talent management program. Therefore, the purpose of this paper is to highlight the way in which the modeling of competences is achieved through talent management. The research methodology is based on a qualitative approach, on the analysis of the specialized literature and on online documents such as: the sites of companies, employees' forums, press articles, etc. Thus, talent management models the competencies by preparing the employees for the necessary expertise and by helping them grow with the organization. Modeling skills from a talent management perspective starts with an effective program to help the employee establish then selves in the new role, to be offered ample opportunities to improve skills and competences, while allowing growth through counseling, coaching, mentoring and job rotation schemes. At the same time, the talent management development directive offers training and development opportunities through several learning channels for employees to acquire additional skills, knowledge, competencies, etc., thus building a higher performing workforce.

**Keywords:** *competence, model, process, strategies, talent management.*

**Rezumat.** Un concept frecvent utilizat atât de cercetători, cât și de practicieni în vederea descrieri performanțelor se identifică a fi denumit competență. Utilizarea modelelor de competență s-a realizat în scopul descrieri proceselor de selecție, identificării nevoilor de training sau în scopul planificării succesiunii. Competențele reprezintă baza managementului talentelor. Managementul talentelor este considerat a fi o metodă care permite organizațiilor să răspundă la cerințele ce se asociază unor competențe sporite. Competențele servesc la baza oricărei strategii integrate de management al talentelor și facilitează legătura dintre strategia de afaceri și filosofia de management al talentului al unei organizații. Modelarea competențelor oferă liderilor de talente informațiile necesare pentru proiectarea unui program clar și eficient

de gestionare a talentelor. Prin urmare, scopul acestei lucrări constă în evidențierea modului în care se realizează modelarea competențelor prin intermediul managementului talentelor.

Metodologia de cercetare este fundamentată pe un demers calitativ, bazat pe analiza literaturii de specialitate și a unor documente online precum: site-urile unor companii, forumuri de angajați, articole de presă etc. Astfel, managementul talentelor modelează competențele prin pregătirea angajaților pentru expertiza necesară și prin ajutarea acestora de a crește odată cu organizația. Modelarea competențelor din perspectiva managementului talentelor începe cu un program eficient de a ajuta angajatul să se stabilească în noul rol, de a i se oferi oportunități ample pentru îmbunătățirea abilităților, aptitudinilor și competențelor, permițând totodată creșterea prin scheme de consiliere, îndrumare și rotație de locuri de muncă. Totodată, directiva de dezvoltare a managementului talentelor oferă oportunități de formare și dezvoltare prin mai multe canale de învățare pentru ca angajații să dobândească abilități suplimentare, cunoștințe, competențe etc., construind astfel o forță de muncă cu performanțe superioare.

**Cuvinte cheie:** *competență, managementul talentelor, model, proces, strategii.*

### Introducere

Ultimele decenii pun în centrul creșterii economice preponderent tehnologiile inovatoare, lăsând în plan secundar importanța capitalului uman, cu toate că este resimțit un interes asumat privitor la talentele din cadrul organizațiilor, cum ar fi managementul, potențarea și poziționarea lor strategică.

Experiența practică și cristalizarea teoretică regăsite în țările Uniunii Europene ne provoacă să înțelegem importanța talentelor, a gândirii manageriale dedicate pentru potențarea și valorificarea lor, iar mai mult ca oricând să transpunem în structurile economice românești, atât private cât și în cele de stat, toate instrumentele specifice managementului și dezvoltării resurselor umane din această perspectivă revoluționară.

Ancorarea unei organizații în nevoile externe și interne este strâns legată de gândirea inovativă și talentele angajaților implicați în procesul de producție, iar valorizarea este dependentă de gestionarea capitalului uman.

Gestionarea eficientă a capitalului uman și identificarea talentelor acestuia generează reale oportunități implicite în planul îmbunătățirii abilităților salariaților, direcție care consolidează și valorizează segmentul competențelor acestora.

Înțelegerea relației dintre talent și competențe reprezintă dezideratul, dar și stadiul de evaluare a calității, în general, a managementului resurselor umane, iar în special a managementului talentelor.

Astăzi, la nivel global, suntem în prezența unei veritabile competiții pentru talente și competențe, politica de personal fiind poziționată pe identificarea, recrutarea, angajarea, dar și asigurarea stabilității de noi angajați din spectrul celor care prezintă talente, fiind apreciați ca avantaje competitive ale organizațiilor private sau de stat.

Managementul talentelor devine un proces care se confundă cu însăși progresul companiei, nucleul acestuia arătând că semantica cuvântului inovație nu se mai rezumă doar la dezvoltarea unor noi tehnologii, servicii ori produse, ci astăzi inovația este o fațetă a talentului și un fundament ale competențelor.

Talentul este acel atribut care, în vederea optimizării capitalului uman, transcende formării și dezvoltării personalului aducând capacitatea de inovare la rang de element individual ce necesită gestionarea în vederea îndeplinirii obiectivelor strategice pe termen mediu și lung.

Analizând talentul personalului dintr-o organizație vom putea răspunde obiectivului urmărit de concluzionare a rolului generator în plan individual a modului de a face mai bine, mai calitativ și mai robust produsele ori serviciile.

### Managementul talentului – definiție și proces

Conceptul de „management al talentului” a fost inventat de către McKinsey & Company în urma unui studiu, ieșind în prim – plan odată cu apariția sintagmei „războiului pentru talent” [1]. Asociația pentru Dezvoltarea Talentului (ATD) definește managementul talentului ca fiind „o abordare holistică necesară optimizării capitalului uman ce permite unei organizații obținerea unor rezultate pe termen scurt și lung prin intermediul construirii unei culturi, a implicării și capacitării proceselor integrate de achiziție, dezvoltare și desfășurare de talente, aliniată la obiectivele de afaceri” [2].

În sens larg, managementul talentului reprezintă implementarea strategiilor sau a sistemelor integrate concepute în vederea creșterii productivității la locul de muncă prin intermediul dezvoltării proceselor de atragere, dezvoltare și menținerea angajaților ce au abilitățile și aptitudinile necesare satisfacerii nevoilor organizației prezente și viitoare [3]

Managementul talentului are ca scop crearea unei organizații durabilă și performantă ce prezintă capacitatea de a-și îndeplini obiectivele strategice și operaționale. Un model tipic de management al talentelor are în vedere procesele cheie de resurse umane ce sunt concepute și dezvoltate pentru asigurarea faptului că o organizație își atrage, menține și motivează forța de muncă.

Conform lui Armstrong, procesele cheie de management al talentelor sunt [4]:

- Dezvoltarea organizației ca fiind un loc minunat de lucru;
- Utilizarea procedurilor de recrutare și selecție necesare asigurării atragerea unui personal talentat;
- Proiectarea locurilor de muncă și dezvoltarea rolurilor ce oferă personalului oportunități de aplicare și dezvoltare a abilităților;
- Oferirea unor oportunități de dezvoltare a carierei;
- Crearea unui mediu de lucru în cadrul căruia procesele și facilitățile de lucru permit proiectarea și dezvoltarea de locuri de muncă, roluri recompensate, precum și dezvoltarea unui contract psihologic pozitiv;
- Recunoașterea angajaților talentați prin recompensarea excelenței și a realizărilor acestora;
- Realizarea unor audituri de talente ce îi identifică pe cei cu potențial.

Conform lui Mathis și Jackson, Aswathappa și Schuler, procesele menționate anterior se pot realiza prin intermediul unor programe de capital uman, precum [5-7]:

- Recrutarea, selecția și plasarea – reprezintă procesul de identificare și atragere a solicitanților apti pentru angajare. Realizarea acestui proces este posibilă prin verificarea existenței unui post vacant, identificarea tipului de angajat pe care o caută organizația și, în cele din urmă, căutarea candidaților și realizarea unei liste scurte a celor care se încadrează în tipar [8 - 9]:
- Instruirea și dezvoltarea – reprezintă orice încercare de îmbunătățire a performanței actuale sau viitoare a personalului organizației prin intermediul creșterii capacității unui angajat de efectuare prin învățare, prin schimbarea atitudinii acestuia sau prin dezvoltarea abilităților și a cunoștințelor:
- Compensarea – reprezintă modalitatea de recompensare a angajaților pentru realizările importante de muncă, pentru contribuția la îndeplinirea obiectivelor organizației etc.
- Managementul performanței – reprezintă un proces continuu de comunicare și clarificare a responsabilităților locului de muncă, a priorităților, așteptărilor de performanță și a planificării dezvoltării necesare optimizării performanțelor angajaților, prin alinierea la obiectivele strategice ale organizației.

Astfel, în termeni simpli, managementul talentelor reprezintă modalitatea prin care o organizație construiește și mobilizează talentul în întreaga organizație. Cercetările au evidențiat

că organizațiile care se angajează într-o strategie integrate de management al talantului oferă oportunități de învățare și dezvoltare, precum și o gestionare individuală a carierei angajaților.

Organizațiile care au un succes uriaș își tratează angajații la fel ca propria afacere: îi analizează cu atenție și îi dezvoltă strategic în scopul îndeplinirii obiectivelor de afaceri [10]. Aceste tipuri de organizații identifică competențele și experiențele necesare îndeplinirii obiectivelor și a planului strategic aferent acestora, identifică decalajul dintre nevoile și resursele curente și dobândesc talentul necesar.

### **Competențe – definire**

Competențele reprezintă capacitățile de combinare și utilizare a cunoștințelor și abilităților în scopul stăpânirii situațiilor profesionale, obținând totodată rezultatele așteptate. De asemenea, acestea reprezintă capacitățile reale, comportamentele observabile și măsurabile ce pot fi dezvoltate și modificate, provenind din diverse surse, cum ar fi instruirea, învățarea, experiența la locul de muncă și experiența de viață [11].

Astfel, implementarea competențelor dobândite prezintă acea formă ce permite influențarea unor situații diferite și învățarea din cadrul lor. Examinarea competențelor nu se limitează doar la realizarea unui inventar sau descrierea unor capacități în practica muncii, ci trebuie să aibă ca referință însăși organizația, funcționarea acesteia, procesele de operare, nivelul de competitivitate atins, indicatorii de calitate și productivitate, precum și procesele ce vizează menținerea, dezvoltarea și compensarea talentelor în organizație [11].

Totodată, competența poate fi privit ca un ansamblu de comportamente definite ce oferă cu ghid structurat capabil să identifice, să evalueze și să dezvolte comportamentele angajaților individuali [12].

Combinăția dintre cunoștințe observabile și măsurabile, abilități și atribute personale contribuie la îmbunătățirea performanței angajaților și la succesul organizațional. În vederea înțelegerii competențelor este necesară definirea componentelor competențelor [12]:

- Cunoștințe – prezintă cunoașterea faptelor, a adevărilor și a principiilor obținute în urma formării și experienței formale. Aplicarea bazei de cunoștințe este esențială în vederea obținerii succesului individual și organizațional.
- Aptitudini – o aptitudine reprezintă o competență dezvoltată în operații mentale sau procese fizice, competență dobândită de asemenea prin antrenament specializat. Executarea aptitudinilor prezintă ca rezultat o performanță de succes.
- Abilități – acestea prezintă capacitatea de efectuare a activităților fizice sau mentale ce sunt afiliate adesea cu o anumită profesie.
- Atribute individuale – reprezintă proprietățile, calitățile sau caracteristicile persoanelor care reflectă o înfățișare personală unică. Acestea sunt privite ca fiind dezvoltate genetic sau dobândite din experiențele de viață acumulate. Chiar dacă atributele personale reprezintă cel mai ridicat grad de subiectivitate, cercetările leagă trăsăturile de personalitate specifice performanței individuale și organizaționale de succes.
- Recunoaștere individuală și recompense – acestea oferă o bază puternică în ceea ce privește implicarea individuală în performanță.

Competențele oferă organizațiilor un mod de definire în termeni comportamentali, a obligațiilor personalului pentru a putea produce rezultatele dorite de organizație într-o manieră în care să se respecte cultura acesteia. Definirea competențelor într-o organizație permite cunoașterea de către angajați a elementelor de care au nevoie pentru a fi productivi. Atunci când definirea se realizează în mod corespunzător, competențele permit organizațiilor să evalueze măsură în care sunt sau nu prezente anumite comportamente ale angajaților, iar în situația în care se înregistrează lipsa unor comportamente, acestea pot fi dobândite prin învățare. Această

evaluare oferă posibilitatea organizațiilor de a cunoaște potențialul resurselor de care au nevoie astfel încât să ajute angajatul să se dezvolte și să dobândească competențele necesare.

### **Crearea unui model general privind competențele angajaților**

Consultații în managementul talentelor: Towers Watson, Tracy Shamas și Renee Smith, au identificat patru tipuri de modele diferite de competențe ce se pot dezvolta și anume [13]:

- Modele la nivelul întregii organizații ce includ competențe importante valabile pentru toți angajații, indiferent de nivel sau poziție;
- Competențele ce au la bază funcțiile din cadrul organizației: acestea se aplică unei singure funcții sau unei anumite linii de activitate;
- Modele ce au la bază anumite roluri – includ competențe specifice unui anumit rol sau al unui anumit nivel din organizație, fiind create în scopul de a diferenția așteptările și cerințele comportamentale pentru diferite niveluri.
- Modele ce au la bază locurile de muncă – acestea sunt dezvoltate pentru un anumit post.

Astfel, modelele de competență oferă organizațiilor o direcție clară: „obiectivele de performanță ale unui angajat definesc ceea ce se așteaptă să realizeze angajatul, iar modelele de competență definesc cum și de ce ar trebui atinse respectivele obiective” [13].

De exemplu, Lominger International, o organizație Korn/ Ferry, a dezvoltat unele dintre cele mai cunoscute competențe de conducere: în cadrul grupei „aptitudini strategice” se regăsesc competențe specifice de conducere precum „abordarea ambiguității”, „creativitatea”, „agilitatea strategice”, „gândire în perspectivă” și „managementul inovației” [13].

Investirea timpului și a resurselor în vederea stabilirii unui cadru model de competență agreează oferă beneficii semnificative în managementul talentelor, precum și în modul în care vor fi utilizate competențele în cadrul organizației. Stabilirea unor reguli comune de definire a competențelor într-o organizație va ajuta la stabilirea stadiului de utilizare a competențelor, oferind răspunsuri la întrebări precum [14]:

- Câte unități de competență ar trebuie incluse în fiecare model de competență la locul de muncă?
- Modelele vor include competențe comportamentale, precum și competențe funcționale sau tehnice?
- Cum vor fi gestionate competențele trans-disciplinare?
- Cât de des este necesară revizuirea modelelor de competență?

Prin urmare, există trei criterii de bază necesare unui model de competență capabil să satisfacă nevoile afacerii și care să aibă un impact asupra managementului talentelor, după cum urmează [14]:

1. Modelul de competență trebuie să includă competențele necesare unui angajat în prezent dar și în viitor;
2. Modelul de competență trebuie să o utilizeze preconizată, de exemplu: evaluare, dezvoltare etc.;

Este necesară înțelegerea cu ușurință a competențelor de către întreaga organizație.

### **Elementele unui model de competență**

Modele pot varia de la o organizație la alte, având fiecare libertatea de a decide care model funcționează cel mai bine. În ceea ce urmează, este prezentată o structură utilizată de obicei ca bază în ceea ce privește dezvoltarea modelelor de competență, structură care, combinată cu o bibliotecă de competențe, stabilește cadrul de bază necesar dezvoltării modelelor de competență [14]:

Competențe de bază:

- Competențe transversale

- Comune pentru toate locurile de muncă
- Asigurarea unei baze comune pentru toată populația
- Luarea în considerare a viziunii, valorilor, culturii și priorităților strategice.

Specific funcțional:

- Include competențele de bază ale zonei de muncă și competențele specifice postului;
- De obicei, cuprinde mai mult de 50% din modelul de competență;
- Oferă personalizarea locală a modelelor globale;
- Permite aplicarea pe scară largă a reglementărilor locale.

Locație specifică:

- Oferă personalizarea locală a modelelor globale;
- Permite aplicarea pe scară largă a reglementărilor locale.

Conform lui Gabel, dezvoltarea modelelor de competență, mai ales a celor care implică comportamente în comparație cu cele care implică aptitudini, prezintă un grad mai ridicat de dificultate deoarece este crucial pentru specialiștii în resurse umane să identifice competențe bazându-se pe „incidente critice” [13].

Ideea menționată anterior a fost susținută de către Shirley Gross pentru o divizie de vânzări și marketing la Kodak în mijlocul anilor 1990. Astfel, pentru a dezvolta un model de competență, Gross a intervievat liderii funcției adresând întrebări comportamentale, fiind intervievați atât cei mai buni, cât și cei mai slabi și a selectat comportamentele, aptitudinile și atitudinile care au demonstrat o performanță ridicată [13].

Ca elemente „contra” pentru modelarea competențelor se regăsesc timpul și costurile, dar un obstacol comun este reprezentat de momentul în care organizațiile utilizează modelarea competențelor ca o soluție pentru sine și nu ca un instrument de îmbunătățire a gamei complete de procese de management al talentelor [13].

Identificarea unor astfel de comportamente necesită interviuri facilitate, sesiuni de instruire a părților interesate, precum și ateliere de lucru realizate în scopul creșterii angajamentului și pentru schimbarea mentalității.

Conform experților, există anumiți pași necesari de parcurs pentru a putea concepe un model de competență, după cum urmează [13]:

- Colectarea de informații cu privire la rolurile de serviciu;
- Intervievarea experților în domeniu în scopul descoperii competențelor critice actuale, precum și a modului în care se vor schimba rolurile în viitor.
- Identificarea comportamentelor performante.
- Crearea, revizuirea sau verificarea și livrarea modelului de competență.

Ultimul pas presupune comunicarea concretă a modalității în care modelul de competență trebuie utilizat în practică, dar și a modalității în care acesta susține recrutarea, managementul performanței, formarea și dezvoltarea angajaților, dezvoltarea carierei, planificarea succesiunii, precum și alte procese de management al talentelor.

### **Cele mai bune practici**

Este de evidențiat un studiu realizat de Michael Campion, în cadrul căruia a identificat o serie de bune practici, printre care se regăsesc [15]:

- Trebuie luat în vedere contextul organizațional răspunzând la întrebări precum: care sunt principalele obiective? Câtă expertiză și toleranță prezintă organizația față de modelarea competențelor?
- Conectarea modelelor de competență la obiectivele organizaționale – competențele reprezintă o piatră de temelie finală, dar nu și scopul final.
- Utilizarea unor metode riguroase de analiză a posturilor în vederea dezvoltării competențelor – liderii de talente trebuie să proiecteze un proces eficient în timp.



- Luarea în considerare a cerințelor de muncă orientate spre viitor.
- Utilizarea unor metode suplimentare unice.
- Realizarea unei scurte descrieri a competențelor, precum și specificarea unor indicatori de comportament.
- Definirea nivelurilor de competență – construirea nivelurilor de competență prin utilizarea unei scale de evaluare.
- Utilizarea limbajului organizațional.
- Includerea unor competențe atât fundamentale – transversale, cât și tehnice – specifice postului.
- Utilizarea unor diagrame și imagini în scopul comunicării modelelor de competență către angajați.
- Utilizarea unor tehnici de dezvoltare organizațională în scopul asigurării acceptării modelelor de competență.
- Utilizarea competențelor în vederea dezvoltării sistemelor de resurse umane – îmbunătățește considerabil procesele de management al talentelor.
- Utilizarea competențelor în vederea alinierii sistemelor de resurse umane – crearea unui sistem integrat de management al talentelor.
- Utilizarea competențelor în scopul dezvoltării unei „teorii” practice pentru o performanță eficientă a postului – modelele de competență definesc în mod clar cunoștințele și comportamentele critice.
- Menținerea competențelor de bază ale organizației.

### Concluzii

Cu titlu de concluzie ne putem rezuma la a afirma că talentul și managementul acestuia reprezintă cheia în sfera eficienței managementului corporativ al resurselor umane, dat fiind că atragerea de noi angajați înalt calificați semnifică practic, de cele mai multe ori, identificarea acelor persoane creative, talentate, a căror formare este susținută de aptitudini, atribute care facilitează stabilitatea și adaptarea la nevoile și aspirațiile profesionale ale organizației.

Principala tendință ce trebuie urmărită este nu numai identificarea celor mai active și eficiente instrumente de gestionare a talentelor, ci însăși dezvoltarea lor în planul consolidării competențelor și sporirii spectrului final al acestora.

Astfel, utilizarea competențelor în vederea dezvoltării sistemelor de resurse umane - cadru ce îmbunătățește considerabil procesele de management al talentelor, va reforma imaginea managementului resurselor umane transpunându-l într-un plan novator, flexibil și informal, adaptat așa zisei ”limbi a afacerilor”, realizând o comunicare efectivă între management și indivizii talentați ai organizației.

Managementul resurselor umane în universul divers și colorat al talentelor are rolul personalizării modului de identificare și selectare a angajaților prin orientarea către personalitate în detrimentul rigidului.

Productivitatea muncii, capacitarea ei și performarea salariaților sunt temele contemporane ce își găsesc soluționarea prin dezvoltarea modelelor de competență, implicit prin comportamente în comparație cu cele care implică aptitudini.

Capitalul uman al pieței muncii din România încă comportă o fragmentare, o dezorganizare, și chiar o discreditare, însă fondul incomensurabil de talente pot să își găsească valorizarea și valorificarea într-o strategie durabilă a managementului talentelor, în care dezvoltarea, dar și promovarea talentelor să încurajeze funcțiile de resurse umane în mecanismele profunde ale organizației în timp real.

Putem discuta deschis despre modelarea competențelor din perspectiva managementului talentelor, atunci când fiecare organizație se axează pe planificarea, recrutarea

și angajarea de personal în baza unor criterii clar definite și dependente de necesitățile reale, inclusiv din perspectiva personalității salariaților, oferind ca și contraprestație o motivație ambientală și financiară suficientă să genereze satisfacție, implicare și loialitate. Modelarea competențelor înseamnă oferirea unor modele de competențe, dar și a unor sisteme corecte și coerente de evaluare a performanței angajaților, organizația având astfel un cadru de diagnosticare și evaluare a angajaților organizației.

Aceste dimensiuni permit atât dezvoltarea calității resurselor umane, cât și a eficienței, dar și a imaginii de angajator, formând modele de competențe și sisteme proprii de dezvoltare a acestora.

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## THE IMPACT OF FOOD WASTE AND WAYS TO MINIMIZE IT

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**Abstract.** The article addresses the issue of food waste, which presents a global problem that has recently become even more important on the public and political agenda. The importance of this topic will continue to grow, especially given the need to feed a growing world population. At the same time, in the pandemic conditions created by Covid-19, it presents a major challenge at the international level, both from a health and social point of view, enormously affecting the economies and all industrial sectors, including agriculture, food production, and especially food consumption and food waste. Food is a precious commodity, and its production can require significant resources. Current estimations indicate that around one third of food produced worldwide for human consumption is wasted or lost, which generates significant economic and environmental costs. Food waste is a problem that occurs throughout the food chain and therefore measures should target all its components, with potential benefits for all parties involved. Although there are a number of EU policies that can help combat food waste, this potential is not being made the most of and the opportunities offered have not yet been exploited.

**Keywords:** *food waste, food flows, food supply chain, Covid 19 pandemic, sustainable development.*

**Rezumat.** Articolul abordează problema deșeurilor alimentare, care prezintă o problemă globală, devenită recent și mai importantă pe agenda publică și politică. Importanța acestui subiect va continua să crească, mai ales având în vedere necesitatea de a hrăni o populație mondială în creștere. În același timp, în condițiile pandemice create de Covid-19, acesta prezintă o provocare majoră la nivel internațional, atât din punct de vedere sanitar, cât și social, afectând enorm economiile și toate sectoarele industriale, inclusiv agricultura, producția de alimente, și în special risipa de alimente. Alimentele prezintă o marfă prețioasă, iar producția sa poate necesita resurse semnificative. Estimările actuale indică faptul că aproximativ o treime din alimentele produse la nivel mondial pentru consumul uman sunt irosite sau pierdute, ceea ce generează costuri economice și de mediu semnificative. Risipa alimentară este o problemă care apare pe tot parcursul lanțului alimentar și, prin urmare, măsurile ar trebui să vizeze toate componentele sale, cu beneficii potențiale pentru toate părțile implicate. Deși există o serie de politici UE care pot ajuta la combaterea risipei de alimente, acest potențial nu este valorificat la maximum și oportunitățile oferite nu au fost încă exploatate.

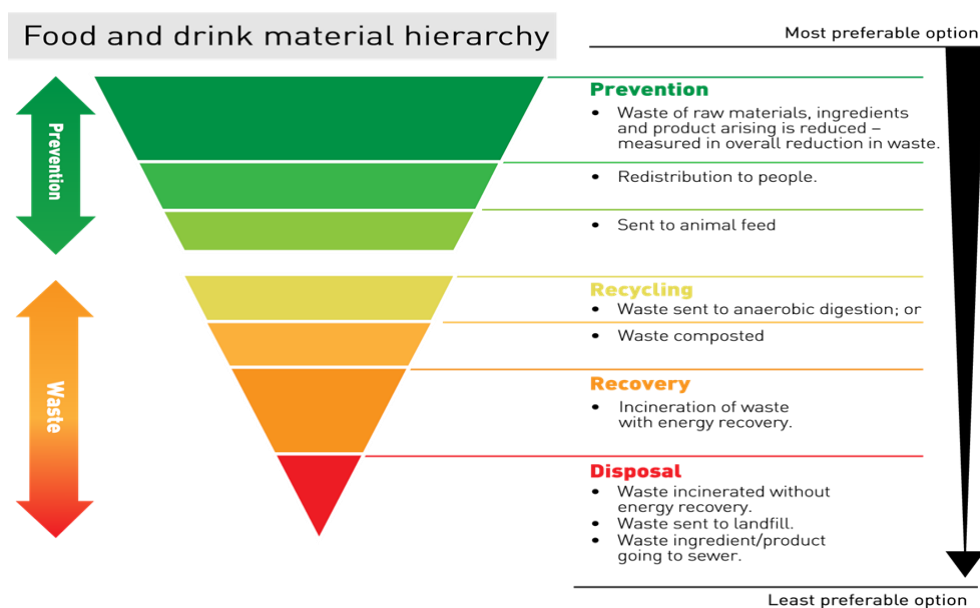
**Cuvinte cheie:** *deșuri alimentare, fluxuri alimentare, lanț de aprovizionare cu alimente, pandemie Covid 19, dezvoltare durabilă.*

## 1. Introduction.

In the EU, 119.1 million people, a quarter of the population, were at risk of poverty or social exclusion in 2015, and 42.5 million people could not afford a quality meal once in two days [1,2]. At the same time, an estimated 88 million tons of food are wasted annually in the EU and the associated costs are estimated at EUR 143 billion [3,4]. In addition to its important economic and social impact, food waste puts undue pressure on finite natural resources and the environment. According to the Food and Agriculture Organization of the United Nations (FAO), about a third of all food produced in the world is lost or wasted [5]. Food that is harvested, but eventually lost or wasted, consumes about a quarter of all water used in agriculture each year and requires an area of land the size of China [6,7]. Food waste generates about 8% of global greenhouse gas emissions annually.

## 2. Waste hierarchy in case of food waste.

The waste hierarchy establishes an order of priority of waste treatment actions, from the most preferable option to the least preferable option, based on criteria related to environmental sustainability. The EU Waste Framework Directive sets out the waste hierarchy applicable in the EU [8]. This hierarchy can be applied in relation to food waste but should be slightly changed to take into account the particularities of food. Several Member States have adapted the food waste hierarchy, opting for the order of preference shown in Figure 1.



**Figure 1.** Waste hierarchy applied in relation to food waste.

## 3. EU food and waste streams.

The main objective of food waste prevention is to act on the source by limiting excess food production at each stage of the food supply chain (ie, production, processing, distribution and consumption). An overview of the analysis of food and waste flows in the EU is presented in Fig. 2 in the form of a Sankey diagram. We notice that the flows of each product group are visualized, starting from the quantities of food produced to primary production and ending with consumption. All flows that enter the supply chain are represented as imports and leave them as exports, by-products to non-food, animal feed by-products, food waste and food consumed by humans.

When a surplus of food occurs, the best destination that ensures the maximum use of edible food resources is their redistribution for human consumption. Food donation not only supports the fight against food poverty but can help reduce the amount of excess food that is industrially recovered or sent as waste to the landfills.

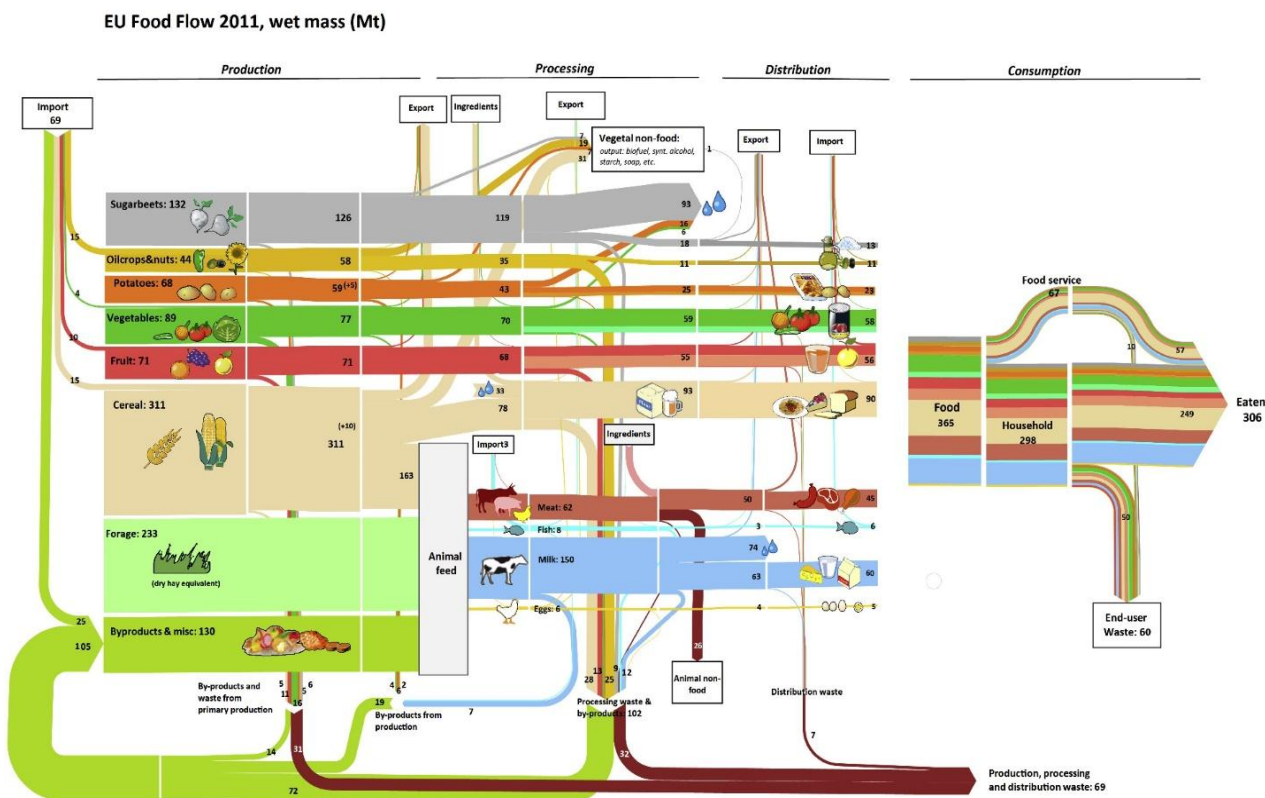


Figure 2. Sankey diagram. EU food and waste streams [9].

However, even if the redistribution of excess food is a growing phenomenon and food producers and retailers are willing to donate their surplus to food banks and charities, the amount of redistributed food is still a small proportion of the total excess edible food available in the EU. For example, in 2016, some members of the European Federation of Food Banks (FEBA) distributed 535,000 tonnes of food to 6.1 million people [10], which is only a small part of the estimated volume of food waste registered annually in the EU.

It should be noted that Member States (MS) and stakeholders have identified for donors and beneficiaries legal and operational barriers to the redistribution of safe and edible food in the EU[11]. Therefore, the action plan proposed by the Commission to promote a circular economy involves clarifying EU food law to facilitate food donation [12].

As mentioned above, food waste is a global issue that has become increasingly important on the public and political agenda in recent years. The importance of this topic will continue to grow, especially given the need to feed a growing world population. Food is a precious commodity, and its production can require significant resources. Current estimates indicate that around one third of food produced worldwide for human consumption is wasted or lost, which generates significant economic and environmental costs [13].

Ensuring the food security of the population is the obligation of each state. The problem of food security, of the access of the population to basic agri-food products of adequate quality, is a major concern faced, to a greater or lesser extent, by all the states of the world, but primarily the underdeveloped or in development countries [14,15]. The problem of food access is a factor that can lead to global instability. Ensuring food security for all individuals contributes to social peace, stability and prosperity [16].

On April 7, 2015, on the occasion of World Health Day, the WHO chose to promote food safety, as foodborne illness kills two million people a year, a significant proportion of whom are children. Foods can contain bacteria, viruses, parasites or chemicals that are responsible for over 200 diseases, from acute diarrheal disease to cancer. There is a vicious cycle between digestive diseases and malnutrition, which primarily affects infants, young children, the elderly

and people with other pathologies. Foodborne diseases can influence socio-economic development by burdening health systems, affecting national economies, tourism and trade [17].

In 2004, the unanimous adoption of the food rights guidelines by the FAO Council was one of the most important steps in the history of the right to food. For the first time, the international community fully agreed on its significance. These guidelines provide a bridge between the legal recognition of this right and its effective realization, providing governments, civil society and other partners with a coherent set of recommendations. They cover economic development policies, legal and institutional issues, agricultural and food policy, nutrition, food security and consumer protection, education and awareness, safety devices, social security, emergencies and international cooperation. It provides a framework for an integrated food security policy at the national level.

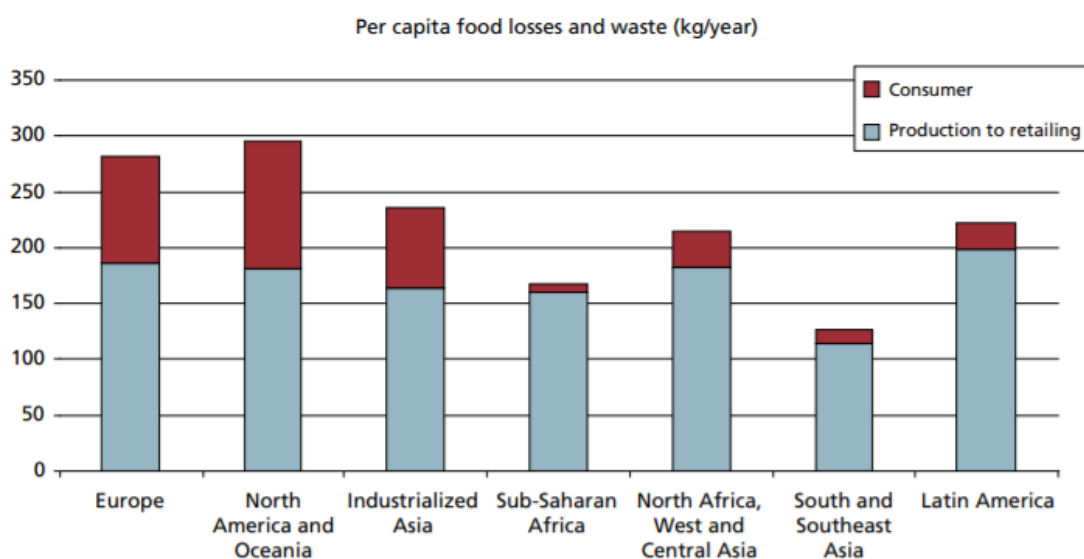
#### 4. Analysis of the situation at international level.

Food waste - means any food and / or inedible parts of food, which are removed from the food supply chain, which must be recovered or disposed of (by composting, anaerobic digestion, bio-energy production, incineration or storage of organic waste) [18].

Food waste is produced along the entire value chain: during the production and distribution process, in shops, restaurants, public catering establishments and households. This is why it is very difficult to quantify them: there is currently no harmonized and reliable method in the EU of their origin and evolution over time. Finding a solution for measuring food waste is an important step towards a better understanding of the problem, a coherent monitoring and reporting process, and effective exchanges of good practice at EU level. The European Commission will develop, in close cooperation with Member States and stakeholders, a common EU methodology for measuring food waste [19].

Food loss - represents the decrease in the quantity or quality of food reflected in the nutritional value, economic value or food safety of all food produced for human consumption but not consumed by humans [20].

Figure 3 shows that the food loss per capita in Europe and North America is 280-300 kg / year. In sub-Saharan Africa and South / Southeast Asia it is 120-170 kg / year. The total per capita production of edible parts of food for human consumption are: in Europe and North America about 900 kg / year and in sub-Saharan Africa and South / Southeast Asia, 460 kg / year.



**Figure 2.** Per capita food losses and waste, at consumption and pre-consumptions stages, in different regions [21].

Food wasted by consumers in Europe and North America is 95-115 kg / year, while this figure in sub-Saharan Africa and South / Southeast Asia is only 6-11 kg / year. Food losses in industrialized countries are as high as in developing countries, but in developing countries more than 40% of food losses occur at post-harvest and processing levels while being industrialized. In several countries, more than 40% of food losses occur at the retail and consumer levels. Consumer food waste in industrialized countries (222 million tonnes) is almost as high as total net food production in sub-Saharan Africa (230 million tonnes).

The graphs of the seven groups of goods below show the percentage of food losses and edible waste parts of food that have been produced for human consumption.

In the case of cereals (Figure ...) wheat is the dominant crop supply in middle- and high-income countries, and the consumer phase is the stage with the highest losses, between 40-50% of total cereal food. In low-income regions, rice is the dominant crop, especially in the very popular region of South and Southeast Asia.

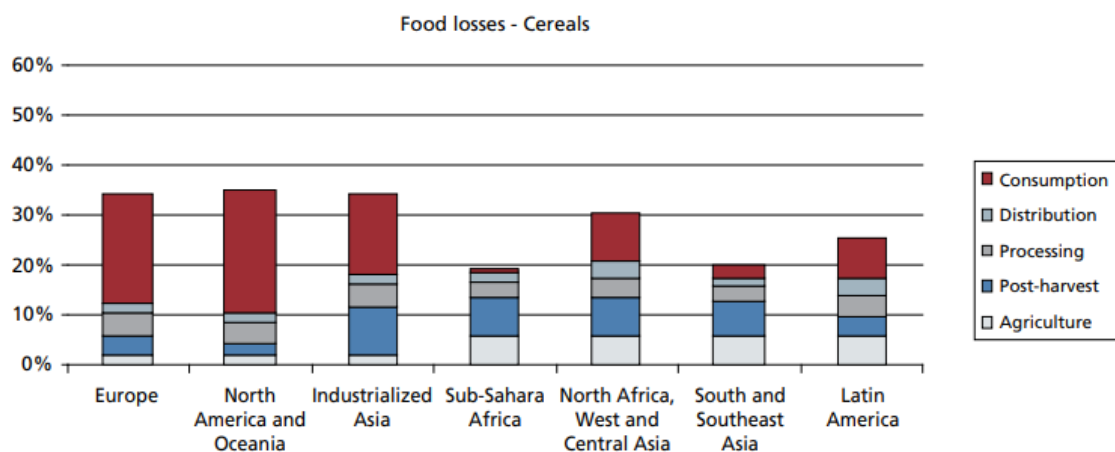
For these regions, agricultural production and post-harvest handling and storage are stages in the FSC with relatively high food losses, as opposed to distribution and consumption levels. In the group of roots and tubers (Figure ...), the potato (sweet potato in China) is the dominant crop supply in middle- and high-income countries.

The results indicate that all three middle- and high-income regions lose the largest volumes during agricultural production.

This mainly depends on the quantity after harvest classification, due to the quality standards set by retailers. However, food waste at the consumer level is high.

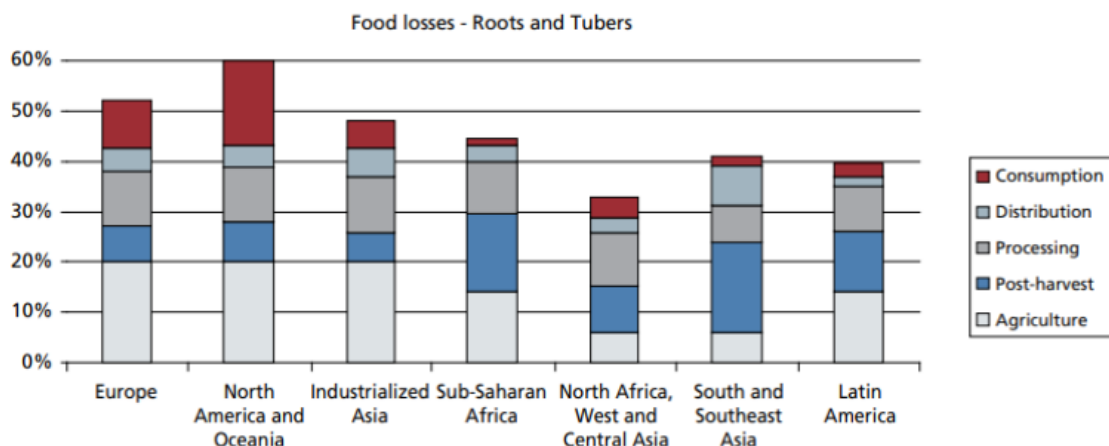
Another important aspect that falls within the food waste is presented by the need for water that is used in the food production that is subsequently thrown away (not consumed).

Thus, the drinking water resources involved in food waste are 215 km<sup>3</sup>/year, which represents approximately 12-15% of global water consumption [22]. At the same time, about 35% of the global population lives with limited access to water [23].



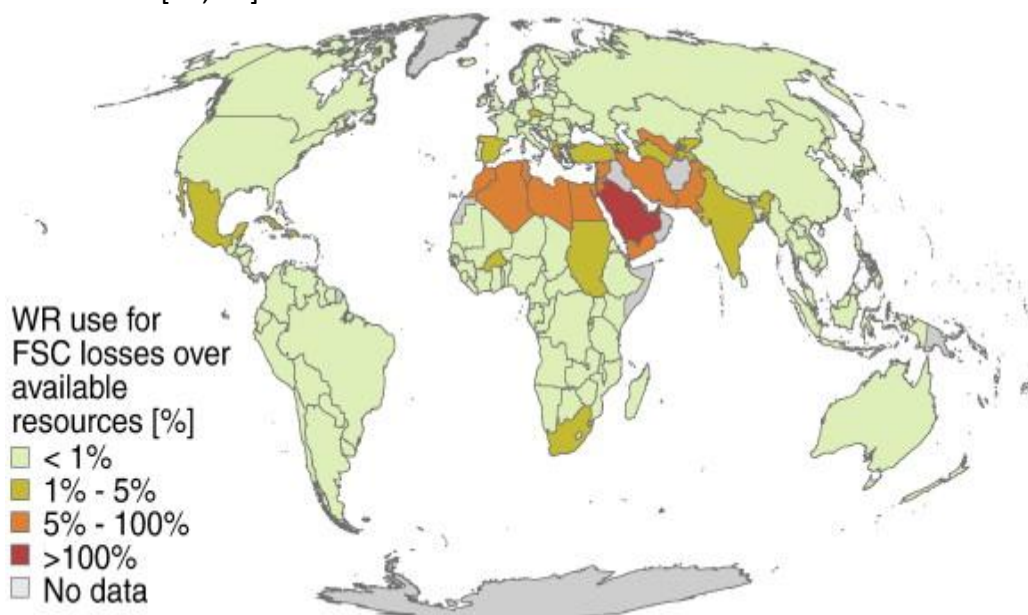
**Figure 4.** Part of the initial production lost or wasted, at different FSC stages, for cereals in different regions [21].

The use of water for food losses as a percentage of the total available freshwater resources is particularly high for the North African countries and West and Central Asia region (more than 5% of the available resources) and in the densely populated South Asian region (about 1-5%) (Figure 6) [24]. In the rest of the world, this percentage is less than 1%, except for Mexico, South Africa, Spain, Turkey and a few small European, African and Caribbean countries. In these countries, the use of water resources for food losses exceeds available resources, namely Kuwait (595% of national renewable water resources), Saudi Arabia (115%) and the United Arab Emirates (222%).



**Figure 5.** Part of the initial production lost or wasted at different stages of the FSC for root and tuber crops in different region [21].

These countries have specific climatic conditions and limited water resources. As a result, they import a large proportion of agricultural products, including food consumed in the domestic market [25]. Another very important factor involved in food waste is agricultural land. Their total use involved in food waste (198 Mha / year) is almost equal to the area of land cultivated in Africa (221 Mha) and is greater than the total expansion of cultivated land worldwide in the last 60 years [26]. Reducing food waste under the "minimum loss" scenario could save 78 Mha of agricultural land, which is more than the area of processed agricultural land in Brazil. It is necessary to take into account that fertilizers that are part of agriculture. Thus their use leads to food waste. These mentions highlight the huge potential of the food supply chain in saving valuable resources [27, 28].



**Figure 6.** Percentage of water resources (WR) use for FSC losses over national renewable water resources. Data source for national renewable water resources: AQUASTAT database.

##### 5. Top countries with major food waste.

The **United Kingdom** throws away 14 million tons of food a year. It is currently estimated that 60% of annual food waste could have been avoided in the UK. Although control actions have led to a reduction of 1.6 million tonnes in annual food waste production compared to 2007, the



results are not encouraging. Studies show that food waste can increase by 1.1 million tons by 2025, if no action continues to be taken [29].

In **Germany**, 11 million tons of food are thrown away every year. Research has highlighted that food waste is mainly generated by retailers, which play a key role between producers and consumers. In addition, through store promotions, consumers are attracted to buy more food than they really need, which leads to the creation of a large amount of household food waste. The vision of German Agriculture Minister Christian Schmidt is for food to have smart packaging that informs consumers when they are no longer edible, such as a microchip in a yogurt glass could decide if it is still consumable "We need conscious consumers who know where food is - in the mouth and stomach, not in the trash," he said.

The **Netherlands** has issued the "United against food waste" initiative. The original initiator is the Task Force Circular Economy in Food, which includes a large number of companies, research institutions, civil society organizations and government agencies under the same umbrella. They aim to halve food waste in the Netherlands by 2030 compared to 2015. The Dutch Ministry of Agriculture, Nature and Food Quality will provide seven million euros over the next four years to support this goal by investing in innovation, research, monitoring and education.

In **France**, the problem is similar. According to a report by the French Environment and Energy Agency (ADEME), every year 10 million tons of food are either thrown away or lost, with damage of 16 billion euros a year. The negative impact on the environment is also shocking. In France, food waste produces 15.3 million tons of CO<sub>2</sub>, which is 3% of the country's total CO<sub>2</sub> emissions. In 2017, France became the first country in the world to ban 10 <https://nuaruncapainea.ro/2019/02/15/top-primele-10-tari-cu-cea-mai-mare-risipa-alimentara/> 8 supermarkets to throw away or destroy unsold food. Thus, it forces them to donate food that is about to expire to charities and food banks.

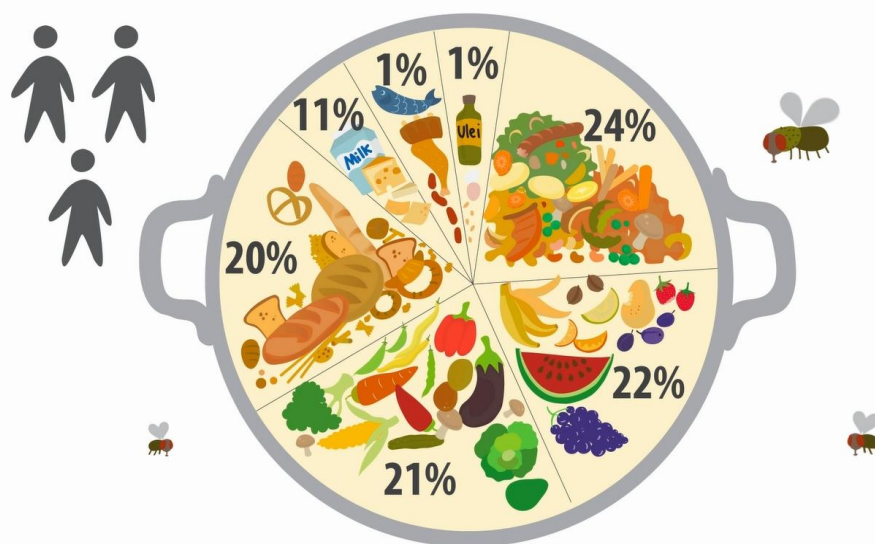
Every year, the population of **Poland** throws away 9 million tons of food. Parliament is working on legislation that limits the amount of waste, followed by other EU countries, while the Polish Senate is drafting a bill on combating food waste. In this context, the question arises as to whether the proposed regulations will reduce this negative phenomenon. In addition, there are many local initiatives in Poland to combat food waste. The best known are the 32 existing food banks. Other initiatives are Outlet Spożywczy, an online platform that sells food near the end of its shelf life, Café Kryzys in Warsaw and others.

In **Italy** - 2013, the Ministry of Environment began working on a national food waste prevention plan, in collaboration with Last Minute Market, a collaborator in food waste management. The main players in the food chain have been involved in the preparation of this waste prevention program. The plan aims to solve the problem of food waste from supply to final consumption. For the time being, animal food waste will not be pursued.

In **Spain**, around 8 million tons of food is wasted every year, making it the seventh largest producer of food waste in the EU. The website "Yo No Desperdicio" and the mobile application, launched in November 2015 and February 2016, are trying to present an alternative to this massive problem. "Yo Nu Desperdicio" is a sharing tool, similar to platforms that facilitate the exchange of trips or exchanges of apartments. This platform (<http://yonodesperdicio.org/>) aims to promote alternative ways of responsible and sustainable consumption, through which we can reconsider our role as consumers, in order to reduce food waste at home, says project coordinator Mari Cruz Martín.

In **Belgium**, two entrepreneurs from Brussels analyzed this problem in their country and came up with an innovative idea: Market Happy Hours, created by Ludovic Libert and Aurélien Marino, to better understand the life cycle of food in supermarkets, logistics in behind processing and handling, as well as ideas for improving the Happy Hours market. "Our desire was to test the distribution logistics to discover constraints that we would not have detected otherwise. We have found that our operational business seems solid, although we still have a lot of work to do. At the end of the week, we collected about 500 kg of food, of which we sold about half. The other 250 kg were given to refugees"- Ludovic Libert.

In **Romania**, food waste amounts to 6,000 tons per day. Romania has implemented the law against food waste, but it is inefficient, because it has rules that "touch" large commercial chains, where food waste is too small compared to that of households. By comparison, 7% of food waste is produced in retail, while 49% is produced in households. Another 37 percent is lost in the food industry, 5% in public catering and only 2% in the agricultural sector. From February 2019, the law on reducing food waste came into force. According to the normative act, the economic agents will have to be more responsible, in order to reduce the food waste, through measures such as the sale at a reduced price of the products close to the expiration of the validity date. 10. The Swedish National Food Agency, in collaboration with the Environmental Protection Agency and the Agriculture Agency, has drawn up the 'More to do more' action plan to reduce food waste, namely one ton per day, on throughout the food chain, from farmers to final consumers. The action plan is part of the Swedish government's commission to the authorities on food loss reduction. The mission extends over a period of three years, starting in 2017, with decision-making in 2019 [30].



**Figure 7.** Percentage distribution of food waste in Romania.

A Romanian throw over 350 grams of food every day, reaching 129 kilograms of food annually. Of this amount, 24% is cooked food, 22% - fruits, 21% - vegetables, 20% - bakery products, 11% - dairy products and 1% - meat. We waste almost as much as the European average, although we have much lower incomes and spend about 40% of them on food [31].

## 6. Food waste and the Covid-19 pandemic.

The Covid-19 pandemic poses a major international challenge both from a health and social point of view, greatly affecting the economy and all industrial sectors, including

agriculture, food production, and especially food consumption. According to the World Health Organization (2020), on June 7, 2020, the Covid-19 pandemic resulted in approximately 6.8 million confirmed cases and over 397,000 deaths globally. In Europe, over 2.2 million cases and over 183,000 deaths. The socio-economic impact, especially due to social distancing, self-isolation and travel restrictions, have led to the blockage of the whole society, millions of jobs being lost or transformed into remote work. Food services for example in hotels, canteens, restaurants, cafes, etc. have been stopped, greatly reduced or reclassified in delivery services [31, 32]. Both food consumption and consumer food behavior have undergone changes due to the Covid-19 pandemic outbreak in early March 2020. The main consequences of the situation have been linked to very large stocks of highly perishable foodstuffs, food chain disruptions, impressive increases in food stocks purchased in large-scale distributions caused by the "stock effect" and "effect stay at home" and a sharp increase in food waste throughout the supply chain with food products, from agricultural stages to consumption [33, 34].

In the context of the above, we can mention that the COVID-19 pandemic has generated a new era in the world. Today, the question of the possible ways of transmitting COVID-19 through food, the involvement of the killer virus in the food supply chain, is becoming more and more topical. For the time being, the possibility of food transmission is poorly outlined and not deeply researched, and the pursuit of SARS-CoV-2 in the workplace is not considered a priority by public authorities. However, the adverse effects on the environment, food systems and people along the food supply chain are already evident. Following some scientific research that has been already carried out, some key findings and conclusions have been made in this field. Thus, as we move "from farm to fork", more safety measures are needed, because more people (and subsequently more potential sources of infection) are involved in the process. For this reason, the need to develop those bioanalytical protocols for food and environmental safety applications is highlighted [36].

### **7. Possibilities to reduce food waste.**

EU research shows that responsibility for food waste lies with:

- 42% of households (households)
- 32% of food producers
- 5% to retailers
- 15% to the catering sector.

The best solution to combat the food crisis is to support family farms. On average, every citizen of the Balkan countries throws away half a kilogram a day. An impressive number of consumers are returning to traditional foods that were part of their diet. For this, family farms, small farms and organic farms are increasingly being developed in response to pesticides and chemicals. People are starting to look for healthy, quality food. Food banks play an important role in reducing waste. There is still much to be done with these banks, including legislative changes. Thus, for such foods, which are donated, no taxes should be paid as for the food sold [29, 31].

At the same time, the economic operators in the food sector represent the natural or legal persons who are responsible for fulfilling the requirements of the food legislation within the food profile enterprise under their control. Among the options that operators have to reduce food waste, the following are recommended:

- Taking accountability measures to reduce food waste in the agri-food chain, starting with the production, processing, storage, distribution and marketing of food, including in the hotel industry and food services sector.

- Taking actions regarding the sale at a reduced price of products close to the expiration date of the minimum durability, according to the legislation in force.

- Taking action regarding the transfer of food by donation, for human consumption, but close to the expiration of the minimum durability date, to the receiving operators, carrying out registered / authorized sanitary-veterinary and food safety activities, assuming responsibility for complying with food safety; the products may be transferred at any time during the last 10 days of validity until the date of minimum durability is reached.

Taking action to target agri-food products that have become unfit for human or animal consumption by composting, in accordance with the veterinary legislation in force on the disposal of animal by-products not intended for human consumption and environmental protection legislation.

- Taking measures for the targeting of agro-food products that have become unfit for human or animal consumption in order to capitalize on them by transformation into biogas, according to the environmental legislation and the sanitary-veterinary legislation in force.

At the same time, it is recommended to implement at least two actions to prevent food waste from those listed above before ordering the neutralization of waste generated. It is recommended to include food waste reduction plans, together with the actions taken and the results obtained, in the annual sustainability reports of food business operators.

### Conclusions

From what previously presented, note that food waste occurs along the entire supply chain, i.e. agricultural production - storage - processing - distribution - management - consumption. As a result, the main responsibility for food security and the adoption of measures to limit food waste lies on the actors in that chain. In some EU Member States it is forbidden to sell food at a price below cost. As a result, retailers do not have the opportunity to sell fresh products (towards the end of the day) at a lower price. This ban amplifies the food waste in the chain presented above. Measures taken by governments against losses and waste must be aimed at increasing the efficiency and sustainability of food supply chains. EU member states have been running public awareness campaigns since 2011 on the causes and effects of food waste. Waste reduction measures are proposed, scientific information related to the sustainability and solidarity of the population is communicated. Legislative measures and good practices promoted by governments aim to improve the efficiency of food chains. These measures are beneficial for the sustainable development of economies and the balancing of flows in world trade in agricultural products. There is a close correlation between food waste and the state of the environment. For every kg of food produced (by processing) 4.5 kg of CO<sub>2</sub> is released into the atmosphere. Given the food waste of about 89 million tons produced in Europe, it would result in an equivalent of 370 million tons of CO<sub>2</sub>, resulting in the greenhouse effect.

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## THE ROLE OF CITIZENS IN THE ACTIVITY OF LAND PLANNING AND URBANISM

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**Abstract.** Urbanization is strictly related to the participation of the population in the arrangement of the territory. The relationship between local authorities and the citizens serves as an index that determines the performance of the community in solving existing problems and is the main competence in assessing local competence. Participation of the population in the activity of spatial planning and urbanism is achieved through different methods, one of which would be the community spirit. Creating a community spirit is possible only in an atmosphere of mutual trust and commitment. The problem consists in the degree to which the participation of the citizens must be admitted for the formation of the development plans of the localities.

**Keywords:** *Urbanization, population, community, solving existing problems, plans.*

**Rezumat.** Urbanizarea este strict legată de participarea populației la amenajarea teritoriului. Relația dintre autoritățile locale și cetățeni servește drept indice care determină performanța comunității în rezolvarea problemelor existente, fiind o competență importantă în evaluarea competenței administrative locale. Participarea populației la activitatea de amenajare a teritoriului și urbanism se realizează prin diferite metode, dintre care una ar fi spiritul comunitar. Crearea unui spirit comunitar este posibilă numai într-o atmosferă de încredere și angajament reciproc. Problema examinată în articol se referă la evaluarea nivelului de participare a cetățenilor la formarea planurilor de dezvoltare a localităților.

**Cuvinte cheie:** *Urbanizare, populație, comunitate, rezolvarea problemelor existente, planuri.*

### Introduction

The science of building and running cities would be nothing without a complex form of human settlement. Thus, urbanization is strictly related to the participation of the population in the arrangement of the territory.

According to art. 1 of the Law on local public administration no. 436-XVI of 28.12.06, of the Republic of Moldova [1], the local public administration is the totality of local public authorities established under the law, to promote the general interests of the inhabitants of an administrative-territorial unit (community of people living on a certain territory - village, commune, city, municipality).

The population chooses an eligible candidate for a position (for example: mayor, president etc.) [2].

**Eligible candidate for a public position**

Eligible - is the person who meets the conditions to be elected to a position or representative body. From this point of view, according to art. 119 of the Electoral Code [3], mayors of cities (municipalities), villages (communes) and councilors in district councils are elected by universal, equal, direct and free vote, for a term of 4 years, which actually begins on the day of the general election. Thus, citizens ensure:

- ensuring the rule of law;
- economic and financial;
- personnel policy;
- education, social protection and health care;
- ecology and landscaping;
- defense and exceptional situations;
- electoral;
- collaboration with other public authorities;

The efficient functioning of public power in a unitary state, such as the Republic of Moldova, largely depends on its territorial organization, because the functioning of both state and local and district authorities is carried out within the limits of territorial areas of to the citizens of this state.

Power is exercised not over the territory, but over the population established within the respective territorial limits, namely in this sense the territorial dimension of the organization and activity of public authorities is a territorial area, within which the power is realized [4].

The territorial organization of public power is based on the following assertions:

- in contemporary states the power of the people is realized at different levels, having various forms (collectivist-volitional vision on public power);
- at each level of existence of the local communities, their population as a component part of the people, directly or through the authorities created by these communities, realizes, within its territorial limits, the public power, according to the legal provisions;
- the power of each local (subnational) community represents a component part of the public power, which together with the state power, forms a unitary system of public power;
- the legal foundation of this public power is constituted by the Constitution and the laws of the state which attribute to the elective authorities of the local collectivities the necessary competence in order to realize their power.
- the territorial dimension of the local power influences the modalities of action of the local power and the efficiency of its activity.

The territory, as a spatial foundation of the organization of state or local public power, cannot be treated arbitrarily, outside formally assigned and abstract criteria, which would mean outside the relationship with the general system of territorial organization of public power and without interaction with the other elements.

The organization of public power must have an orderly structure, which also applies to its territorial component. First of all, the territorial organization of the public power must be a structured one, is to include certain types of territorial entities, formally accepted, thus being a rational territorial organization. The phrase "territorial organization" can be understood as a set of principles and rules for ordering the component elements of the territory in such a way as to ensure the interaction between its component elements. The territorial structure of the state represents, in fact, the form of territorial organization of the public power.

The participation of the population in the activity of landscaping and urbanism is achieved by:



### **Informing the population**

The central and local public administration authorities ensure the organization and development of the process of participation of the population in land use planning and urban planning activities. Citizens can participate in the activity of land use planning and urbanism, individually or by association, in accordance with the law [5].

Informing the population is the activity through which the following are made public:

- the objectives of the economic-social development regarding the arrangement of the territory and the urban development of the localities;
- the intentions of the central and local public administration authorities regarding the elaboration of some landscaping and urban planning documents, as well as the purpose for which they are elaborated; c) the content of the spatial planning and urban planning documents to be submitted for approval, according to the law. The information and consultation of the population is carried out differently, depending on the extent and importance of the spatial planning or urban planning documentation, according to the procedures established by the Ministry of Economy and Infrastructure.

### **Consultation of the population**

Consultation of the population is the process by which it expresses its options and opinions on the provisions of land use planning and urban development programs, as well as those contained in land use planning and urban planning documents, in the process of developing and approving them, and is done by publishing the procedure for conducting the consultation and conducting the public inquiry. In the Republic of Moldova this principle is regulated both by art.109 of the Constitution and art.8 of Law no.436-XVI on local public administration, [1] which bears the same name.

The relationships between local authorities and the citizens they serve are an index that determines the performance of the community in solving existing problems and is the main competence in assessing local competence.

These relationships depend not only on legislation but also on their competence (citizens), willingness to collaborate, experience gained, and circumstances created. The consultation of the population is strictly related to the principle of transparency, which involves informing citizens about the decisions taken, providing information about the activity of the authorities. Informing and consulting citizens also implies the possibility of involving and involving the public in the decision-making process - art. 17 of Law 436-XV [1].

### **Other forms of participation provided by law**

The transition from the old centralized-hierarchical model to the participatory one in the management of public affairs involved the creation of the community where the spirit of collaboration persists.

Creating a community spirit is possible only in an atmosphere of trust and mutual commitment, the problem is the degree to which participation must be allowed. In order to ensure citizen participation, such methods can be used as (information, consultation, creation of collaborative communities, joint decisions taken by consensus):

1. Opinion polls (the best results are obtained when the questions are addressed directly to the local citizens).
2. Public meetings (citizens come to the headquarters of the public administration and express their opinion: for example at the meeting of the local council).
3. Forums (general assemblies of citizens, voters, etc.). According to art. 4 of Law no. 435/2006 on administrative decentralization, the first level local public administration authorities: local

councils and mayors are invested with the competence to regulate their own fields of activity, which refer to [6, 7]:

- urban planning and management of green spaces of local interest;
- collection and management of household waste, including sanitation and maintenance of land for storage;
- distribution of drinking water, construction and maintenance of sewerage and wastewater treatment systems;
- construction, maintenance and lighting of local public streets and roads;
- local public transport;
- arrangement and maintenance of cemeteries;
- the administration of the goods from the local public and private domains;
- construction, management, maintenance and equipment of preschool and extracurricular institutions (nurseries, kindergartens, art schools, music schools);
- development and management of urban gas and thermal energy distribution networks;
- cultural, sports, recreation and youth activities, as well as the planning, development and management of the infrastructures necessary for these types of activities;
- the arrangement of the agricultural markets, of the commercial spaces, the accomplishment of any other necessary measures for the economic development of the administrative-territorial unit;
- the establishment and management of municipal enterprises and the organization of any other activity necessary for the economic development of the administrative-territorial unit;
- the construction of housing and the granting of other types of facilities for the socially vulnerable layers, as well as for other categories of the population;
- organization of fire services.

The methods numbered above help to analyze, highlight problems in the locality and plan objectives. The form of plans may be different, but they all contain [8]:

1. Objectives - what do we want?
2. Time - when?
3. Resources - with what?, with whom?
4. The customer - for whom?
5. Goal achievement strategy - how?
6. SWOT analysis (Table 1.)

Table 1

SWOT analysis

<p><b>Strong points:</b> Resources, capacity that helps the local public administration to fulfill its mission.</p> <p>Example: professional employees, local members, appropriate insurance, with advanced technologies, special ecological environment, etc.</p>	<p><b>Weaknesses:</b> Lack of resources, capacity that impedes or limits the ability of the local public authority to fulfill its mission.</p> <p>Example: insufficiently qualified staff, lack of initiative, morally used equipment, small budget, etc.</p>
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Continuation Table 1

<p><b>Opportunities:</b> Potential nurses, policy makers, help resources and trends that will help or could help the community [9].</p> <p>Example: favorable geographical location, presence of the railway, support of the district council, increase of the birth rate, etc.</p>	<p><b>Threats:</b> Potential trends, political factors, environmental differences that would prevent public administration from fulfilling its mission</p> <p>Examples: location of the locality in the area of landslides, active seismic area, low interest from foreign investors, etc.</p>
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### Conclusions

Only citizens can ensure the basic principles of territorial development: efficiency - good use of natural, human, financial and production resources on the entire territory of the Republic of Moldova [9];

- equity - equal rights of access to economic, social and cultural values for all citizens of the Republic of Moldova, regardless of their place of residence;

sustainability - the viability from a technical, financial and institutional point of view of the measures, programs and projects, financed, of regional development [10];

- planning - elaboration and implementation, in accordance with the National Development Strategy and the regional development strategy, of regional development measures, programs and projects, which have clearly defined objectives, priorities and mechanisms;
- coordination - coordination, both at national and regional level, of measures and objectives to support regional development;
- the partnership - the cooperation of the central and local public authorities, the public and private sector, the civil society in the activity of planning, elaboration and implementation of the measures regarding the support of the regional development;
- transparency - clarity in the processes of allocation, distribution and use of means for the realization of regional development strategies, programs and projects.

In conclusion, I mention that usually the inhabitants know best the specifics of the locality, its problems, features and habits, better than any form of government. Therefore, the involvement of locals is crucial for the establishment and implementation of public policies. Thus, the public is one of the greatest resources in the development and practical implementation of local laws and policies.

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**Abstract.** Acad. prof. Cristea Mateescu is one of the greatest Romanian engineers and scientists, a personality of perfect honour and sincerity, loving the truth above all. His simplicity and modesty became proverbial. But the greatest merit of acad. Prof. Cristea Mateescu is the one to have created a Romanian school of hydromechanics. He conducted studies and executed dams, hydroelectric plants, foundations for thermal turbogenerator groups (Floresti, Campina, Comanesti). Following the earthquake of 1940 and the bombings of the Second World War, he carried out the consolidation of several large, heavily damaged buildings in Bucharest.

**Keywords:** *hydraulics, civil construction, industrial construction, hydroelectric plants, dams, canals.*

**Rezumat.** Acad. prof. Cristea Mateescu este unul dintre cei mai mari ingineri și oameni de știință români, o personalitate de o sinceritate desăvârșită, iubind adevărul mai presus de toate. Simplitatea și modestia lui au devenit proverbiale. Dar cel mai mare merit al acad. Prof. Cristea Mateescu este cel de a crea o școală românească de hidrotehnică. A realizat studii și a executat baraje, hidrocentrale, fundații pentru grupuri de turbogeneratori termici (Florești, Câmpina, Comănești). După cutremurul din 1940 și bombardamentele din cel de-al doilea război mondial, el a realizat consolidarea mai multor clădiri mari, puternic avariate, în București.

**Cuvinte cheie:** *hidraulică, construcții civile, construcții industriale, hidrocentrale, baraje, canale.*

**Cristea Mateescu** was born on the 11th of August 1894 at Caracal. His father was a clerk, and his mother a housewife. He attended the primary school in his native town, then „Carol I” secondary school in Craiova and High school in Buzau. He passed the entrance examination at the National School of Bridges and Roads of Bucharest in top position. He got his engineer degree in 1919 and he continued his studies in Switzerland between 1920 –1921 and in France between 1921 – 1922.

During these internships which were financially supported by the Romanian Academy, he studied especially the display of water falls and of the lakes for hydroelectric plants. In France he met professor Denis Fydoux who helped him visit several hydroelectric plants, opening his professional career.



### Rhetorical questions

My imagination can go further and I can ask myself if engineer Cristea Mateescu, born at 15 km from the Olt River, having a passion for hydroelectric arrangements, had ever thought, that the Olt River would be radically transformed along 350 km in order to build 31 hydroelectric plants with an installed power of 1.112,8 MW and an electric production of 3.040,6 GWh/year.

Had he ever imagined that, at Râmnicu Vâlcea, it would be build in 1974 a hydroelectric plant whose dam would have 34 metres height and it would be supplied from a lake with a surface of 319 ha and 319 million m<sup>3</sup> of water? This make me think of the hydroelectric plant from Ionești, inaugurated in 1978 and whose dam is 14 m height and which is supplied from a lake with the surface of 466 ha and 25 million m<sup>3</sup> of water. I am also thinking of the hydroelectric plant from Turnu, built in 1981 and whose dam is 44 m height, and its lake has a surface of 154 ha and 13 million m<sup>3</sup>. What can we say about the hydroelectric plant from Drăgănești, built in 1988 whose lake with a surface of 1000 ha goes beyond the bridge that crosses the Olt river, covering the beach where the child Cristea Mateescu used to sunbathe with his friends?

Finally, we should not forget about the hydroelectric plant from Izlaz whose construction will begin soon.

### Certain answers

I do not know if the engineer Cristea Mateescu imagined all these achievements, but I know for a fact that his first scientific paper was about the electric plant from Sadu-Gorj. He remarked himself within scientific community in 1927 with the paper "The Rationale Arrangement of the superior part of the river Ialomița". He organized and led, for the first time in Romania, a department for the hydro-energetic study of the rivers Prahova, Ialomița, Târlung, Buzău-Bâsca, Siret. It is known for sure that he designed the hydroelectric plant from Sadu V-Sibiu, with a dam built with rockfill and reinforced concrete, the first one of this type in Romania. The river Sadu was used for obtaining electricity along the history. Let us present some information about it. In 1896 the first hydro-electric plant was built along this river, Sadu I. In 1907 in uphill it was built the second one, Sadu II, and in 1955 the hydroelectric plant Sadu V, supplied from Negoveanu lake with a dam of 62 m height.

It is known for sure that the engineer Cristea Mateescu participated in the designing of the dam from Valiug, built between 1946 and 1949, that he participated in the designing of the hydro-electric plant from Bicaz, built between 1951 and 1960. It is also known for sure that he was the head of the designing team of the hydro-energetic complex from Corbeni, built between 1958 and 1966. Fortunately, Cristea Mateescu lived enough to see or to read about the hydro-energetic arrangement of the river Olt which started in 1974.

### Engineer at Electric Plant

In 1922, after graduation, he was employed at "Electrica" Company where he worked until 1926. Within this context I want to mention that the Electric Plant from the Peles Castle started to function in August 1884. In 1899 it is inaugurated the Hydroelectric plant from Sinaia, the biggest in Romania at that time. In 1898 the Romanian Society for Electric and Industrial Companies was set up. It managed the energetic activity of Prahova area.

On the 11<sup>th</sup> of May 1901, this society changed its name in "Electrica" Society Ltd. We can conclude that Cristea Mateescu started his professional career in one of the most important hydro-electric companies from Romania.



**Professor**

His results as a student, his specializations in Switzerland and France, his results as an engineer recommended him for a teaching career. In 1936 he became assistant at the rational mechanics and material resistance course.

In 1938 he defended his Ph.D. thesis with the subject "La résolution des systèmes hyperstatiques par deux méthodes récentes- critique et extension des méthodes Filipescu et Cross".

He became associate professor in 1939, and then professor in 1946. He taught several disciplines, among which the regime and water arrangement at the Construction Institute of Bucharest. This was the name of the present Technical Institute of Construction of Bucharest. It must be mentioned that he was the head of the Hydraulic Construction Department between 1950 and 1964.

**Other accomplishments**

Cristea Mateescu became an engineer at the National School of Bridges and Roads, so in his CV there are included also projects for famous civil constructions, for example "Asigurarea Română" ARO-Patria block from Bucharest.

**Complex personality**

He was editor-in-chief at "Hydro-techniques" journal. He was a collaborator at the national electrification plan. He was the president of the Romanian National Committee for Big dams during 1957-1963. He evoked in his works the contributions of two great Romanian engineers: Alexandru Davidescu and Ion Ionescu. He was chosen associate member of the Romanian Academy in 1955 and full member in 1974.

He died on the 14th of June 1979 in Bucharest.

**Bibliografie**

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