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## CONTENT

<b>NATIONAL ECONOMICS AND MANAGEMENT .....</b>	<b>4</b>
<b>Blendi Lami, Fatri Morina.</b> GEOPOLITICAL ISSUES IN THE EUROPEAN REGION – CASE OF TURKEY.....	4
<b>Emiliya Duneva.</b> CENTRALIZED ELECTRONIC DATA INTERCHANGE SYSTEM (EDI) AND BUSINESS ITS IMPACT IN A PANDEMIC .....	15
<b>Sergiy Kovalenko.</b> CROSSBOUNDARY CLUSTER SYSTEM AS A FACTOR OF STRENGTHENING THE INNOVATIVE POTENTIAL OF THE UKRAINIAN ECONOMY .....	21
<b>Anatolii Chynchyk.</b> TAX POLICY AND ITS RELATIONSHIP WITH THE INDUSTRIAL STRUCTURE OF THE NATIONAL ECONOMY .....	26
<b>WORLD ECONOMY .....</b>	<b>30</b>
<b>Balabin O.</b> ECONOMIC SANCTIONS AGAINST RUSSIA (ANALYSIS OF THE RESULTS OF THEIR ACTIONS) .....	30
<b>ENTERPRISES ECONOMICS AND MANAGEMENT .....</b>	<b>35</b>
<b>Daniela Tzvetkova.</b> REASONS FOR INTERNATIONALIZATION OF BULGARIAN SMES.....	35
<b>Jaroš J., Čorejová A., Šramová V., Hornická K.</b> TYPES OF BATTERIES IN ELECTRIC VEHICLES.....	41
<b>Jaroš J., Čorejová A., Šramová V., Hornická K.</b> THE COMPATIBILITY OF CHARGING STATIONS FOR ELECTRIC VEHICLES .....	52
<b>Jaroš J., Čorejová A., Šramová V., Hornická K.</b> CURRENT STATE OF ELECTROMOBILITY IN SLOVAK REPUBLIC .....	65
<b>Jaroš J., Jarošová J.</b> FINANCIAL LEASING AGREEMENT IN TERMS OF VAT .....	75
<b>PRODUCTIVE FORCES DEVELOPMENT AND REGIONAL ECONOMY .....</b>	<b>84</b>
<b>Volodymyr Vareschenko, Lidiia Karpenko.</b> MODERN APPROACHES TO THE FORMATION OF THE MECHANISM OF INVESTMENT SUPPORT FOR INNOVATIVE DEVELOPMENT OF THE REGION .....	84
<b>MONEY, FINANCE AND CREDIT .....</b>	<b>90</b>
<b>Arjeta Hallunovi.</b> IS IT AUTOMATION AND IT REPLACING THE WORKFORCE? .....	90
<b>Barbora Drugdová.</b> THE COMMERCIAL INSURANCE MARKET IN THE SLOVAK REPUBLIC BEFORE PANDEMIC COVID - 19 .....	101
<b>Ilijana Zyberi.</b> THE IMPACT OF PERSONAL FACTORS ON TRUST AND IMAGE OF E-BANKING CUSTOMERS.....	106
<b>ACCOUNTING, ANALYSIS AND AUDIT .....</b>	<b>115</b>
<b>Natalia Kashchena, Hanna Chmil, Hanna Verzilova, Igor Kononov, Andriy Lachkov.</b> FACTORS FOR ENSURING THE QUALITY CHARACTERISTICS OF REPORTED FINANCIAL INFORMATION.....	115
<b>Oksana Nesterenko, Angelica Krutova, Tetiana Staverska.</b> TRANSPARENCY OF FINANCIAL REPORTING IN THE CONDITIONS OF MODERN INFORMATION TECHNOLOGY .....	120
<b>STATE ADMINISTRATION, SELF-GOVERNMENT AND GOVERNMENT SERVICE.....</b>	<b>136</b>
<b>Evgen Zhivilo, Victor Nesterenko.</b> VISION OF THE DEVELOPMENT OF EDUCATIONAL ACTIVITIES OF COMMUNICATIONS DEPARTMENTS OF HIGHER EDUCATIONAL INSTITUTIONS OF THE STATE SECURITY AND DEFENSE SECTOR IN THE TRAINING OF MILITARY SPECIALISTS AT THE EDUCATIONAL LEVEL “BACHELOR” (“MASTER”).....	136
<b>Kobzev I.V., Kosenko V.V., Melnykov O.F.</b> DIGITAL TRANSFORMATION OF PUBLIC ADMINISTRATION .....	145
<b>MANAGEMENT .....</b>	<b>153</b>
<b>Gina Prodan.</b> ARE ELECTRIC CARS REALLY GREENER? .....	153
<b>PSYCHOLOGY, PEDAGOGY AND EDUCATION .....</b>	<b>159</b>
<b>Joana Taci, Ermelinda Kashahu.</b> THE ASSIGNMENT OF CASE TO THE SUBJECT NOUN PHRASE OF THE ALBANIAN LANGUAGE .....	159
<b>Idriz Metani, Sidita Dano.</b> NAMES OF PEOPLE WITH ANIMAL WORLD NAMES IN ALBANIAN LANGUAGE .....	169
<b>Yuri N. Arsenyev, Vladimir S. Minaev, Tatyana Yu. Davydova, Ksenia A. Morenova.</b> INFORMATION MODELS AND HUMAN HEALTH .....	192
<b>Lia Gachechiladze, Roman Samkharadze.</b> DEVELOPMENT A TRAINING SYSTEM FOR TEACHING THE CALCULATING OF A FUNCTION’S DERIVATIVE .....	203

## NATIONAL ECONOMICS AND MANAGEMENT

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### GEOPOLITICAL ISSUES IN THE EUROPEAN REGION – CASE OF TURKEY

***Abstract.** Turkey's inclusion in the European Union has been under consideration for several years, but it is opposed by some member states. Turkey is eligible to be a member of the Union, but its efforts have failed. This paper tries to reveal the reasons why the member states are opposing its membership. It sets forth the pros and cons of Turkey joining the European region. This relationship is faced today with certain hurdles and furthermore invites conflict. However, the geopolitical aspects dictate clear rules on this alliance, which has proved effective in the past.*

***Keywords:** geopolitics, strategic position, security, cooperation, rivalry*

#### INTRODUCTION

Geopolitics entails the political and economic involvement of two or more countries mostly influenced by geographical factors. Countries are connected with borders, and pacts and unions bind these countries together for economic and political gains (Emmanouilidis, 2014, p. 9). European Union is one such economic and political community that is considered to be a pioneer in developing ties through an international system, enabling countries to engage in trade and other activities for the mutual benefit of each of them (Meerts, 2015, p. 85).

Ever since European Union came into existence, it has been struggling with managing the security and harmony amongst its member states and potential candidates for EU membership. After the mass destruction of World War II, countries suffered immensely in terms of economy and collapse of the political system (Meerts, p. 282). It was due to the efforts of the European Union that countries joined hands together for economic integration of activities in the European region. Since then, EU started off with six countries and currently consists of twenty-eight member states that are mutually integrated in terms of wealth generation and economic enhancement.

But there is a lot of criticism regarding the integration process of some countries and their role in fulfilling the criteria required by EU and maintaining stability and peace within the region. Turkey is one such country that has been in the controversy with the European Union since many years.

Turkey has provided its bid for EU membership to finally acclaim its European identity in the world (Baştürk, 2013, p. 4). However, it remains an issue to date as the EU members oppose the idea of granting Turkey membership (Elitok, 2013, p. 7). The main argument against such an inclusion is what Turkey represents: a Middle Eastern Muslim nation, whose values are incompatible with those of “Christian Europe,” and whose inclusion would require changing the “idea” of Europe, possibly spelling its end (Cohen, 2013, p. 2).

In technical terms, the 2019 Progress Report of EU outlines that Turkey is still a security ally, but its candidacy is frozen due to “further serious backsliding” on rights, the judiciary and economic policy, and that “Turkey has continued to move further away from the European Union”. On the other hand, Ankara, considering itself a very important to Europe, rejects this criticism as "unfair" and "disproportionate" (“Turkey 'backsliding' on democracy, Ankara disagrees”, 2019).

However, Turkey has been geopolitically an organic part of Europe. And it will remain one of the most important countries for the European Union. It is worth mentioning their historical relations, dating back to Ottoman times. In the eighteenth century, the Ottoman Empire played a major role in European peace, as it became involved in the European balance of power. In the nineteenth century, the Ottoman Empire, after the Concert of Europe, became part of elementary international law of that era. In the twentieth century, after the dissolution of the Ottoman Empire, the Turkish pro-Western project intended the incorporation of Turkey into Europe, while Ataturk imposed Western reforms in Turkey. In the second half of the twentieth century, relations were dense, driven by the role of NATO and the need of the West to contain the Soviet Union.

Contrary to today’s perception, while recent headlines show Turkey turning its attention to the Middle East, Ottoman Empire was mainly focused toward northwest, toward Europe, where the wealth and lucrative trade routes were. This was the

Turkish orientation since the late Middle Ages, “when the Western European ascent . . . acted like a magnet for Turkish tribes, who themselves had gravitated westward across Anatolia to the Balkans” (Kaplan, 2012, p. 168). By the late nineteenth century and the beginning of twentieth century, the Ottoman Empire was in its death throes. As soon as Mustafa Kemal took power, he started to forge a modern state in Anatolia and was an authentic revolutionary: that is, he tried to change his people’s value system. According to Ataturk’s principles, Turkey would follow the Western path, marching culturally and politically toward Europe. Though Turkey remained neutral during most of World War II, Kemalism — the pro-Western, secularist doctrine of Kemal Ataturk — guided Turkey’s culture and particularly its foreign policy right up through the end of the first decade after the Cold War (Zurcher, 2005, p. 181). Indeed, for years, Turkey entertained hopes of joining the European Union, and Kaplan (2012) underlies that this was “a fixation” of Turkish officials throughout the 1980s and 1990s. But, in the first decade of the twenty-first century, it became apparent that Turkey might never gain full membership in the EU. The reason was blunt: though Turkey was a democracy and a member of NATO, it was not wanted. The rejection was a shock to the Turkish body politic” (p. 169).

### **Turkey’s uncertain path to EU**

In 2004, a European Union session in Brussels proposed to initiate negotiations with Turkey on the possibility of becoming a member of the EU. Turkey was trying since several decades to enter into the European bloc (Aydin-Düzgit, 2012, p. 35). A major backlash was faced by some of the existing member countries, as EU initiated these negotiations with Turkey. Official voices from Turkey frequently say that this backlash is caused due to the differences in culture, religions and the typical mindsets of the West for Muslim countries. In retaliation, Turkish President Recep Tayyip Erdogan would go that far as to “declare EU a Christian club of racists who never intended to admit a Muslim country to the Continental bloc (Ciddi, 2018, pp. 1). So, according to Erdogan, Turkey, being a predominantly Muslim country, is a good reason to oppose its membership. Is the idea of being Muslim connected to the fact that all terrorist activities are attached with the Muslim countries around the world? Toci (2007) notes that “public debate is often poisoned by misperception,

misinformation and at times by outright prejudice” (p. 6), when it comes to EU-Turkey relations.

Do differences in culture and traditions constitute the main obstacle regarding Turkey becoming part of the European Union? Referring to the history of Turkey–EU relations, it seems that Europe has surpassed such deadlock. The current frozen situation might be transitory, as both parties do not totally exclude each other. Primarily, the member states are very concerned with security concerns. As each member state is involved in the security and defense role, similar is expected of Turkey as well (Aydinli and Ozcan, 2011, p. 10). That means Turkey is very important to Europe’s security. EU wants to take advantage of Turkish geographical benefits, like Turkey’s new foreign policy options in the Black Sea region, the Balkans, Middle East and Caucasus. Turkey had some major strategic importance in terms of gaining access to the Middle Eastern region as well, and this was extremely critical to the EU development. Turkey could act as a pathway to the Asian region as well (Balci, 2015, p. 7).

The perspective for full membership was initiated since the 1963 Association Agreement between Turkey and the European Economic Community. In 1987, Turkey submitted a formal request for full membership, which was rejected by the European Commission in 1989 on the grounds that Turkey manifested grave democratic deficiencies. However, the European door was not closed. The Commission’s Opinion on Turkey’s membership application in 1989 confirmed that Turkey was eligible for full EU membership. The prospects for Turkey’s EU membership brightened in 1996, when Turkey became part of EU Customs Union. The turning point came in December 1999, when the European Council in Helsinki granted Turkey its long-sought candidacy, albeit not opening accession negotiations, because Turkey had to fulfill the Copenhagen political criteria for membership and make progress towards resolving the Cyprus problem as well as bilateral conflicts with Greece (Toci, 2014).

The acceleration of Turkey’s reform momentum, particularly after late 2001, was defined by many as the “silent revolution” (Ibid). In December 2002, European Council concluded that it would determine whether and when to open accession talks

with Turkey in December 2004. The approaching green light for the opening of negotiations set a target and a timeline in the reform programme of the Justice and Development Party (AKP) government elected in November 2002. Turkey's progress in reforms spurred the December 2004 European Council to conclude that Turkey fulfilled the political criteria and that accession talks could begin in October 2005. But, although full membership was proposed in 2004 and AKP-led government undertook reforms on this process, following the opening of accession negotiations in 2005, the momentum in Turkey's accession process was lost. Turkey's accession negotiations proceeded at a small pace in their early years and stalled altogether between 2010 and 2013. By mid-2014, 14 out of 35 chapters had been opened. Due to multiple vetoes by the European Council, France, and the Republic of Cyprus, most chapters of the *acquis communautaire* up for negotiation were frozen. Yet, in Turkey's case, the path to membership has been fraught with roadblocks and hurdles, making the final destination uncertain at best (Toci, 2014, p. 2-5).

German Chancellor Angela Merkel proposed a "privileged partnership," which was backed by the then French President Nicolas Sarkozy (Osborne, 2016). In September 2011, Merkel, on the occasion of the visit of the Turkish president Abdullah Gül, said: "We don't want the full membership of Turkey. But we don't want to lose Turkey as an important country" ("Vor Treffen mit Gül", 2011), referring to her idea of a strategic partnership. Later, in 2016, the European Parliament voted to suspend accession negotiations with Turkey over human rights and rule of law concern. In 2018, the EU's General Affairs Council stated that "Turkey has been moving further away from the European Union." ("Outcome of proceedings", 2018). Furthermore, the European Commission's long-term budget proposal for the 2021-2027 period released in May 2018 included pre-accession funding for a Western Balkan Strategy for further enlargement, but omitted Turkey (Communication from the Commission, 2018).

### **Towards Europe: the geopolitical perspective**

After applying to the European Economic Community in 1959, Turkey had much greater chances to align itself to the European region. It was soon after Turkey had joined alliances with NATO and the country was seeking opportunities to

become an active part of the West. These increased ties with the Western Europe were one step towards improving Turkey's economic state and gaining some prominence on the trade front as well (Kuneralp, 2017).

In today's contemporary debates, the European Union "project" is often left out of the geopolitical broader context that occur outside the European cognitive borders, while focusing on developments in the Africa-Asia axis, more specifically from the Middle East to China, and the Pacific developments. Following this logic, Cohen (2011) notes that "there is a tendency for Europe to be left out of the equation, and is often being reduced to a financial history" (p. 221).

Shouldn't the European Union be considered as a great power in addition to the U.S. and China? The EU population is 500 million, the third largest in the world after China and India. The EU economy goes up to \$ 16 trillion, bigger than that of US. The current European "empire" – as all the empires in the past – has expansion in its DNA. Such an expansion has been successful. There is a focus on including Western Balkans (Albania, Kosovo, North Macedonia, Serbia, Montenegro and Bosnia), but on short-term plans Turkey is left out.

Kaplan (2012) points out that Europe is the "western extension" of the continent of Asia. Geography has helped determine that there is an "idea" called Europe - a geographic expression of liberal humanism that was reflected in the unification of sovereignty after World War II. Maintaining this "idea" is also closely related to EU dilemma toward Turkey inclusion (p. 89).

Turkey's contribution in terms of its army and its well-equipped and highly trained troops is an attractive element for European Union. Turkey has always been ready to help and support the European region in any manner in the past and its loyalty is also quite evident for the European Union (Aydin-Düzgit, 2012, p. 35).

Although Turkish current policies seem not to fit into this "European idea" and there is a departure between the two, strategic interests bring both sides together. Geopolitics strongly influences this approach. Will geopolitics prevail over Turkey's current policies – on one hand – and the dynamics of the Union – on the other hand? Time will test this challenge. Such a trajectory, outlined in this paper, can help us to better clarify this notion of Turkey inside or outside the European Union.

Given that Europe is hardly a culturally homogeneous society and civilization, it is reluctant to include Turkey into the Union. Turkey led by a ruling party with Islamic roots, having a negative record on human rights, resisting economic and political reforms, harshly reacting towards the Kurds or showing lack of flexibility towards Cyprus, makes European policymakers believe that there is no room for Turkey within the “European idea”.

Turkey’s path towards Europe is blocked, but that does not mean that policies cannot change. A strong Europe will need Turkey as the defender of the West to the eastern powers. The Ottoman Empire served Europe to create the balance of power and modern Turkey, mainly after World War II, served as a "garrison" to contain the Soviet Union. However, in today's European politics, characterized by populism and nationalism, geopolitical considerations are not taken seriously and there is not a long-term strategy for preserving European cohesion. In a nutshell, the geopolitical dimension, which is inextricably linked to the security issues, is not sufficiently addressed.

At political level, Europe is reluctant to include Turkey in its family. But, this is not the case at geological level. Geopolitical considerations create a positive connotation for the EU-Turkey cooperation and a possible union.

Most importantly, as a NATO member, Turkey retains some leverage over EU plans to develop a separate European Security and Defense Force. It is an EU initiative in the field of crisis management and defense, and is a key component of the EU's Common Foreign and Security Policy. Nowadays, President Trump's attitude towards NATO is viewed as a very dangerous move to Europe’s security. And Turkey's 600,000 troops and its powerful arsenal is a vital component in this force. Turkey’s army is considered to be extremely powerful in the world (Woody, 2018). The defense strength of Turkish troops has been well recognized in the Afghan war and the Balkans and it was also backed by the United Nations. Moreover, as a NATO member country, Ankara can still pursue military cooperation with the U.S., and at the same time Turkey can be part of the Common Security and Defense Policy. Under such circumstances, Turkey's strategic position in the Black Sea, the Caucasus, the Middle East and the Central Asian regions continues to guarantee its

central position in the U.S. and Western Europe goals to contain the sphere of Russian influence.

While NATO is still considered the world's strongest military alliance, the current American leadership sees it differently. U.S. President Donald Trump has openly shown animosity towards against the European Union and NATO. "He supported the Brexit vote in the United Kingdom, reportedly advised French President Emmanuel Macron that his country should leave the union too, and claimed that the EU was created to take advantage of the United States." (Walt, 2018) This attitude has confused European leaders, but has also encouraged them to take new initiatives. Europe will need Turkey's military strength even in the likelihood of NATO's dissolution.

Being as direct as Trump, Friedman (2019) says that nowadays NATO is an anachronism, underlining that "the Europeans are not prepared to subordinate their war option to NATO, and the Americans have an interest in facing the Russians in Poland and Romania, but don't need a NATO war plan to do it. NATO's vast infrastructure is pointless" (pp. 10). As we are witnessing a distant U.S. to Europe's security issues, voices within Union have called for the creation of a European army (Markus, 2018). The U.S.–Turkey rift over S400 defense system purchase from Russia will lead to a rapprochement of Turkey with EU and, as Baydar (2019) notes that this move will "redefine Turkey's geostrategic role" ("S-400 purchase"). In this framework, the Russian vector has to be taken seriously into consideration, because as Stein (2019) emphasizes, ". . . if Ankara chooses to deepen its partnership with Russia, bad could turn into grievous, as legacy defense cooperation with the United States could then be called into question. Most important, the Turkish-Russian entente further undermines Ankara's position within NATO and, therefore, the very notion of collective defense and burden-sharing among the 29 member-states" (Ibid).

An important concern for the European Union is also Turkey's relation with Greece and a 40-year stalemate over Cyprus. Although Brussels has tried to calm down this rivalry between them, UN-led negotiations have had limited progress. Moreover, the Greek Cypriot acceptance of the EU has given Greece a great advantage over Turkey. And Cyprus's involvement in the EU means that Turkey

already has two rivals in the EU (Greece and Cyprus) that can exercise the veto right (Kambas, 2015).

Turkey's strategic position in the Middle East should also be taken into consideration. Based on this position, Turkey projects influence on problematic countries for European security, such as Iraq, Syria, Lebanon and Iran. Also, Turkey has a prominent position in the region of Central Asia, where it has established consolidated alliances, using the pan-Turkic identity card (Stone, 2015). Such eastward expansion makes Turkey a regional power and strongly suggests to European leaders that cooperation with Turkey is essential. In Caucasus and Central Asia, Turkey's strategic role has two advantages for Europe (Winrow, 2006, p. 49 - 54). First, Turkey, because of its position, serves as a secure east-west energy corridor; in this spectrum, Turkey is a bridge for energy transportation from energy-producing areas to Europe. Second, Turkey can serve as a buffer zone: Turkey's cultural and historical development serves as a barrier to the importation of radical Islam toward Europe.

Another major dispute in Turkey being a member of European Union is its geographic location that makes it equally influenced by the East as well as the West. Ankara can reach out to the Muslim world - from the Caspian Sea to China's frontier land, and this traditional influence is based on linguistic, religious, and racial ties (Sengupta, 2014, p. 111 - 112). In such a context, a big dilemma emerges: the focus toward East means that Turkey going to implement an independent foreign policy, whereas the road toward West strongly implies an aligned foreign policy with EU.

The Europeans have another worry. Turkey and Russia have strengthened its relations, as they have coordinated their strategies on the ground in Syria, and are trying – together with Iran – to find a solution to the conflict. It is an imperative for EU to define its role regarding the relation with Turkey. Failure to do so will weaken its role in the neighborhood and global stage.

Turkey struggles to gain a positive image in the eyes of the West and even showcases itself as a mediator and peaceful regional partner that has no connection with these war-struck areas (Hale, 2012). It is continuously working on building stronger ties with both its Asian neighbors as well as European neighbors.

So Turkey has plenty to offer to the European Union. First, Turkey's main benefit for the EU is in the form of security and defense mechanisms from the rest of the world (Aydinli and Ozcan, 2011). Second, Turkey shares closely connected borders with countries in the Middle Eastern region and can act as a protective shield from these nations for the European states. Third, the size of its population and the economy which is currently increasing at a very decent pace makes it extremely attractive from economic point of view. And finally, as Turkey is becoming economically stable, it brings about more and more benefits to the European Union overall.

As emphasized the above, Turkey's geopolitical interests coincide, for the most part, with those of the European Union. The combination of geopolitical considerations with cultural and political processes is very attractive to the EU. Ideally, Turkey's involvement cannot only strengthen the EU, but its membership can also contribute to a greater global geopolitical equilibrium.

### **CONCLUSION**

Based on the intricate history of Turkey's relationship with Europe, the trajectory of Turkey's European future remains highly uncertain. Turkey's strategic assets like strong defense, booming economy, attractive location are eye-catching in so many regards, but already the pre-set alliances and foreign policy regulations restrain EU to fully open the door to Turkey.

Turkey's inclusion in the European Union has been under consideration for several years. Turkey is attractive to the EU due to a wide range of reasons – from economy to security – but has failed to cater to all the concerns pointed out by its European Allies and therefore seems to have lost its chance to become a part of Europe in the near future. The internal political situation in Turkey aggravates such complicated relationship, and the tension in the Middle Eastern region has created further fluctuations during its negotiations with the EU.

This paper concludes that there are several internal as well as external factors that collectively contribute towards Turkey's potential exit from EU. In the near future, two possible scenarios can be foreseen: rivalry or collaboration. In the long

run, geopolitical considerations dictate that there might always be room for Turkey within Europe's infrastructure.

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## **CENTRALIZED ELECTRONIC DATA INTERCHANGE SYSTEM (EDI) AND BUSINESS ITS IMPACT IN A PANDEMIC**

***Abstract.** In the conditions of Covid-19 without a physical presence in the workplace, the work of many companies is difficult, as much of the activity of organizations is associated with the physical transfer of documents. In order to be able to cope with the challenges of the modern business environment caused by the current pandemic and the development of technology, the management of the companies is required to quickly optimize the organizational processes. This paper analyzes EDI and its impact on business in a pandemic. As a result, it can be concluded that companies that use the EDI system cope with the challenges of today's business environment much more successfully than those that are not well digitized.*

***Keywords:** Covid-19, Centralized Electronic Data Interchange System (EDI), modern business environment*

### **INTRODUCTION**

Due to the COVID-19 pandemic situation in the country, it is no longer enough for organizations to have clients and a well-established model of work over the years to be successful. They need to rethink their business processes by implementing new technologies in the work process such as the centralized electronic data interchange (EDI) system.

The companies that managed to adapt quickly and maintain their business despite the situation share that one of the main factors for their success is due to this system. Following the views of the process management manager in the largest hypermarket in our country "Kaufland Bulgaria" we can say that the processing of documents after the introduction of EDI is much faster, the cost of this process and errors are reduced and also not documents need to be returned to providers, which in turn facilitates archiving in the EDI archive [1].

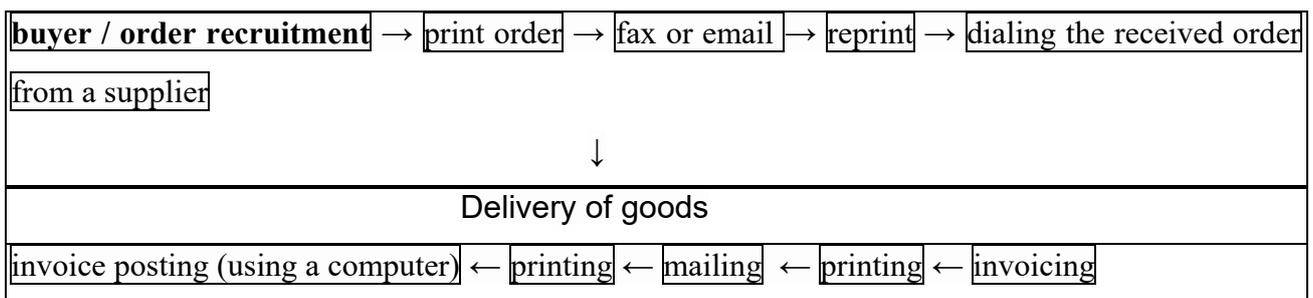
### **LITERATURE REVIEW**

Electronic data interchange is a process in which data from one organization's information system is electronically converted into input data from another organization's information system [2]. This is done through an electronic platform. In general, it is a question of document circulation electronically, exchange of the so-called electronic documents - from laws and regulations, through offers and contracts

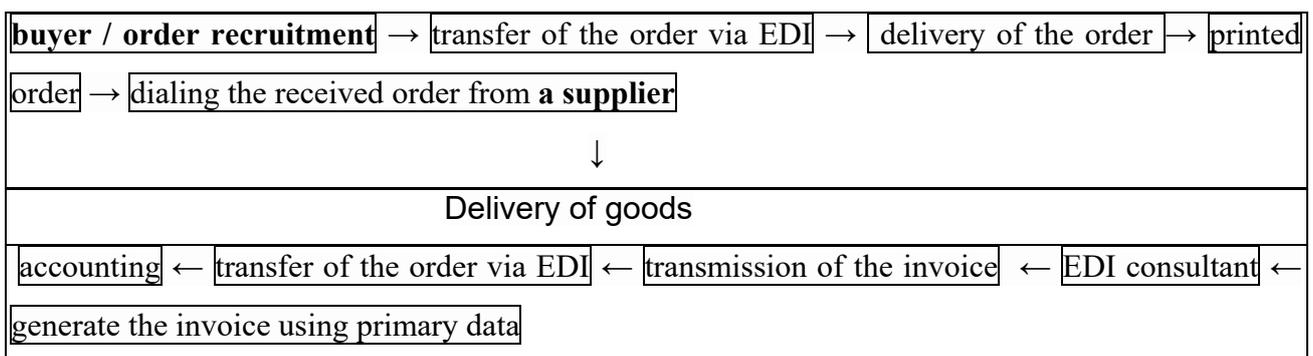
to invoices, orders, deliveries, transport documents. It was the labor-intensive exchange of all types of paper documents during Covid-19, as well as the development of information technology, that increased the interest of many managers in using a system called electronic data interchange (EDI). Using this technology, organizations have the opportunity to achieve greater flexibility and efficiency in their work. D. Janz & Mark N. Frolick (2008) view EDI as providing efficiency for transactions between organizations much more accessible than other network alternatives [3]. A major contribution to the development of EDI was made by a study published in 1988, which issued a directive to make EDI a method of conducting operations in the Ministry of Defense [4]. In those days, it was quite difficult to decide on implementation, but researchers point out that EDI can improve defense logistics business processes by reducing ordering time, through controls, contract notices and more high awareness in the demand for goods and services, thanks to which rapid change will take place during a crisis.

## RESULTS

For greater representation, we made a comparison (Fig. 1 and Fig. 2) of a business cycle, which is based on paper documents and what the business cycle would look like when using electronic data exchange in trading company.



**Figure 1. Business cycle based on paper documents**



**Figure 2. Business cycle using EDI**

After the comparative analysis it is seen that the purchasing company becomes much more efficient in the supply activity. First of all, the cost of packaging and paper is reduced, then it is necessary to take into account the time spent by people to fill out the forms, put them in envelopes and send them by mail. Often, even the number of incorrect orders and wrong addresses is quite large, which is significantly reduced when using EDI. In this respect, EDI systems have a greater advantage and can be integrated with other systems to a greater extent. Obviously, the greatest benefits are achieved when the systems are integrated. For example, if a company has an EDI based delivery system integrated with financial control, production and inventory management systems, when ordering, it is possible to take into account the company's inventory, expected production capacity and order portfolio. Finally, when placing an order, the money is automatically transferred to the supplier company through the financial management system. Accounting becomes much more efficient and it is possible to monitor broadly the financial resources of the company and cash flow. As it turns out, by using EDI systems for electronic data exchange, it is possible to improve the workflow in order to achieve higher efficiency.

Office work is minimized and, in addition, systems for inventory and production management are integrated, making it extremely easy to supply and plan production. Nowadays, more and more supplier companies are demanding that buyers place their orders using EDI systems. These systems integrate to such an extent with their production system that it simply becomes impossible without them to process traditional paper orders - it is too bureaucratic for them.

Some consultants are even of the opinion that there is a danger that companies will be completely cut off from suppliers if they do not use EDI systems or at least have no knowledge of them. If the supplier accepts orders only on EDI basis and the buyer does not have this technology, it is still possible to place the order on paper - in the old way, but the price of raw materials is likely to increase significantly because the supplier must process more paper material to slow down the work. Buyers will not be left unattended but will be offered more unfavorable market conditions.

There is also no doubt that in a pandemic, the rapid and efficient exchange of documents between partners and customers is more than necessary. Thanks to EDI,

documents such as invoices, reports, statements, reports, declarations, orders and more. they can be sent quickly and in a timely manner without the need for additional delivery, storage, and confirmation. Many experts call EDI the language of business communication in business.

### **EDI - Technologies and standards**

EDI is an established widely used standard. Very specific EDI modules developed by large companies can be used directly by different organizations, but are often too expensive. Nowadays, most companies have an ERP system for financial activities. Commonly used systems are Concorde XAL, Navision14 or the German product SAP / R3. A key feature of all systems of this type is that it is possible to connect to an EDI module, which allows the company to use EDI in its transactions with suppliers and associates. By obtaining an EDI module from the same source as the ERP system, it becomes easier for the company to connect different systems. The problems related to the standards and the various specific protocols of the systems are solved in this way. There are many examples of organizations that have purchased EDI modules that cannot connect to other systems installed in the company. They often subsequently must pay large sums after the sale to adapt the system to all the needs of the company. Today it is possible to use a simple Internet browser to exchange information via EDI. For this purpose, the XML language (extended markup language) has been developed. This language (protocol) has the ability to "translate" EDIFACT information into standard HTML, which can be understood by any browser. Thanks to the support of the UN, a single global standard for electronic document exchange has been created. UN / EDIFACT16 is established worldwide as a way to process and exchange documents in the process of administration and trade.

Standardization in this segment (documents and messages) is especially necessary in order to avoid a non-working situation in which we have a large number of EDI systems, which, however, are closed and not compatible with each other. Therefore, the standards are independent of the hardware, the type of application, the communication protocol, and the means of transmission.

As a result of Covid-19, more and more companies and banks are exchanging payment documents electronically, and large chain stores are ordering goods and

materials from their suppliers. EDI technology exchanges service contracts, forwarding and transport documents, customs documents, those related to insurance activities. Even documents issued by the state administration circulate in this special space. Organizations using EDI at the moment are retail chains such as Metro, Shell, Billa, Fantastiko, Praktiker, Baumax, OMV and many many others. The number of companies that use this platform is constantly growing and more and more small and medium enterprises are beginning to require documentary communication with them to be done in this way. From the analysis, we derive the main advantages of EDI:

- improving the activity of the organizations;
- guaranteeing the receipt of correct information;
- reducing the risk of infection during a pandemic;
- reducing the amount of paper;
- increasing the efficiency of the investments made in software so far;
- addition of functionality to the modules of the implemented ERP and CRM systems;
- accelerate the exchange and processing of information between business partners;
- conversion of the received files in the company-specific formats;
- controlling the document flow;
- security, storage and reliability of information;
- automatic data entry;
- making a connection between the existing company software applications and the electronic data exchange system.

## **CONCLUSION**

Businesses have undergone radical changes in their organizational processes and attitudes under the influence of pandemic pressure. In this sense, good knowledge and use of the EDI system will contribute to more efficient management of business processes in general, as well as to faster adaptation of companies to technological change. EDI management involves not only the technical implementation of the described processes, but also requires a lot of creativity and the

ability to react quickly in different situations. Based on our research, we can conclude that the centralized EDI service provider is more cost-effective, more reliable and secure, optimizing the activities of organizations, accelerating the exchange of information and ensuring security and obtaining the right information, especially in today's uncertain working conditions.

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## **CROSSBOUNDARY CLUSTER SYSTEM AS A FACTOR OF STRENGTHENING THE INNOVATIVE POTENTIAL OF THE UKRAINIAN ECONOMY**

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### **ТРАНСКОРДОННА КЛАСТЕРНА СИСТЕМА ЯК ФАКТОР ПОСИЛЕННЯ ІННОВАЦІЙНОГО ПОТЕНЦІАЛУ ЕКОНОМІКИ УКРАЇНИ**

***Abstract.** The article deals with the under consideration is to offer theoretical and methodological provisions and practical propositions to justify the improvement tools of project planning of the European regional innovative systems with Ukraine as a participant under the conditions of EU enlargement by means of creating cross-border cluster systems – network industrial integration institutions – which have become the poles of economic growth and competitiveness.*

***Keywords:** innovations, integration, cross-border cluster system, competitiveness.*

***Анотація.** У статті розглянуто теоретичні, методичні положення які мають обґрунтувати інструменти вдосконалення проектування єврорегіональних інноваційних систем за участю України в умовах розширення ЄС, шляхом створення транскордонних кластерних систем – інститутів мережевої промислової інтеграції, які стають полюсами економічного зростання і конкурентоспроможності.*

***Ключові слова:** інновації, інтеграція, транскордонна кластерна система, конкурентоспроможність.*

В умовах посилення процесів глобалізації, Україна, будучи учасницею міжнародного поділу праці, втягується в галузеві структурно-технологічні зрушення, що відбуваються у світовій економіці. Ідеї «Вашингтонського консенсусу» визначили якісні трансформації в країнах пострадянського простору, пов'язані з глобалізацією світової економіки, в першу чергу, через лібералізацію зовнішньоекономічних зв'язків та посилення процесів «відкритості» економік [1]. Актуальність теми нашого дослідження обумовлена важливою роллю транскордонної кооперації у підвищенні конкурентоспроможності периферійних прикордонних регіонів, зменшення просторової диференціації між прикордонними і внутрішніми субрегіонами, з одного боку, і слабкою розробленістю теоретичних і методичних аспектів вивчення механізмів транскордонного співробітництва, з іншого.

Підтримка наукових досліджень та розробок, процеси стимулювання впровадження інновацій є стратегічним пріоритетом соціально-економічного розвитку країни. Роль освітніх структур полягає в активному впровадженні нововведень в освітній процес, трансфері та дифузії нових знань у підприємницьке середовище через програми «longlife learning». Таким чином, розвиток кластерної інноваційної системи має фокусуватися на основних напрямках, відображених на рис. 1.



**Рис. 1. Інституційна платформа розвитку кластерної системи на ґрунті посилення інноваційного потенціалу**

Характеристикою інноваційного потенціалу на мезорівні виступає наявність інститутів генерації знань, включеність єврорегіону в міжнародні інноваційні мережі, оптимальне співвідношення територіальних і убіквітетних знань в рамках єврорегіону, наявність елементів мережевої організації транскордонного простору. Автором запропоновано визначення інноваційного потенціалу єврорегіону як складної просторово організованої системи

взаємопроникаючих збалансованих потенціалів (економічного, інституційного та потенціалу наукових досліджень і розробок), що приводяться в дію транскордонним кластерним механізмом співпраці (науки, влади і бізнесу) "поверх" адміністративних кордонів і досягають синергічного ефекту [2].

Держава тільки підійшла до розв'язання цих завдань шляхом вдосконалення законодавства і розвитку суб'єктів інноваційної інфраструктури, розвитку в країні мережі технопарків, інноваційних кластерів, бізнес-інкубаторів, наукових центрів, залучення в інноваційну сферу приватного капіталу. Транскордонні кластерні системи (ТКС) пропонуються для розгляду в якості об'єкту стратегічного планування. Вони визначаються як територіально злокалізовані соціально-економічні системи, сформовані групою незалежних господарюючих суб'єктів по обидві сторони кордону держав, на основі самоорганізації виконавчих адміністративних органів держав Євросоюзу і співтовариств, що взаємодіють один з одним на стабільній основі, за допомогою обміну інформацією, товарами і послугами, персоналом і фінансами і що забезпечують більш високу ефективність у порівнянні з іншими об'єктами не здатними до системної організації. ТКС можуть стати центрами регіонального розвитку, залучення інвестицій, поширення інновацій, формування людського ресурсу нової якості, бізнес-культури, розвитку адекватних інститутів, спрямованих на рішення завдань економічного прогресу в усьому національному масштабі. Країни Східної Європи мали ще один значний стимул, який підтримували практично усі значні політичні сили, - їх повернення в Європу, швидша інтеграція в основні європейські інститути.

Створення транскордонних кластерів, як промислових, так і інноваційно-освітніх перебуває в Україні на початковій стадії. Недостатньо чітко розпрацьовані механізми їхнього формування: визначення концепції розвитку, основних елементів та інструментів управління, оцінка їхньої ефективності. Концепція кластерного розвитку промислового сектора ґрунтується на міжнародному досвіді кластерних ініціатив розвинених економік [3]. Тому питання адаптації цих методів у країнах з економікою, що формується, для відродження регіонів і підтримки промислових секторів, які базуються на

впровадженні нових ефективних економічних механізмів, залишається відкритим. Враховуючи результати проведеного аналізу та запропонованої структури чинників посилення регіонального інноваційного потенціалу, нами була розроблена типологічна модель інноваційної системи регіону. Ця модель максимально точно відображає специфіку території, а також коригує виявлені вище обмеження. Під час реалізації даного процесу важливим є розподіл функцій і відповідальності, позначення чітких кореляційних зв'язків і розробка механізмів координації та взаємодії основних структур, відповідальних за інноваційний розвиток регіону [4]. Розмаїття варіантів визначень дозволяє звести поняття інноваційної системи до такої авторської інтерпретації:

Інноваційна система єврорегіону – це комплекс інститутів, які всі разом і кожен окремо беруть участь у процесі створення нових знань або трансферу та адаптації вже наявних релевантних знань до потреб економіки єврорегіону.

Інститути-норми включають в себе законодавство, а також неформальні правила здійснення інноваційної діяльності. До інститутів-суб'єктів інноваційної системи належать: органи державної влади, інститути генерування і поширення знань, бізнес-структури, суб'єкти інноваційної інфраструктури.

Звернімося до проблеми узгодженої взаємодії всіх учасників європейських кластерів, а також до питання врахування чинників, що впливають на кластерний розвиток. У даній моделі наочно показано групи чинників (сили), що впливають на розвиток конкурентоздатних промислово-інноваційних кластерів, а відтак, на конкурентоздатність окремих компаній єврорегіону. Роль підприємницького сектора полягає у створенні спільних технологій на основі адаптації та комерціалізації досліджень і розробок, запропонованих науковим середовищем. Автор пропонує розвивати вже впроваджений на практиці механізм одного з типів кластеру знань – інноваційно-освітнього кластеру (ІОК), актуального для країн з ринковою економікою. Транскордонні кластери є прикладом систем, що самоорганізуються, в економіці. Мінливість кластерів в часі робить їх динамічними системами; наявність вхідних і вихідних матеріальних та інформаційних потоків - відкритими; здатність змінювати свою структуру -

адаптивними; здатність виникати і "розчинятися" - диссипативними; наявність підсистем різного роду і рівня - складними; децентралізований характер і накопичення досвіду - саморганізованими. Транскордонний (транснаціональний) інноваційно-освітній кластер може бути визначений як географічно сконцентровані по обидва боки кордону організації дослідницької, інноваційної та освітньої спрямованості, що завдяки активній взаємодії стають рушійною силою розвитку інноваційної спеціалізації євро регіону. ТКС є новим типом систем з новою ідеологічно функціональною конфігурацією, яка дозволяє розширити сферу функціонально-організаційних зв'язків, що породжують комплексну діяльність, яка об'єднує людей, засоби, ресурси і нові парадигми формування інформаційного простору України, простежувати транслогістичний ланцюжок інтегрованого використання всіх взаємопов'язаних видів ресурсів. Таким чином, «невидима рука» підприємницького сектора поєднується в Європі з «видимою рукою» кластерних політик європейських країн та ЄС в цілому.

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## **TAX POLICY AND ITS RELATIONSHIP WITH THE INDUSTRIAL STRUCTURE OF THE NATIONAL ECONOMY**

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### **ПОДАТКОВА ПОЛІТИКА ТА ЇЇ ВЗАЄМОЗВ'ЯЗОК З ГАЛУЗЕВОЮ СТРУКТУРОЮ НАЦІОНАЛЬНОЇ ЕКОНОМІКИ**

***Abstract.** The article describes the structure of the economy and structural changes, taking into account transformational trends and global features. Objective indicators of the analysis of branch structural changes of the national economy and their interrelation with tax policy are revealed.*

***Keywords:** tax policy, national economy, economic structure, tax stability, structural changes.*

***Анотація.** У статті охарактеризовано структуру економіки та структурних змін з урахуванням трансформаційних тенденцій та глобальних особливостей. Виявлено об'єктивні індикатори аналізу галузевих структурних змін національної економіки та їх взаємозв'язок з податковою політикою.*

***Ключові слова:** податкова політика, національна економіка, структура економіки, податкова стабільність, структурні зміни.*

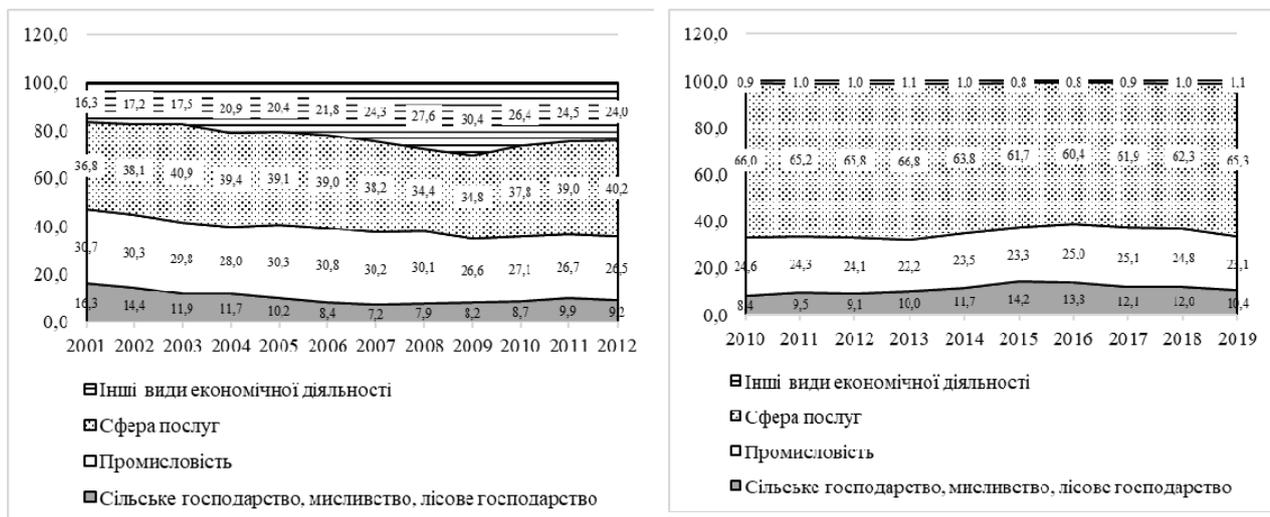
Структура економіки є однією з базових її характеристик, що розкриває вагомість різних параметрів та їхнього поєднання: галузевого – щодо видів економічної діяльності; секторального – щодо секторів матеріального/нематеріального, державного/недержавного, виробничого/послугового; технологічного – щодо технологічної участі (у поєднанні до традиційних підходів використання факторів виробництва); територіального – щодо територіальної участі; відтворювального – щодо перерозподілу національного доходу; соціального – щодо форм бізнесу (великого, середнього, малого), форм власності (державної, комунальної, приватної) тощо.

Структура економіки визначає її конкурентоспроможність, спеціалізацію та різноманітність як передумову збільшення кількості виробничих секторів (ризиків моноспеціалізації), утворення нових ринкових сегментів [1]. Структурні зміни в національній економіці означають зміни вагомості різних її параметрів.

Практичні висновки щодо аналізу структури економіки та структурних змін дозволяє зробити застосування галузевого підходу. При цьому можуть братись макроекономічні показники, показники діяльності підприємств, зайнятості, інвестиційної та інноваційної активності тощо в розрізі різних видів економічної діяльності, залежно від наявності статистичної бази оцінки.

Аналіз галузевої структури економіки дає змогу з'ясувати трансформаційні тенденції. Трансформація галузевої структури національної економіки відображає виникнення нових видів економічної діяльності та галузей (як їх об'єднань), що формують наступний технологічний уклад, змінюють особливості залучення факторів виробництва, забезпечують продукування нових товарів і послуг з виникненням нових споживчих потреб.

Одним з об'єктивних індикаторів аналізу галузевих структурних змін економіки та виявлення взаємозв'язку з податковою політикою є дослідження вагомості видів економічної діяльності залежно від створення доданої вартості (ВДВ), адже даними сферами виготовляється продукція (надаються послуги), що забезпечують конкурентоспроможність економіки на вищих просторових рівнях [2].



**Рис. 1. Галузева структура економіки України за показником ВДВ у ВВП, 2001-2019 роки, %**

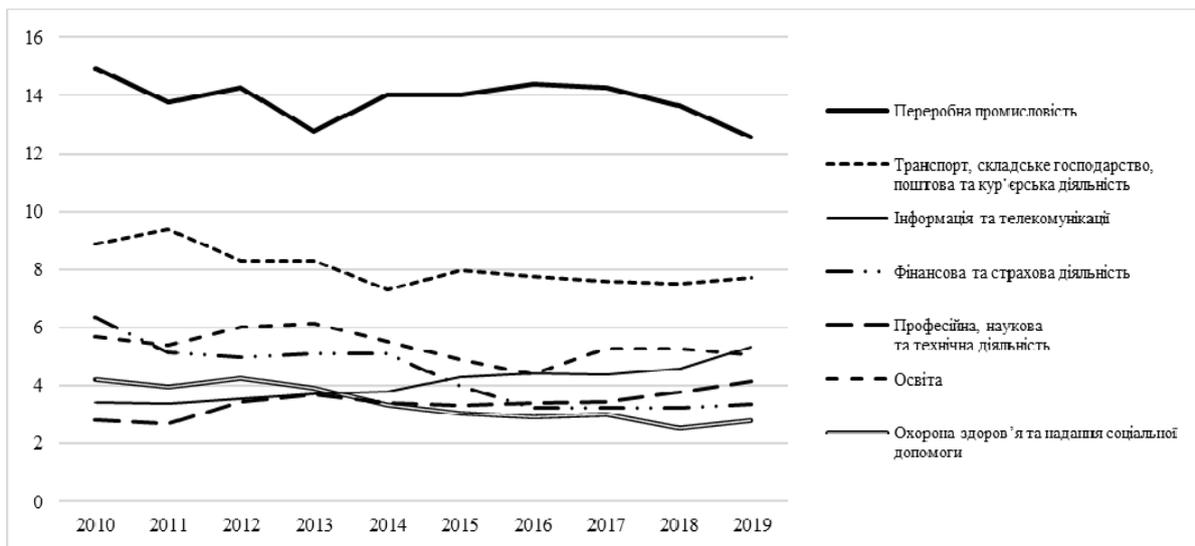
*Джерело: [3; 4]*

На рис. 1 відображено зміни галузевої структури економіки України. Податкова політика при цьому має слугувати одним з вагомих напрямків

стимулювання цільових структурних змін та виявлення причин структурних деформацій з низькою часткою інноваційно орієнтованих видів економічної діяльності, що є базовою умовою забезпечення сталого економічного зростання і глобальної конкурентоспроможності.

Аналіз галузевої структури економіки України за показником ВДВ у ВВП, починаючи з 2001 року, показує, що в принципі докорінних змін на користь сфери послуг не відбулось, хоча певне зростання спостерігається. За весь період відбувалось скорочення частки переробної промисловості: коли на початку 2000-х років вона коливалась біля 20 %, то у 2019 році знизилась до 12,6 %. Якщо говорити про трансформацію економіки на інноваційних засадах, то вагомість переробної промисловості має зростати, оскільки дана галузь включає багато технологічних видів економічної діяльності – хімічної, фармацевтичної, машинобудування, виробництво комп'ютерів, електронної та оптичної продукції, електричного устаткування тощо.

Аналіз вагомості інших знаннємістких галузей, як от освіта (частка ВДВ у ВВП за останні роки лише на рівні 5 %), охорона здоров'я (менше 3 %), фінансова і страхова діяльність (3,3 %) вказують на нереалізований інноваційний потенціал даних сфер. Спостерігаються позитивні тренди щодо розвитку для таких видів, як професійна, наукова та технічна діяльність (зростання до 4,1 %), а також інформація та телекомунікації (до 5,3 %), однак їхні частки залишаються ще надто низькими (рис. 2). При цьому залишається на порівняно стабільному рівні частка добувної промисловості (2001 рік – 4,7 %, 2019 рік – 6,5 %) та сільського господарства (16,3 і 10,4 % відповідно), що зберігає сировинну спеціалізацію економіки. Додавши значну ресурсозатратність переробної промисловості та сільськогосподарського виробництва, виражену в високому зносі основних засобів та задовільних показниках інноваційної активності, беззаперечною є необхідність задіювання податкового інструментарію для трансформаційних змін економіки України на інноваційних засадах.



**Рис. 2. Тенденції структурних змін економіки України за показником ВДВ у ВВП щодо інноваційно орієнтованих та знаннємістких видів економічної діяльності, 2010-2019 роки, %**

Джерело: [4]

Таким чином, аналіз галузевої структури економіки за показником ВДВ вказує на її спеціалізацію та необхідність нарощування і реалізації інноваційного потенціалу. Податкова політика при цьому має бути спрямованою на: стимулювання розвитку інноваційно орієнтованих та знаннємістких видів економічної діяльності через інструменти підтримки та компенсації; коригування діяльності ресурсомістких видів економічної діяльності, посилення їх технологічної спеціалізації, зниження негативного впливу на навколишнє середовище та неефективного використання людського потенціалу.

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## WORLD ECONOMY

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### ECONOMIC SANCTIONS AGAINST RUSSIA (ANALYSIS OF THE RESULTS OF THEIR ACTIONS)

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### ЭКОНОМИЧЕСКИЕ САНКЦИИ ПРОТИВ РОССИИ (Анализ результатов их действия)

***Absrtact.** The article examines the history of the emergence, goals and consequences of the introduction of economic sanctions against Russia. The article examines measures to counteract the sanctions conditions for importing goods to Russia. The results of sanctions against Russia and other countries that initiated the introduction of sanctions are analyzed.*

***Keywords:** Economic sanctions, World Trade Organization, sanctioned import of goods, destruction of prohibited goods, food imports.*

***Аннотация.** В статье рассматриваются история возникновения, цели и последствия введения экономических санкций в отношении России. Исследуются меры по противодействию санкционным условиям импорта товаров в Россию. Анализируются результаты действия санкций в отношении России и потери стран, инициировавших введения санкций.*

***Ключевые слова:** Экономические санкции, Всемирная торговая организация, санкционный ввоз товаров, уничтожение запрещенных товаров, импорт продуктов питания.*

Интеграция стран в мировую рыночную систему вне зависимости от степени развития экономики требует открытия своих рынков потребления товаров и услуг. Это зачастую используется государствами с высокоразвитой экономикой в своих интересах для дискриминационного использования рынков развивающихся и наименее развитых государств и, как следствие, поглощения национального производства, либо размещение производства своих товаров с использованием дешевой рабочей силы. В итоге такой деятельности страны с развитой экономикой получают внушительные прибыли, не утруждая себя поиском возможности совершенствования производства товаров и услуг с использованием результатов научно-технических разработок, оптимизации производственных затрат на основе менее затратных и использование более экологически чистых и экономичных источников энергии.

В последнее время для достижения наибольшей прибыли своих товаров и услуг странами с развитой экономикой широкое использование приобретает введения экономических санкций. Маскируясь политическими стремлениями по защите мировых демократических ценностей с целью решения экономических вопросов, США вводит на постоянной основе экономические санкции как в отношении государств, являющихся их прямыми конкурентами, так и стран, входящих с ними в одни экономические сообщества и блоки. Примером тому может служить строительство газопровода «Северный поток-2», осуществляющее Российской Федерацией совместно с западными партнерами, которые в дальнейшем будут являться потребителями российского газа.

Еще более вызывающим примером, противоречащим правовым основам Всемирной торговой организации (ВТО) [1], является использование экономического эмбарго государствами-членами ВТО в отношении других ее членов, к которым относится Россия с 2012 г. Речь идет о введении в 2014 г. в отношении Российской Федерации экономических санкций, которые действуют и по настоящее время. Причиной их введения послужило воссоединение полуострова Крым с Россией. Кроме США и стран ЕС экономические санкции в отношении России были введены Австралией, Новой Зеландией, Канадой, Японией, Швейцарией и Норвегией.

Санкции в отношении России предусматривали замораживание активов и введение визовых ограничений для лиц, включённых в специальные списки, а также запрет компаниям стран, наложивших санкции, поддерживать деловые отношения с лицами и организациями, включёнными в эти списки.

Впоследствии расширилось в части ограничения доступа российских банков и компаний к рынку капитала ЕС, а также затрагивающих нефтяную, авиастроительную отрасли и оборонный комплекс. Эмбарго было введено на торговлю оружием с Россией и запрет на поставки в Россию товаров двойного назначения, предназначенных для военного сектора. Был также ограничен экспорт в Россию технологий и оборудования, необходимых для модернизации российской нефтяной индустрии.

Российская Федерация, являясь с 2012 г. полноправным членом ВТО [2], столкнулась с ограничениями доступа к иностранному капиталу, торговли оружием и поставок технологий и оборудования для нефтяной и газовой добычи, что противоречило самим принципам ВТО, провозглашающих свободу международной торговли на основе устранения экономических барьеров, препятствующих ее развитию.

Ответным шагом на эмбарго было введение Россией контр санкций в отношении западных сельхозпроизводителей и производителей продуктов питания стран, инициировавших антироссийские санкции. Правительством России был сформирован список запрещённых к ввозу продуктов питания, в перечень которых вошли мяса крупного рогатого скота (свежего, охлажденного и замороженного); свинины; мяса и субпродуктов домашней птицы; соленого, сушеного и копченого мяса; рыбы, ракообразных, моллюсков и прочих водных беспозвоночных; молока и молочной продукции; овощей, съедобных корнеплодов и клубнеплодов; фруктов и орехов; колбасы, а также молокосодержащей продукции на основе растительных жиров [3].

По данным официального сайта Федеральной таможенной службы, в 2013 г. Россия импортировала такой продукции из вышеперечисленных стран на сумму около \$ 8,35 млрд., что составляет около 2,5% от общего объема импорта (\$317,8 млрд.) [4].

Общая сумма запрещенных для импорта в Россию товарных позиций составила в 2013 г. для:

- США около \$700 млн. или около 4% от общего объема импорта из США в Россию в 2013 г. (\$16,5 млрд.);
- стран ЕС около \$ 6 млрд. или около 4,5% от общего объема импорта из ЕС в Россию в 2013 г. (\$134,2 млрд.);
- Канады около \$370 млн. или около 20% от общего объема импорта из Канады в Россию в 2013 г. (\$1,8 млрд);
- Австралии \$182,2 млн. или около 22,2% от общего объема импорта из Австралии в Россию в 2013 г. (\$815,2 млн.);

- Норвегии более \$1,1 млрд. или около 62% от общего объема импорта из Норвегии в Россию в 2013 г. (около \$1,76 млрд.).

На рис. 1 представлены стоимостные объемы ввоза продуктов в 2013 г, которые с 2014 г. стали санкционными и получили запрет на ввоз в Российскую Федерацию.



**Рис. 1 Стоимостные объемы импорта санкционных продуктов, ввезенных в Россию в 2013 г.**

Тема санкций была озвучена российской делегацией на переговорах в штаб-квартире ВТО в Женеве в августе 2014 г. Однако какого-либо решения по данному вопросу в ВТО не было принято. Как и не был удовлетворен запрос, который был направлен США, Австралией, Канадой и странами ЕС руководству ВТО, о законности введении ответных (зеркальных) санкций в отношении западных партнёров России по ВТО с требованием их отмены. Ответные санкции России остались в силе.

Пытаясь минимизировать свои потери от введения эмбарго своих товаров на российский рынок, иностранные экспортеры для ввоза на территорию России транзитные поставки через другие, соседние с Россией страны. Все попытки такого ввоза таких товаров в Россию решительно пресекались российскими правоохранительными органами. При ввозе в Россию санкционные продукты, которые нелегально пытались провезти в Россию, подлежали уничтожению. По данным Россельхознадзора, с 6 августа 2015 г. утилизировано почти 17 тыс. тонн продукции, которая попала под эмбарго [5].

Следует отметить, что действие санкций оказало в целом благотворное влияние на российскую экономику, поскольку способствовали развитию импортозамещения. Освободившуюся нишу на рынке смогли занять отечественные российские производители.

В ряде случаев российские контрсанкции привели к тому, что европейские производители стали переносить производство своей продукции в Россию. Датско-шведская компания Arla Foods, финская компания Valio, немецкие Ehrmann, Hochland и Meggle открыли заводы по производству сыров в России, используя для их производства российское сырье.

Страны Запада уже, потеряв значительные объемы инвестиций в российскую экономику, продолжают санкционную политику. В декабре 2020 г. Совет ЕС продлил срок действия санкций против России до 31 июля 2021 г., что потребовало от России применить ответные санкционные действия, срок которых был продлен до конца 2021 г.

В настоящее время в Российской Федерации в полной мере реализуется программа импортозамещения. Можно отметить экономические успехи в оборонной промышленности, в производстве продуктов мясной и молочной индустрии, развитие аграрного сектора в области выращивания овощей и фруктов, сделаны определенные шаги в развитии производственной сферы и технологий, используемых при производстве оборудования для российских предприятий топливно-энергетического комплекса.

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## ENTERPRISES ECONOMICS AND MANAGEMENT

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### REASONS FOR INTERNATIONALIZATION OF BULGARIAN SMES

***Abstract.** SMEs, incl. family businesses (as dominant ones) play an important role in modern economies, taking into account their contribution to employment and economic development (especially those with better international performance). This article is based on empirical data obtained from the implementation of basic research on "Determinants and models of competitive performance of small and medium enterprises in the international business environment" The results of a study related to the internationalization of Bulgarian SMEs are presented. The aim of the article is to reveal the reasons for internationalization of Bulgarian SMEs.*

***Keywords:** internationalization, SMEs, reasons for internationalization.*

### INTRODUCTION

The representation of small and medium business in an international environment is crucial in Bulgaria's market economy with limited number of large enterprises, small domestic market, regional differences and intense competition from local and international players. Among the leading possible ways to deal with current socio-economic challenges is the internationalization of business and the opportunities it provides to improve the competitive performance and growth of these companies. SMEs, including family businesses (being dominant) occupy an important place in modern economies, taking into account their contribution to employment and economic development (especially those that are better represented internationally). The internationalization of SMEs, including family businesses and their competitive performance in the global market is a relevant and important research area, actively developing in the context of globalization. It is especially important for Bulgaria, where such research is in its infancy and lacks a critical mass of researchers. Of the companies active internationally, exporting companies play an important role. It is determined not only by their predominant share, but also by the importance of exports for competitive performance, expressed in increasing market shares and sales revenues from the international market (as opposed to imports, which is a passive method).

## **1. SMEs in Bulgaria - role and specific characteristics**

SMEs occupy an increasingly important place in the economies due to the important tasks they solve: dynamization and diversification of the economy; solving employment problems; contributing to regional development; creation and transfer of innovations and technologies; internationalization of business. In an international context, doing business is more difficult for smaller companies. However, the processes of internationalization and globalization enable small business owners to develop it outside national economies (most often through their involvement in entrepreneurial / business networks and strategic alliances). In the context of globalization of the world economy, SMEs face the need to respond to the dynamically changing market environment and to take steps to expand their presence in international markets. As they face the challenges of the international market, SMEs increase their efficiency and become more competitive, which also benefits consumers. Bulgaria's membership in the European Union raises the need to increase the competitiveness of the SMEs sector. Some of the negative effects for the new member states are increased competition "from the west" (companies from developed economies rely on institutional support, consulting services, economies of scale and innovation) and the closure of production due to bankruptcies in several industries and regions. However, there are certain opportunities for Bulgarian entrepreneurs in connection with the potential for cooperation with leading European companies (in terms of subcontracting) and SMEs (strategic alliances, including the establishment of joint ventures). Some of subcontractors are required to relocate part (or all) of their facilities (often abroad) in order to be geographically closer to their main customers (Харизанова, М., Цветкова, Д., 2013). The role of SMEs in expanding foreign trade has not been accurately assessed by state institutions and in this regard, there is unrealized potential on the part of SMEs. Internationalization support activities must be tailored to the specific needs of local SMEs. The policy in this area must take into account the specific characteristics of the SME sector, which includes a number of different firms by sector, size, ownership and other indicators (Georgieva, S., 2020). The majority of Bulgarian SMEs are still not very export-oriented (Тодоров, К., 2011). Therefore, most smaller enterprises, especially micro-enterprises, remain

focused on the local market, which is characterized by a limited size and the presence of dynamic, intensifying competition from international players in various sectors of the economy.

## **2. Reasons for internationalization of Bulgarian SMEs**

According to Dunning (Dunning, J. H., 1994), four groups of motives for internationalization stand out: Motives related to resources: lower labor costs, natural resources, managerial and technological capabilities; Market motives: market attractiveness, opportunity to protect current markets and exploit new markets; Motives related to the strategy: the goal is to increase the global perception of the product and to develop a global network, to develop a good image of the company and increase sales; Efficiency motives: economies of scale.

Other scholars present aggressive and defensive motives that are proactive and reactive motives for internationalization (Wattanasupachoke, T., 2002).

- Proactive motives include: the goal of increasing profit / growth, the uniqueness of the product / service, the opportunities in foreign markets, economies of scale, the goals of managers and tax exemptions.

- Reactive motives include: competitive pressure, small national market, unused capacity of the company, seasonal sales and contracts with international subcontractors, fluctuations in demand and mental distance from international markets.

This article is based on empirical data obtained from the implementation of basic research on "Determinants and models of competitive performance of small and medium enterprises in the international business environment", funded by the Research Fund of the Ministry of Education and Science. The project is implemented by a research team of the University of National and World Economy - Sofia and the Institute for Economic Research of the Bulgarian Academy of Sciences. The empirical study was conducted in 2018 and covers a representative sample of 500 Bulgarian enterprises, selected according to ownership (family and non-family), industry sector, planning region and size. The empirical study focused on a mixed sample of family and non-family SMEs. Bulgarian SMEs operate in a single internal market, where there are several opportunities for their internationalization. Within

this market, smaller companies may also be competitive outside the EU, growing and becoming global players (under certain conditions, of course). This is one of the reasons why SMEs have a key role to play in economic stability and their internationalization is seen as a key driver of competitiveness and growth. A structured questionnaire was used for the study. Due to the heterogeneity and specificity of the surveyed companies, both closed and open questions were used. To produce a more comprehensive research the questionnaire included both dichotomous and multiple-choice questions, such for assessing importance, as well as grades (grading scales). This paper uses a small proportion of the responses received that have been processed using the SPSS statistical software.

For the needs of the paper, the few micro and large companies (used in the project sample for comparisons) were excluded, reducing the number of analyzed companies to 468 enterprises, 76% of which - small and the remaining - medium sized. The representativeness of the sample makes it possible, based on the results obtained, to draw conclusions concerning Bulgarian small and medium-sized enterprises operating on international stage. The selected 468 companies are engaged in three main activities: 227 are manufacturing firms, 137 are companies from the service sector and 87 are trade companies. There are several enterprises operating in other sectors – not engaged in any of the three types of activities pointed above. Family businesses are 58% of the studied enterprises.

The study shows that the main forms of international activity of Bulgarian SMEs are imports and exports. 30.4% of SMEs have imported and 28.9% - exports, of which 7% accidental, irregular exports. Forms of internationalization such as: franchising, outsourcing, offshoring, licensing agreements are left behind with a very low rate of manifestation. Interesting results are reported by the question: When do the international activities of the company start? It is clear that the majority of Bulgarian SMEs start international activities at the very beginning or within a year from the start - 52.9%, and 30.6% start international activities from 1 to 2 years after the start. These results show the orientation of companies towards growth and internationalization since its inception. We can assume that the goals for

internationalization of the activity are set from the very beginning or are even the reason for the establishment of the company.

Preferred countries for international activity are: Germany with 8.1%, followed by Greece with 7.6%, Italy - 6.9%, England - 5.3%, Serbia - 4.6%, Romania - 4.4%. Reasons for choosing a country are mostly good logistics - 23.4%, business climate created by the government of the country - 19.7%, contacts with consumers and markets - 18.6%.

The results of the study of the reasons for the internationalization of the activities of SMEs reveal several trends. As a significant reason for the internationalization of SMEs is the one related to the profit and growth of the company (for 54% of the companies). In second place in importance is the motive related to the restriction of the small domestic market (44.5% of companies). In third place is the need for proximity to consumers (44.4% of companies). The following is the information about foreign markets and opportunities, which is 43%. Management motivation is significant 35.4%. The tax benefits as a motive for starting an international activity are 31.5%. Economies of scale are cited as the reason for the internationalization of 34% of the surveyed companies. This is approximately the same percentage (34.1%) for those who reported the pressure from competitors as significant. The study of Bulgarian SMEs shows that the key factors such as motives for the internationalization of the company's activities are profit and growth orientation, the limitations of the small domestic market and the need for proximity to consumers. 43.1% of companies indicated participation in a network as a motive for internationalization of SMEs. As goals related to participation in the network are: goals related to lobbying and stakeholder relations (15%); goals related to finding strategic partners (11%); targets related to securing and expanding the market (11%); targets for growth and increase in turnover and number of employees (10.8%) and access to resources, including information (10.6%).

## **CONCLUSION**

The reasons for internationalization of companies can be sought in several ways. Motives related to the market, strategy, resources, and efficiency. From the survey of Bulgarian SMEs with international activity, several trends are clearly

outlined. Bulgarian companies are internationalizing mainly for market and strategy reasons. The desire for growth of companies in an international business environment has been set since the very beginning of the companies. The motives for joining networks related to international activities are also dictated by the desire to expand the market.

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## TYPES OF BATTERIES IN ELECTRIC VEHICLES

**Abstract.** *The development in the manufacture of electric vehicles' batteries is still progressing. It brings better, smaller and more ecological batteries. In the present times Li-ion and Li-pol batteries are still being used, however they're progressively reaching their limits. The future is in solid-state, Li-metal and Sodium-ion batteries. They should mainly be lighter with bigger capacities and lower carbon footprint.*

**Keywords:** *Solid-state battery, Li-metal battery, charge cycle, electric vehicle*

### ELECTRIC MOTOR

Electric vehicles use high voltage electric systems and electric motor without middle gears. Electric motor is placed right on the car axle or in its proximity and it only has a rigid reducing gear. The automobile does not need a gear box, because electric motor's speed can be easily increased or decreased.

Batteries are predominantly placed under automobile's floor. This placement has several designing advantages. The battery is heavy and affects driving attributes of electromobile very positively. Because of the heavy battery electromobile has low centre of gravity under its floor. That's why the car drives through curves so well.



**Fig. 1. Location of the electric motor and battery in Mercedes-Benz EQC**

Source: <https://rc.305.cz/view.php?cislocclanku=2015050003>

There are also concepts of placing electric motors in the wheel body; however this solution brings various problems, because it's problematic to effectively subdue the big wheel mass while driving through road irregularities. For this reason, the distribution of it in serial production wasn't successful. This system is only useful for low-speed means of transport.

Protean Electric Company developed a module for one wheel weighing 31 kg, which is not that big of a weight anymore. But it's at the expense of unsprung components' weight. The solution is "retrofitting," which means that it can be used for vehicles that had been already manufactured. Protean Drive counts with common solution of vehicle suspension. It can be installed on every wheel in the size of 18-24 inches; it's fitting for FWD, RWD and also for AWD driving gears. It does not need any gear box and can distribute the torsion moment to individual wheels as necessary. The car does not need another heavy electric motor under the bonnet and the space can be used for other designing purposes or for luggage.

Module's component is also a specifically integrated brake system. Recuperation of braking energy up-to 85 % is a part of it. A car like this will not need the usual configuration of drive chain with differential, gear box and half-axles, which will increase the effectivity of driving gear by 6 - 8 % in comparison with conventional electromobile with one axle that is being driven. To design the hybrid will be much easier than in the present times. Ideally only 2-4 modules will be added to the already existing platform.

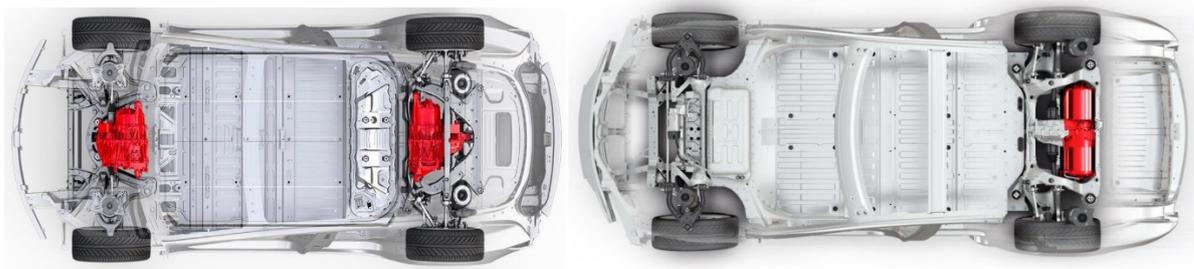


**Fig. 2. Electric motor placed in the wheel body**

Source: <https://www.topspeed.sk/novinky/co-poviete-na-elektromotory-v-kolesach/13931>

In case of 4x4 configuration, a pair of motors is being used, each for one car axle and their cooperation is controlled electronically. Systems of driving gear are dedicated and particular manufacturers develop them individually for a concrete model or a series, although there are already concepts of electric platforms utilizable for a whole chain of models. Configurations of parallel hybrids and plug-in hybrids resemble vehicles with combustion engines, where electric motor and generator are mostly integrated in gear box's block. Generally there are two ways applicable for the gear boxes. The first one is axle drive with planetary shifter, which Toyota and Ford are using in their HSD systems. The second one that is being used by majority of other manufacturers is a classic version with automatic gear box.

This is a design of Tesla version with back driving gear, so one electric motor and driving gear for all the wheels with two electric motors (Model 3).



**Fig. 3. Tesla models**

Source: <https://itavisen.no/2019/04/07/tesla-model-s-og-x-far-ny-motor-og-lengre-rekkevidde/>

## **BATTERIES IN ELECTRIC VEHICLES**

The development brings better and smaller batteries; utilization of Li-ion or Li-pol batteries is slowly but surely hitting the limit. One of the reasons why is difficult thermal management of the batteries. They are sensitive to big changes in temperatures. They quickly lose their capacity at low temperatures, so it's necessary to heat them, high temperatures can cause the battery damage. So it's inevitable to ensure quality cooling. In addition these systems disable the dramatic increase of energy density of batteries because they form the adding weight and capacity of batteries.

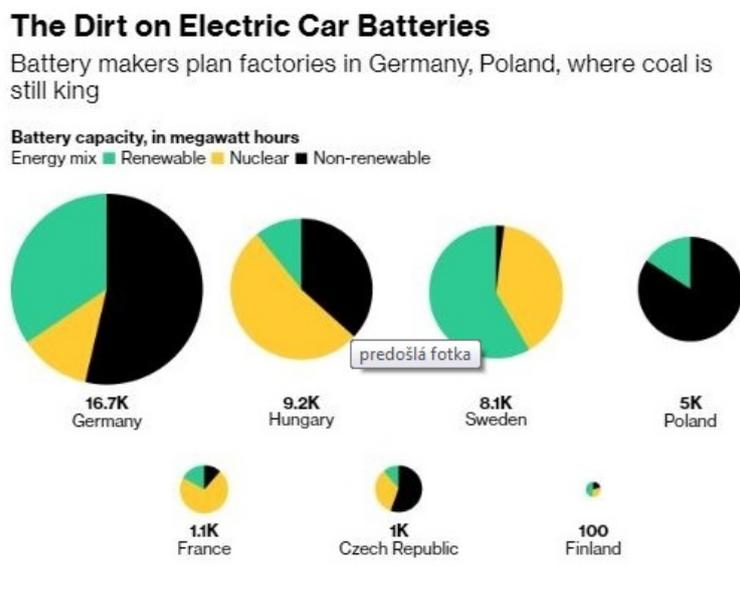
### **Batteries challenge the ecology issue**

The bigger the electromobiles' batteries are, the bigger the carbon footprint there is. The problem of new electromobiles is that the load from batteries'

manufacture is bigger than the gain from electromobile's functioning without local emissions. Electromobile with big capacity batteries has to drive for years just to come close to the load that was caused by manufacture of batteries. That's what the education of Bloomberg New Energy Finance analysis says. At the same time their study claims that some drivers will emit less CO<sub>2</sub> (and other injurants) into the air if they choose diesel engine instead of electromobile.

The evaluation does not handle the problem of ecological impact of heavy metals' mining at all; meanwhile they're necessary for the manufacture of batteries. It also does not take the transfer of components around the world, the difficulties of recycling and so on into consideration. It's "just" the manufacturing of batteries and energy sources, which are being used while doing so.

Batteries for new electromobiles are mostly manufactured in places, where energy sources are mainly fossil fuel, coal and all that e.g. in Thailand, China, but also in Germany or Poland. Although Germany has the fastest growing energy industry from sustainable resources, but the majority of energy is from coal. Present and also future factories of Lithium-ion batteries are situated in countries and regions, whose energetic mix is one of the worst in the world.



**Fig. 4. Capacity includes announced plants and plants under construction.**

**Actual energy generation from 2017**

Source: Bloomberg New Energy Finance, European Network of Transmission System Operators for Electricity

Automobile factories that are currently starting to manufacture electromobiles on a large scale should focus on energy gained from renewable resources (to solely use solar panels, water or wind plant for batteries' manufacture). Electromobiles with batteries manufactured in this way will be considerably more ecological than the alternative from other manufacturers. Another option is to manufacture hybrid (plug in) vehicles which do demand electricity but have smaller batteries and their combustion engines are especially effective.

Bloomberg New Energy Finance developed a study, where they chose an electromobile with 60kWh capacity. So a car with battery like Chevrolet Bolt, Hyundai Kona or Kia Niro EV has. While riding 15 000 km a year in Germany it would take more than 10 years to get the electromobile with this battery on the same level that a car with new effective combustion engine is on. It basically means that for the first 10 years (or 150 000 km) the electromobile would be bigger producer of CO<sub>2</sub> emissions in Germany than a car with a diesel combustion engine. It stands to a reason that the bigger the battery, the worse the prognosis is.

### **BATTERY TYPES AND FORMATS**

Today the lithium batteries are most commonly used in electromobiles. These battery cells, invented in the middle of 1960's were captivating because of their high measuring capacity and very low self discharge.

The principle of Li-ion accumulator's operation is: positive lithium ions go from positive electrode to negative during charging and during discharging it's the other way around, so from negative to positive. From designing point of view there are mainly cylinder battery cells in sizes 4/3A (ICR 17670) and 4/3AF (ICR 18650) applied in practice, meanwhile the size 18650 is unambiguously the most widespread. It's not only being used independently, but also as an essential designing feature of big batteries for electromobiles or houses. Battery cells usually have the capacity of 3500 mAh and more. 18650 designation is a combination of parameters. Cylinder battery cell has 18 mm average and standard length of 65 mm.

Battery cells in 18650 size are also essential designing parts of Tesla batteries. The current Tesla S models use batteries with 85 kWh capacities. The weight of the battery reaches 540kg. Battery's voltage is approximately 400V.



**Fig. 5. Tesla model S gear battery**

Source: <https://rc.305.cz/view.php?cisloclanku=2015050003>

In total the battery consists of 7104 pieces of Li-ion battery cells in 18650 size in 16 models connected in series. Every module contains 6 groups connected in series and every group consists of 74 battery cells that are connected in parallel ( $74 \times 6 \times 16 = 7104$  pieces of battery cells). These battery cells are manufactured by Panasonic, they are modified Li-ion battery cells with nickel-cobalt-aluminum cathode, which are cheaper to manufacture and less heavy than usual battery cells of the same size. They should also contain a substance that lowers the risk of battery cell's burning out.

Lithium-metal batteries - General Motors is developing a new generation of Ultium batteries, which should extend the trailing throttle to 640 km, but it's currently not that exceptional of a number. At the same time they're working on batteries of a new generation that could have considerably better qualities in terms of energy density for lower price. Within E-mobility General Motors wants to build on advanced battery technologies, including Li-metal (lithium-metal) accumulators. These should come from collaboration with SolidEnergy Systems which is the leader in the ambit of lithium-metal battery technologies and software for battery management via artificial intelligence. Liquid electrolyte is being used in the batteries, its energy density gets two times higher and the price should lower by 60 percent. Previously mentioned increase of energy density will show in electromobile's trailing throttle. According to GM these batteries will enable trailing throttle of 800-970 km with one charging. Electromobiles have accomplished more than 270 000 km within the simulation test. Both companies will build a production factory in Massachusetts and the prototypes of Li-metal batteries should be manufactured by 2023.



**Fig. 6. Prototypes of Li-metal battery cells from GM**

*Source: GM*

Sodium-ion batteries - Japanese scientists from Tokyo University of Science are developing sodium-ion batteries with anode manufactured from hard carbon. These batteries should be cheaper and they should be reaching higher energy density.

The essentials of new battery are inexpensive and commonly available materials. Alkali metals, lithium and sodium are chemically very similar. Even though in comparison with rare lithium, sodium does not have energy density, it's easily available and inexpensive. Based on analyses the new anode from "hard carbon" has 478 mAh/g capacity, meanwhile the common number with this type of material is from 300 to 350 mAh/g. The advantage is that the heat treatment requires lower temperatures; hence it's an effective solution from energetic and cost point of view.

For comparison, according to Japanese scientists today's Li-ion batteries use graphite anodes with approximate 372 mAh/g capacity. Thanks to new carbon anode's higher capacity, sodium-ion batteries that are more effective in terms of costs should bring higher energy density and that is by 19 % compared to Li-ion batteries.

In practice these new batteries would also have lasted through many more charge cycles. The manufacture does not require any rare salts of lithium, but simple kitchen salt is sufficient. Hard anodes can be made from brown coal, wood or other biomass. Cobalt or similar rare substances are not necessary.

Like technology of lithium, utilization of sodium brings some disadvantages as well. In comparison with lithium, the main disadvantage of sodium is the heaviness,

which is approximately three times bigger. However lithium represents less than 5 % of battery's total weight. Besides heaviness sodium batteries are less efficient because of lower voltage of battery cells. Despite that it seems that there is a breakthrough happening and the utilization of sodium-ion batteries is going to become a reality. However it will definitely take some time until sodium-ion batteries reach the level of technical forwardness and until they will be able to be manufactured in large amounts and installed into electric vehicles. However when it happens the transition to sodium-ion batteries should be largely trouble free thanks to very similar technology.

Solid-state batteries - Many consider solid-state batteries as the sangrail of E-mobility that should launch the electrification of automobile industry on a large scale. Experts predict that after 2025 only those with the best solid-state batteries will dominate the automobile industry.

From technological point of view, solid-state batteries are generally unique because their electrolyte is in solid state and has high energy density. Meanwhile current batteries have liquid or gel-state electrolyte. Thanks to this they should be fireproof and less toxic, which increases safety.

Toyota is developing solid-state batteries that should've been the successor of present day's Li-ion batteries for several years. Toyota is supposed to present the prototype of electromobile with solid-state battery in 2021, but because of the pandemic it will not be manageable. They mention extremely fast charging that should take only 10 minutes. The current prototype of solid-state battery from Toyota charges in 15 minutes. But several problems need to be solved. It's related to energy density's, endurance's and security's connection. Other issue is slow and difficult manufacture, which is why an effective mass production is not possible yet.

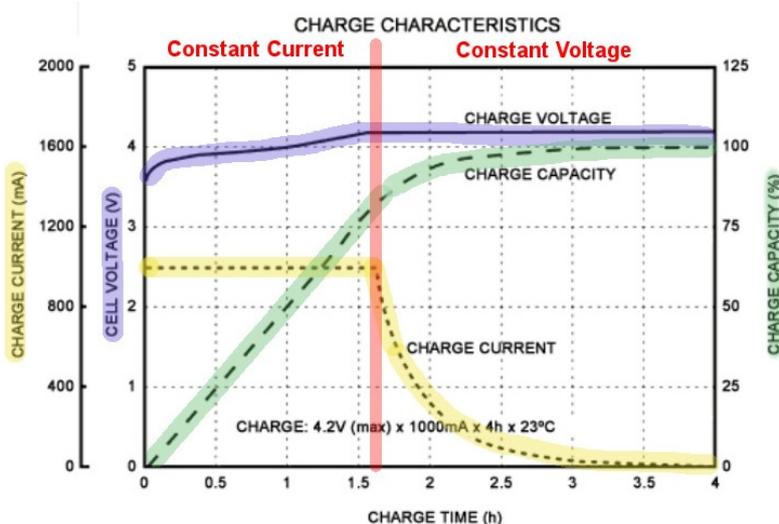
Solid-state battery that is being tested and is collaboration between Toyota and Kyoto University carries fluorid-ion "chemistry" inside. According to the scientists it can have approximately 7-times higher gravimetric energy density than regular Li-ion batteries. For electromobiles it should provide 1000 km trailing throttle in one charging. The current issue is that it only works at high temperatures.

Other company that is planning on manufacturing solid-state batteries as well is Taiwan giant Foxconn, which installs Apple smartphones. They want to present it

on the market in 2024. Foxconn collaborates with CATL and SES. Solid-state battery is supposed to have an anode consisting of LMNO (lithium-manganese-nickel oxide) and silicon-carbon cathode (SiC). Electrolyte will be coated with ceramic film from oxide of (unspecified) metal, which is in the development since 2017. The additives used by Foxconn increased battery's endurance by 10% and at the same time lowered capacity by 17% and weight by 50%.

### Charging batteries

Lithium batteries charge via CCCV method (Constant Current followed by Constant Voltage). It's charging via constant current until the accumulator reaches the voltage that was set in advance, then charging continues with constant voltage. Charging is completed if the charge current lowers to a figure that was set beforehand or by a timer.



**Fig. 7. Constant Current followed by Constant Voltage (CCCV)**

Source: <https://www.fveaa.org/forums/index.php?topic=1302.0>

Then, after achieving the voltage that was established in advance, the accumulator charges for definite time, e.g. two hours via constant voltage. If the constant charge voltage in the second phase is correctly set during lithium-ion battery cells' charging, accumulators cannot overcharge like it happens with Ni-Cd and Ni-MH accumulators charged via constant current. Lithium-ion accumulators do not have memory effect and that's why they don't have to be discharged before charging. Quite contrary, deep discharging is very harmful for them. The electronics in the

electric vehicle does not allow it to happen. And in case that the vehicle is showing zero trailing throttle, batteries keep the requested level of charging.

Figure number shows CCCV charge cycle for one lithium-ion battery cell. The example is presented for small battery cell (e.g. smartphone) but the concept is the same for a big-format batteries that are being used in electric vehicles. In that case lithium-ion battery cell is charged via 1 A (1 000 mA) constant current until the voltage of battery cell reaches 4,2 V and then it stays constant when the current lowers to 0A. Different parts of the figure are highlighted with these colors:

yellow = charging current (1A to 0A when completed),  
 blue = cell voltage (3.6V to 4.2V when completed),  
 green = cell capacity (SOC (State of Charge) from 0 to 100%),  
 red = shows when the charger changes from constant current to constant voltage.

### **Energy recuperation**

One of the key sources of electromobile's and hybrid's savings is recuperation so charging the battery during electric motor braking. Part of the equipment of these vehicles is also a system that transforms mechanic energy to electric. This is normally electric motor's function. It either operates in the engine mode, where it drives the vehicle or generator mode, where it's charging batteries.

Energetic balance of braking – During continuous braking by recuperation without using brakes we can calculate the amount of energy that will be gained and stored into battery during braking from 90 km/h and 50 km/h, so in cases when it's necessary to pull up outside of the city and in the city. Because braking is a short-term process, to make it simple we will eliminate air resistance and road resistance. The formula for kinetic energy calculation that can be used while braking is

$$E_k = \frac{1}{2} \cdot m \cdot v^2$$

We put speed in meter per second in this formula, so instead of 90 km/h and 50 km/h we put 25 m/s and 13,8 m/s. Kinetic energy will be 443 kJ, or more precisely 135 kJ. After calculating efficiency we can use 305 kJ, or more precisely 93 kJ. If we formulate that in the amount of saved gas while braking from 90 km/h it's 0,03 liters and while braking from 50 km/h it's 0,009 liters.

Bosch is using 48-volt technology, which can be mostly used in different micro-hybrids. Lithium-ion battery cells are as compact as possible and the battery is

adapted to simple integration into new models of vehicles. Bosch battery with 384 Wh capacity will be used in connection with Boost Recuperation System (BRS) and an electric motor built directly in 11 kW gear box. BRS stores the energy from braking and slowing down into 48-volt battery and later uses it for speeding up (electric boost). This way less gas is consumed and there are smaller CO<sub>2</sub> emissions. So utilization of lithium-ion battery pays off not just in case of compact class but within mini cars and micro-cars as well.

## CONCLUSIONS

Another increase of electric energy consumption thanks to bigger distribution of electric vehicles must walk hand in hand with building new renewable resources of energy. Otherwise there will just be transfer of emissions into city outskirts, or more precisely other continents.

Emission norms further push automobile factories to manufacture more electric vehicles. In order to really decrease emissions, not just transfer it, the focus should be on energetic mix and factories connected to renewable resources.

Electric vehicles can be more ecological than cars with combustion engines, although we need to evaluate their ecological contribution and load from the mining of raw materials to actual business, all the way to its scrapping and recycling and the same has to apply to other alternatives and classic cars with combustion engines as well.

## Acknowledgements

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## **THE COMPATIBILITY OF CHARGING STATIONS FOR ELECTRIC VEHICLES**

***Abstract.** In the present times automobile factories massively invest in the development of electric vehicles and other technologies of alternative driving gears. The governments provide different allocations and other advantages for the purchase of electromobiles. However, massive development of E-mobility will not be possible until a proper network of charging stations is built. European Union, as well as European countries in general aim for getting as many electric cars as possible on roads in relatively short period of time. Thereby projects are starting to develop, which will bring a huge amount of charging stations for electric vehicles and plug-in hybrids in the near future.*

***Keywords:** CCS – combined charging system, DC – direct current, AC – alternating current, RFID - Radio frequency identification, ISO - International Organization for Standardization, EV – electric vehicle.*

### **Introduction**

The sales for EVs and plug-in hybrid vehicles have increased rapidly in the last few years and it's expected to increase even faster in the future. According to European Automobile Manufacturers Association the market of electromobiles increased by 38% during 2019. In the light of overall decrease by 5% in sales for automobiles in Europe, this result is even more significant. Thereby electric vehicles are the fastest growing segment on the old continent. Interesting is the fact, that completely electric vehicles registered a massive increase (by 49%) and with 45 % they're starting to dominate the segment of electric vehicles, meanwhile plug-in hybrids represent 32 %.

Complete electric car has a battery as the only source of energy, so the most important electromobile's parameters are capacity of the battery and charging options. Charging can be done in two ways. The essential for the first one is

integrated charger firmly installed into the vehicle. It's connected from the external source of alternating current and can have different outputs. The second option is direct current charging via special fast charger.

Charging stations can have different types of currents and outputs. Generally they're divided into:

*AC charging:* all the EVs and plug-in hybrids use alternating current. Charging station sends alternating current into automobile's charger and the charger transmits it into direct current, which is sent back into the battery. AC charging is slower; hence it's more expensive at the public charging station. Standard car electrics usually include a cable that enables charging from the classic 230 V socket (Schuko). With a special cable, AC charging can be also used at public chargers.

*DC charging:* uses direct current for EV's charging, which goes straight into the battery. The advantage is considerably shorter charging time. The majority of electromobiles use DC charging, it requires a special charging station, which also contains the necessary cable. Most of the current EVs can get to 80 % of charging capacity in 20-40 minutes. Fast chargers use direct charging as well.

Electric vehicle can be also charged from classic home 230 V socket, which is secured by 16 A circuit-breaker. It's possible thanks to a charger that is built-in the electric vehicle. The essential method is AC charging. It's slow and can last 12 hours, that's why it's used in case of emergency. The alternative is a 3-phase socket installation (400 V - 16 A - 11 kW/400 V - 32 A - 22 kW), which cuts down the charging time to 6/3 hours.

The substitutes for home sockets are wallboxes, which can be installed on the wall. Its cable can be easily plugged into electric vehicle's charging port. Wallboxes can significantly cut down the charging time of a vehicle.

With new automobile models also come new technologies when it comes to charging. With today's batteries with capacities of 24 up-to 30 kWh, 43-50 kW is sufficient in order to get the vehicle to be charged-up to 80% at least in 30 minutes, these periods of times are extending with increasing capacity of accumulators. Charging 40kWh battery by fast charger lasts minimally 30 to 45 minutes. Because of this, more efficient stations with over 100 kW to 175kW are starting to be built. The

charging is at 400 V. Another generation of electric vehicles with even bigger battery capacities will be using high voltage systems of 800 V, which will provide as high as 350 kW charging. 350 kW charging stations allow charging of the vehicle in course of 15 minutes to a 400 km trailing throttle.

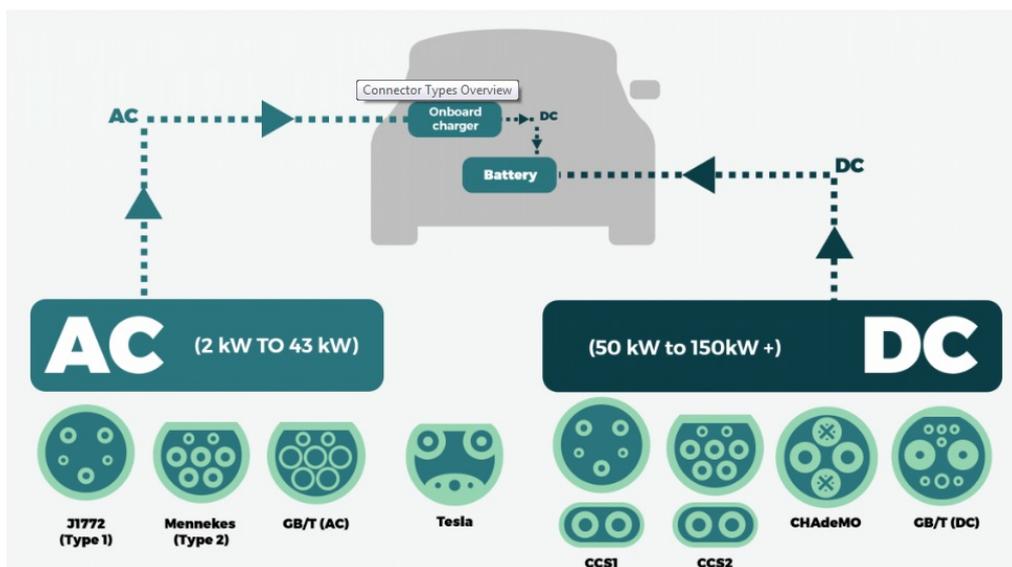
Charging time for 100 km of BEV range	Power supply	Power	Voltage	Max. current
6–8 hours	Single phase	3.3 kW	230 V AC	16 A
3–4 hours	Single phase	7.4 kW	230 V AC	32 A
2–3 hours	Three phase	11 kW	400 V AC	16 A
1–2 hours	Three phase	22 kW	400 V AC	32 A
20–30 minutes	Three phase	43 kW	400 V AC	63 A
20–30 minutes	Direct current	50 kW	400–500 V DC	100–125 A
10 minutes	Direct current	120 kW	300–500 V DC	300–350 A

**Figure 1. Comparison of the charging time depending on the power of the charging station**

Source: [http://e-mobility.provincia.brescia.it/wp-content/uploads/2017/10/d.t1.1.1-e-moticon\\_charging-infra-analysis-\\_final-version.pdf](http://e-mobility.provincia.brescia.it/wp-content/uploads/2017/10/d.t1.1.1-e-moticon_charging-infra-analysis-_final-version.pdf)

### Types of used connectors

Two standards are being used for fast charging. The first one is Japanese standard CHAdeMO, developed by Nissan.



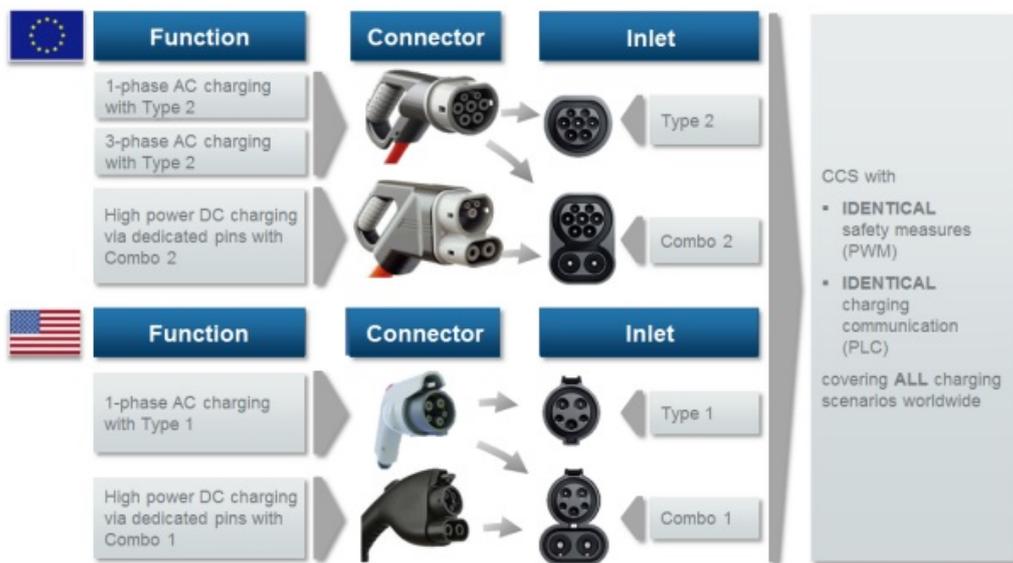
**Figure 2. Charging connector types**

Source: <https://versinetic.com/ev-charging-connector-types-guide/>

Currently it's the most used connector, especially for distribution of electromobiles of this brand. It will not be sufficient in the future; the connector is designed to 65 kW. Although a new CHAdeMo 2.0 standard, which enables charging

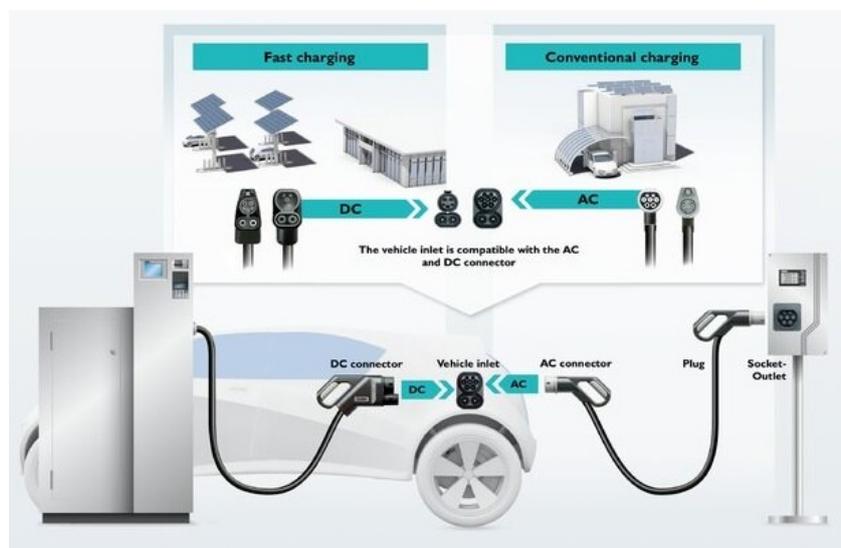
at 400 kW was approved in 2018, Combo 2 (CCS) is being promoted in Europe. Its advantage is that besides DC charging, CCS connector also enables AC charging through type 2 connector. The majority of fast chargers have three connectors, CHAdeMO and CCS for DC charging and type 2 for AC charging. But only some of them can charge 2 EVs simultaneously in DC + AC combination, the newest ultra-fast chargers with full configuration in DC + DC combination.

The following figure provides an overview of the standards for conductive AC and DC charging:



**Figure 3. Charging Interface of CCS**

Source: [https://tesla.o.auroraobjects.eu/Combined\\_Charging\\_System\\_1\\_0\\_Specification\\_V1\\_2\\_1.pdf](https://tesla.o.auroraobjects.eu/Combined_Charging_System_1_0_Specification_V1_2_1.pdf)

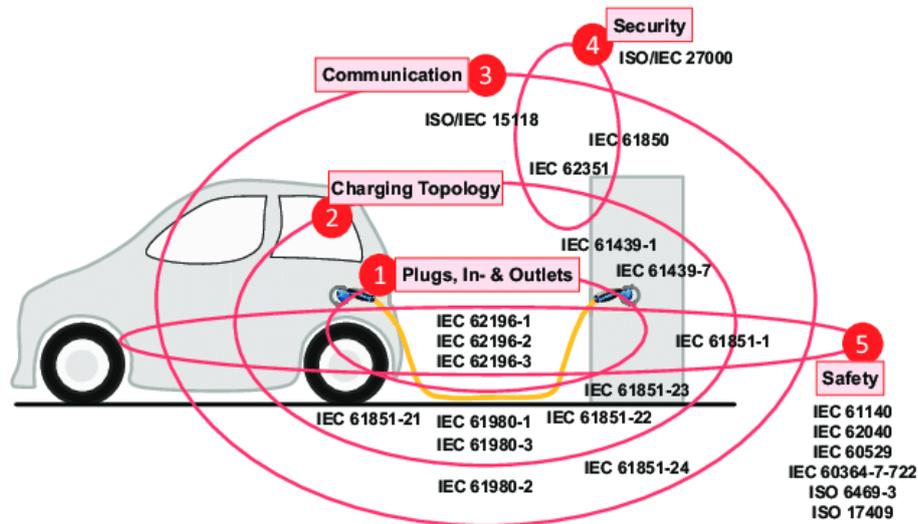


**Figure 4. Combined Charging System (CCS)**

Source: [https://www.phoenixcontact.com/online/portal/nz?ldmy&urile=wcm:path:/nzen/web/main/products/subcategory\\_pages/Charging\\_cables\\_and\\_charging\\_sockets\\_P-29-03/3f34965c-f842-4adc-a9f6-28126dc0a51a/3f34965c-f842-4adc-a9f6-28126dc0a51a](https://www.phoenixcontact.com/online/portal/nz?ldmy&urile=wcm:path:/nzen/web/main/products/subcategory_pages/Charging_cables_and_charging_sockets_P-29-03/3f34965c-f842-4adc-a9f6-28126dc0a51a/3f34965c-f842-4adc-a9f6-28126dc0a51a)

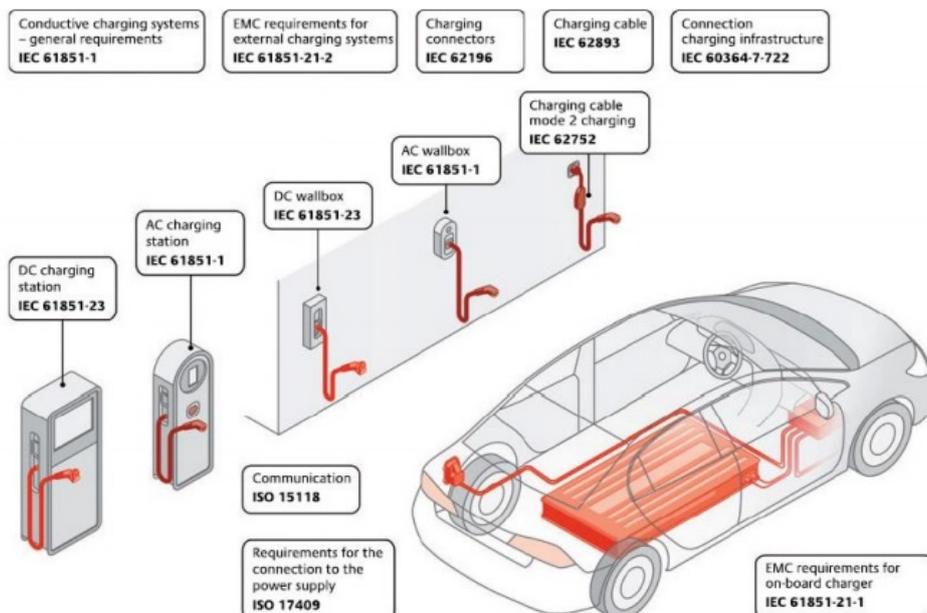
The vast majority of CCS charging stations (Combined Charging System – 50 to 100 kW DC) also supports charging standards CHAdeMO (50 kW DC) and Type 2 (22 to 43 kW AC), so you can charge every EV or plug-in hybrid. And also Tesla EVs with the help of CHAdeMO reduction.

The following images present a brief overview of technical standards from scopes of E-mobility.



**Figure 5. Digest of main ISO/IEC standards for the scope of the E-Mobility V2G Interface based on [3]**

Source: [https://www.researchgate.net/figure/Digest-of-main-ISO-IEC-standards-for-the-scope-of-the-E-Mobility-V2G-Interface-based-on\\_fig3\\_286585931](https://www.researchgate.net/figure/Digest-of-main-ISO-IEC-standards-for-the-scope-of-the-E-Mobility-V2G-Interface-based-on_fig3_286585931)



**Figure 6. Standards for the wired charging of electric vehicles (Nationale Plattform Elektromobilität 2017)**

Source: [http://e-mobility.provincia.brescia.it/wp-content/uploads/2017/10/d.t1.1.1-e-moticon\\_charging-infra-analysis-\\_final-version.pdf](http://e-mobility.provincia.brescia.it/wp-content/uploads/2017/10/d.t1.1.1-e-moticon_charging-infra-analysis-_final-version.pdf)

## Networks of charging stations

One of the biggest impulses for E-mobility's development is building a reliable charging infrastructure outside of big cities as well. According to data provided by EAFO (European Alternative Fuel Observatory) Slovakia belongs to best fitted countries within the scope of its closest neighboring countries.

Public chargers can either use alternating or direct current while charging. AC chargers are almost like exterior sockets; they can charge at 11-22 kW. DC fast charging stations are also called fast chargers. They can charge at 44 to 145 kW.

In the majority of Slovakia's territory, the coverage of fast chargers is really good, especially regarding entire route of D1 highway from Czech-Slovak border to Kosice, either across Zilina or Banska Bystrica. The south of Slovakia has a smaller coverage, the route across Nove Zamky and Lucenec is not covered. But it can be assumed, that the work on this route will commence in the near future.<sup>1</sup>

The essential of fast chargers is to enable longer distance drives for EVs within the standard trailing throttle. It's not good to use them as the main type of charging. The battery is considerably more overloaded during fast charging and with long-term frequent usage the endurance can decrease more quickly. However it does not damage the battery if fast charging is used once in a while during longer drives.

The biggest networks of fast charging stations in our country are provided by Greenway and ZSE.

### Tesla

Tesla was the first one to come up with the idea of building a network of charging stations. By the end of 2018 Tesla had 1375 charging station in worldwide Supercharger chain, and in these stations were 11 414 charging stands. USA and Europe have the most stations, but they're also being built in Australia, New Zealand and Far East. Within Eastern European countries the first fast charger Tesla Supercharger with 4 charging stands was launched in Slovakia, near Banska Bystrica.

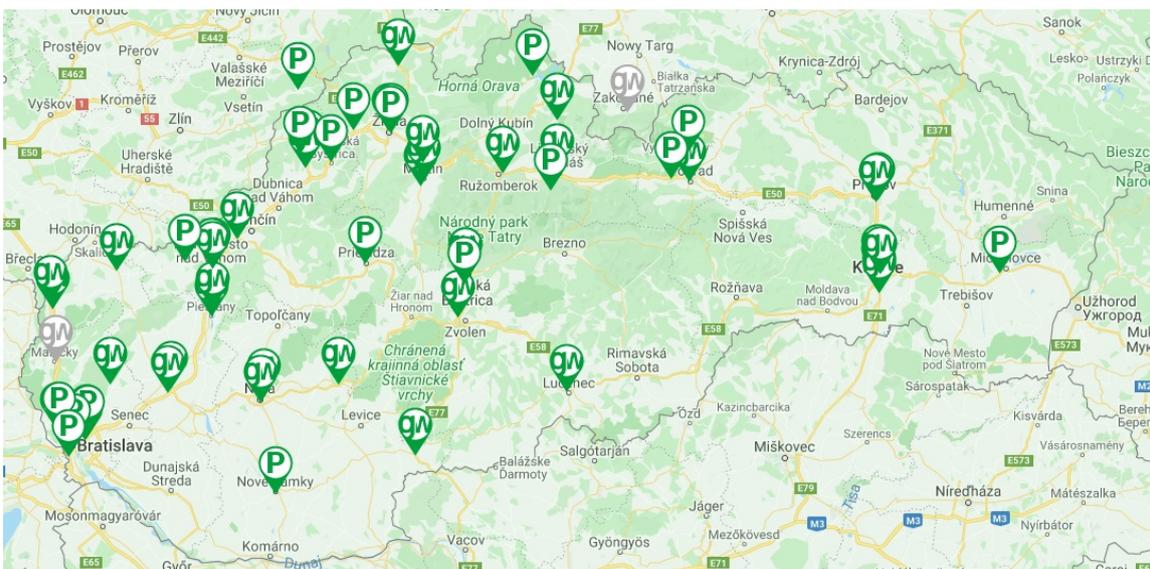
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<sup>1</sup> The biggest penetration of electromobiles within Europe can be found in Norway and Netherlands. Norway has a network of 2267 fast chargers and 8617 public chargers under 22kW, so 91 vehicles fall on one fast charger and 19 vehicles on one charger altogether. In Netherlands there's 811 fast chargers installed and up-to 34 021 public chargers. So it's 160 vehicles on one fast charger, but just 3 vehicles on one charger altogether.

## Greenway

It's a Slovak company and an operator of charging infrastructure. In May 2014 Geenway launched the first network of fast charging stations that was installed between BA and KE. The operator gradually improves the network in order to have a back-up for the chargers in case of power failure, so other charging spots are being added in particular localities. New chargers can reach 50 kW and enable charging two vehicles in DC – AC combination. Structure of the chargers according to outputs: DC fast chargers: 18 (44 kW), 12 (50 kW) / manufacturers: DBT, EFACEC, DELTA, ABB and slow AC chargers: 15 (22 kW). Regarding the parallel charging of two vehicles, up-to 99% of locations has this option. It's possible to charge 4 to 5 vehicles simultaneously on 3 locations.

Within the scope of their new project, the company will build 153 charging stations in total. There will be 10 ultra-chargers (up-to 350 kW), 60 fast chargers (50 kW), 50 AC chargers (7 to 22 kW) and 10 GridBooster stations (with additional battery storage of energy). 23 of them will be built in Slovakia – 3 ultra-chargers and 20 AC chargers. Remaining stations will be in Poland, within the frame of the first Polish nationwide network of charging stations. Thanks to the phone app, the customers can watch charging of the vehicle in real time, they can check current availability of the nearest charger; they can even make a reservation for it.

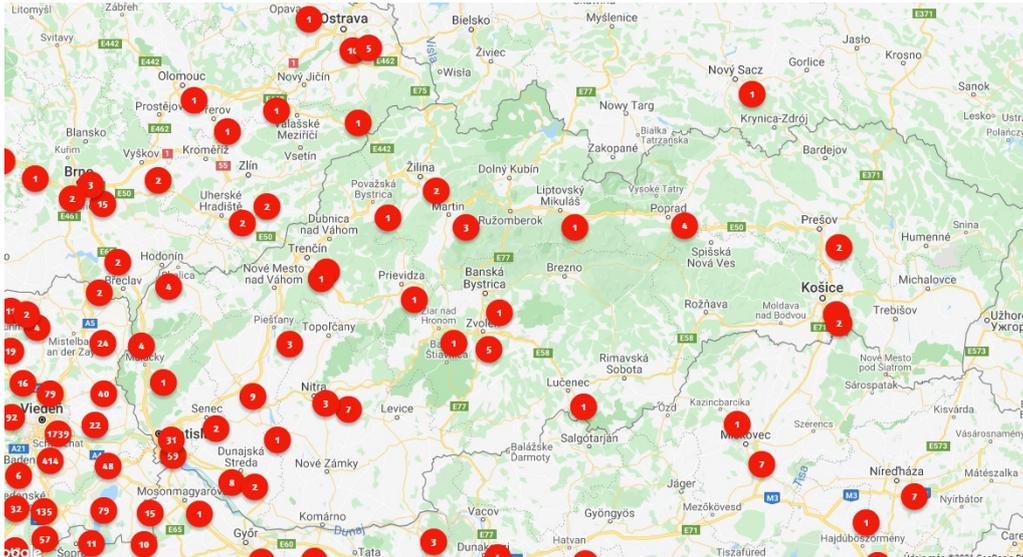


**Figure 7. Charging stations of Greenway network by 15.3.2021**

Source: <https://driver.greenway.sk/#/portal/locations>

## ZSE

ZSE is building its own network of charging stations in Slovakia with ZSE Drive designation, that are integrated to all-European network of charging stations. By the end of 2019 there should had been 103 of them, 51 fast chargers (50 kW), 18 ultra-fast chargers (to 350 kW) and 34 AC charging stations (22 kW). The majority is located in the Western Slovakia.



**Figure 8. Charging stations of ZSE network by 15.3.2021**

Source: [https://zsedrive.sk/mapa?AC=false&AC\\_RESIDENT=false&DC=false&UFC=false&gpsNorthWestLat=49.949004286609835&gpsNorthWestLon=15.998336820203491&gpsSouthEastLat=47.59643333626693&gpsSouthEastLon=24.25456240614099&lat=48.786502587365135&lng=20.12644961317224&zoom=8](https://zsedrive.sk/mapa?AC=false&AC_RESIDENT=false&DC=false&UFC=false&gpsNorthWestLat=49.949004286609835&gpsNorthWestLon=15.998336820203491&gpsSouthEastLat=47.59643333626693&gpsSouthEastLon=24.25456240614099&lat=48.786502587365135&lng=20.12644961317224&zoom=8)

## VSE

Power-plant company Vychodoslovenska energetika, a.s. – VSE, built 5 charging stations for electromobility in Slovakia. They are situated in Kosice, Poprad, Nitra, Stos and Bratislava.

## Charging stations of Slovak electric power stations/Enel

Slovak power stations/Enel established 6 charging stations for electromobility in Slovakia. They are in operating or administrative buildings of power stations in Mochovce, Jaslovske Bohunice, Bratislava, Trencin and Novaky.

## NEXT-E

The project NEXT-E is very significant, it's cofinanced from the CEF<sup>2</sup> fund of European Union. In 2017 it had received the largest grant to date in the amount of

<sup>2</sup> Instrument for connecting Europe (CEF), it's the responsibility of Department of Transportations. CEF is a relatively new instrument founded within the scope of multiannual financial ambit's formation. The means have also been earmarked for its establishment, which had been initially used for Cohesive fund within operating programs.

18,84 million of Euros from European commission for the development of E-mobility. Thanks to this, there will be 222 fast charging stations with 50 kW and 30 ultra-fast charging stations with 150-350 kW built on main routes and TENT-T corridors. The project covers 6 countries of Central and Eastern Europe, and those are Slovak Republic, Hungary, Czech Republic, Croatia, Slovenia and Romania. Thereby a fluid infrastructure for charging electromobiles between countries of Western Europe and countries involved in the project will be created. Four concerns in the scope of electroenergetic, oil and gas industry and two automobile factories are involved in the project. Apart from E. ON group in Slovak Republic, Hungary, Czech republic and also Hrvatska elektroprivreda in Romania, PETROL (in Slovenia and Croatia) and Nissan and BMW automobile factories.

Within the project there will be 25 charging stations built in Slovakia in total (18 fast charging stations and 7 ultra-fast charging stations). One interesting fact is that Slovakia was the first out of 25 countries, where by the end of 2018 an ultra-fast charging station in Budca bay was launched within the project. This station is able to charge at up-to 350 kW and credits ZSE Company. In practice it means that all it takes is 15 minutes of charging in order to extend the trailing throttle by another 400 km. There's not an electromobile that supports this kind of fast charging yet. The current max is 170 kW.

### URBAN-E

The international project URBAN-E covers 167 charging stations, which will be situated in Bratislava, Ljubljana and Zagreb. 55 of them will be built in Bratislava. There will be 50 AC chargers and 5 fast charging DC stations. Companies ZSE, GO4 and city of Bratislava are involved within the frame of Slovak subjects. The whole network should be done by 2020.

### fast E

International project fast E will bring 307 fast charging stations in total, they will be brought to Slovak Republic, Czech Republic, Germany and Belgium. They will cover more than 20 000 km of main roads. The chain is being built. In Slovakia there will be 11 charging stations reaching 50 kW. These will be situated on the route

between Trencin, Trnava, Bratislava and Skalica. The charging stations will be fitted with CCS connectors (50 kW DC), CHAdeMO (50 kW DC) and Type 2 (43 kW AC).

### IONITY

The focus of Ionity association, which was founded in 2017 by Ford, Daimler, BMW and VW, including Audi and Porsche, is to operate up-to 280 charging spots with 350 kW<sup>3</sup> at 60 Shell stations in Europe by the end of 2021. The main goal is to build European network of ultra-fast charging stations with up-to 350 kW, allowing for CCS charging standard. They will be built on the main European transport lines within the range of every 120 km. The complete network of Ionity charging stations should be built by 2020, where 400 charging spots in 24 European countries should be established. Within the network there will be the most down-to-date Terra HP stations charging at 150 kW, which can also be upgraded to 350 kW. Two vehicles can be charged at once. Charger with this output enables electromobile's charging in 8 minutes for 200 km drive. Every charging station will have 6 charging stands. IONITY chargers are fitted with intelligent lighting, which will indicate the state of charging from distance. It will not be restricted to automobiles from founding producers. They could be used by any electromobile, which has compatible CCS sockets.

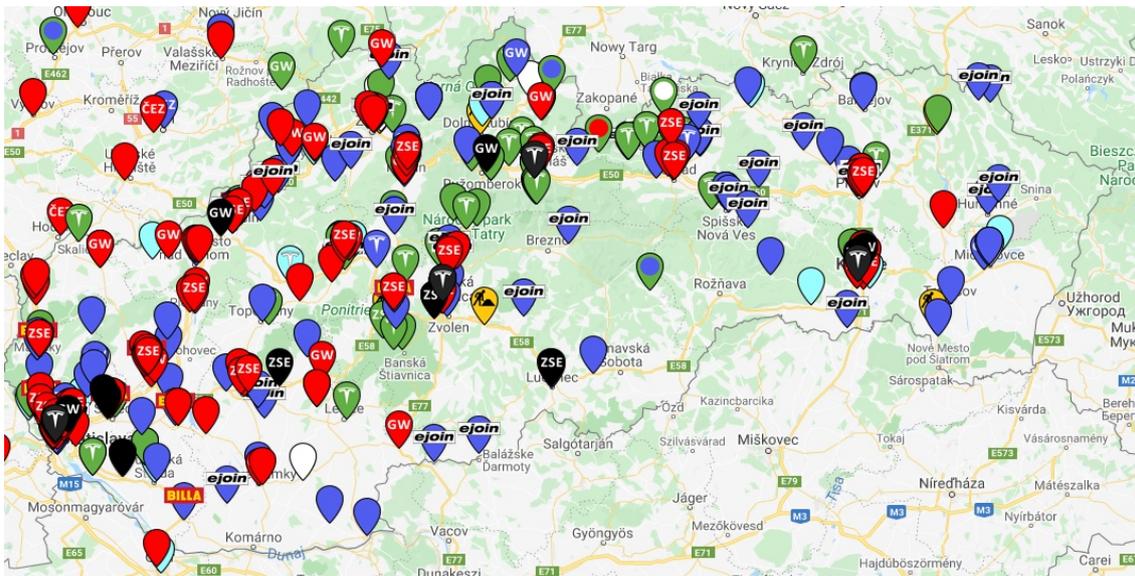
Apart from these operators, the fast charging stations are also building other subjects. For example Trencin district is active and had built fast chargers in Prievidza and Stara Tura. Lidl had opened fast chargers next to its businesses in Nova Dubnica and Bratislava. Nissan also offers fast chargers for its customers and they can be found next to multiple businesses of this brand. Apart from fast charging stations, there are a lot of slow AC chargers with less than 22 kW installed in Slovakia. Unlike other countries with more developed infrastructure, where a lot of chargers are public, we can rarely find this type of charging in towns and villages of our country. The majority of AC chargers are at restaurants, hotels or factories. This

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<sup>3</sup>Charging station on Shell fueling station in Senec with 350 kW with the most extended CCS connector uses exclusively energy from Slovak's renewable resources and is able to charge multiple vehicles at once with the maximal output. It's also ready to be extendable to 2 other charging spots. In the future it will enable to charge-up electromobiles to 80% capacity in 10-15 minutes, which is three times faster than what can usual fast charging stations with 50 or 110 kW.

is the biggest challenge for the autonomies into the future and the road to public charging in neighborhoods, residential quarters and villages. Providing and building these charging spots is considerably less challenging from financial and executive point of views than building fast chargers and in villages this can also bring the desirable increase of tourist traffic.

The network of charging stations is gradually growing; you can see the overview at nabky.com, which is the most complex portal for Slovak's charging stations.



**Figure 9. Charging stations in the territory of the Slovak Republic by 15.3.2021**  
Source: <http://www.nabky.com/>

-  Accommodation with charging station. Only for registered guests.
-  The charging station is not conditional on accommodation.
-  CHAdeMO or Combo quick charging station (44kW or more)
-  Charging stations Type 2 (22 kW, 3x32A)
-  Charging stations Type 2 (11 kW or more)
-  Charging stations Type 1
-  Sockets 16A, 32A, or a home socket, e.g., in the parking lots in front of the restaurant
-  Fastest charging stations – Supercharger (100 kW and more)

When going abroad, you can use the map of charging stations in Europe available at [Chargemap.com](http://Chargemap.com), also available as a phone app.



**Figure 10. Charging stations in Europe by 15.3.2021**

Source: <https://chargemap.com/map>

## Conclusions

High speed of battery charging by fast chargers provides more flexibility in case of driver's needs. European and North American practices show that the consumers are willing to pay extra for this option. Chargers are mostly fitted with several types of authorization according to the operator. RFID cards in combination with authorization via phone app are the most common. This type is being used by both of our biggest operators. For the time being, charging in Slovakia is accomplished via registration and advance payment, or more precisely payment of monthly bills. This system is applicable for drives on Slovak roads or in neighboring countries, which the operator has scope or contracts in. Chargers from another operator will mostly not serve. That's why EU pushes operators into enabling an option for direct credit card payment, potentially payment via phone.

The support of E-mobility in Slovak Republic will be based on three points in the coming years. The first one is the instrument for connecting Europe (CEF), which is Department of Transportations' responsibility. The second are eurofunds and the third one is budget section of Department of Economy. Which one of these instruments will be used depends on particular department of support. Meanwhile Department of Economy provides a direct support for electromobility's purchases from

its budget, eventually from eurofunds, charging stations can be also funded from CEF.

### Acknowledgements

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OF TRANSPORT  
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- <https://driver.greenway.sk/#/portal/locations>
- [https://zsedrive.sk/mapa?AC=false&AC\\_RESIDENT=false&DC=false&UFC=false&gpsNorthWestLat=49.949004286609835&gpsNorthWestLon=15.998336820203491&gpsSouthEastLat=47.59643333626693&gpsSouthEastLon=24.25456240614099&lat=48.786502587365135&lng=20.12644961317224&zoom=8](https://zsedrive.sk/mapa?AC=false&AC_RESIDENT=false&DC=false&UFC=false&gpsNorthWestLat=49.949004286609835&gpsNorthWestLon=15.998336820203491&gpsSouthEastLat=47.59643333626693&gpsSouthEastLon=24.25456240614099&lat=48.786502587365135&lng=20.12644961317224&zoom=8)
- <http://www.nabky.com/>
- <https://chargemap.com/map>

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## CURRENT STATE OF ELECTROMOBILITY IN SLOVAK REPUBLIC

***Abstract.** The modern history of electromobility began around 2011, when the first serial models of electric vehicles started to appear. Since then, their gradual onset has taken place, infrastructure has been built, and new models have been released. The problem with this slow progress is not so much the technology as the hesitation of manufacturers and retailers, who are very careful, and everyone is waiting for what the competitor on the market is planning to release. Today, it would probably be difficult to find a car manufacturer that does not offer or at least does not prepare an electric car model.*

***Keywords:** electromobility, charging stations, hybrid, plug-in hybrid*

### **History**

The first documented electric car was a model of an electrically powered vehicle from 1828, built by the Hungarian inventor of Slovak origin Stefan Anian Jedlik. In 1835, Professor Sibrandus Stratingh and his assistant Christopher Becker designed an electric tricycle in Groningen, the Netherlands. However, the first practically usable electric car dates back to 1884 from the English electrical engineer and inventor Thomas Parker. The Czech engineer Frantisek Krizik built an electric vehicle in 1885. It was powered by a DC electric motor with an output of 3.6 kW and a lead-acid battery consisting of 42 cells.

At the turn of the 19th and 20th centuries, the French chemist Camille Faure made more significant progress in the production of electric cars by improving the rechargeable battery which Gaston Plante invented. Both thus prepared a breeding ground for electric mobility, which was clearly dominant at the time. Ferdinand Porsche's first electric car, the Porsche P1, was built in 1898, had a top speed of 35 km / h and had a range of 80 km. In 1896, the Hartford Electric Light Company introduced a new truck business concept. The owner rented a battery from Hartford

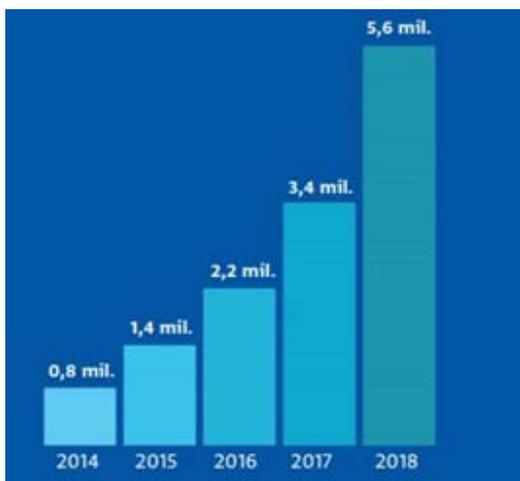
after purchasing the vehicle from General Electric Company. He paid a fee according to the distance traveled and a monthly fee for maintenance and garage. This service operated from 1910 to 1924 and covered almost 10 million kilometers. The biggest boom was recorded in electric cars in 1912. However, this was a long time and the beginning of their end. The construction of the first highways, a significant reduction in the price of gasoline, the invention of the electric starter, and especially the arrival of the Ford Model T marked the end of this chapter in the history of electromobility.

Tesla Motors again promoted the electric drive. Tesla managed to change electric cars' view, which until then had been considered disgusting boxes, useless in everyday life. In 2018, electric vehicles with larger battery capacities came on the market. While until then, the usual capacities were 24 - 28 kWh, 40, 64, or 90 kWh batteries are currently being introduced, promising a real range of 250 km to 450 km according to the new WLTP methodology, which more accurately takes into account real operating conditions.

With the gradual improvement, expansion of the portfolio, and subsidization of electric cars by governments, electric vehicles' sale is growing every year. Since 2011, when about 55,000 electric vehicles were sold, annual sales of electric vehicles in Western Europe, the USA, China, Canada, and Japan have increased 13-times, i.e., by 1 300%.

More than 1 853 000 electric cars were sold in Europe, the USA, and China by December 2016. In 2016, 202 895 electric vehicles and 251 891 plug-in hybrids were registered in the entire EU + EFTA region (Iceland, Liechtenstein, Norway, and Switzerland) + Turkey, with the total number of electrified vehicles exceeding 1 million at the end of September 2018. Further growth is expected due to investments in developing new technologies and the expected greater availability. The following figure shows the development of the total number of electric vehicles in the world in the years 2014 - 2018. In 2018, the development of the number of newly registered electric vehicles in the world by country was as follows: China (1 256 000), USA (361 310), Norway (86 340), Great Britain (59 910), France (53 750), Netherlands (29 190), Germany (67 500), Japan (52 010), Sweden (28 330), Canada (43 000), Switzerland (9 490), Spain (13 890), South Korea (32 000), the rest of the world

(150 000), a total of 2 242 720 newly registered electric vehicles worldwide in 2018 (pcs).



**Figure 1. Development of the total number of electric vehicles until 2018**

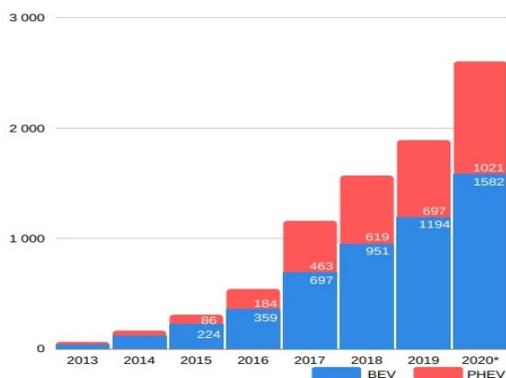
Source: e-mobility.sk

	2017	2016	% zmena
AUSTRIA	5 433	3 826	42.0
BELGIUM	2 709	2 054	31.9
CZECH REPUBLIC	307	200	53.5
DENMARK	698	1 312	-46.8
FINLAND	502	223	125.1
FRANCE	24 910	21 752	-
GERMANY	25 056	11 410	119.6
GREECE	38	12	216.7
HUNGARY	749	172	335.5
IRELAND	622	392	58.7
ITALY	1 967	1 377	42.8
NETHERLANDS	9 897	4 268	131.9
POLAND	439	108	306.5
PORTUGAL	1 640	756	116.9
ROMANIA	188	74	154.1
SLOVAKIA	209	59	254.2
SLOVENIA	288	144	100.0
SPAIN	3 920	2 005	95.5
SWEDEN	4 217	2 945	43.2
UNITED KINGDOM	13 597	10 264	32.5
EUROPEAN UNION	97 571	63 479	53.7
NORWAY	33 025	24 222	36.3
SWITZERLAND	4 773	3 295	44.9
EFTA	37 798	27 517	37.4

**Figure 2. Sales comparison of electric vehicles 2016-2017**

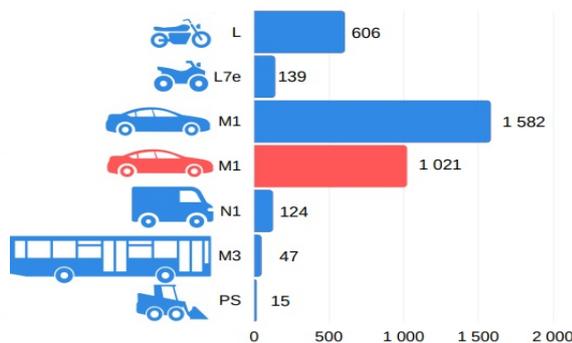
Source: e-mobility.sk

The number of registered electric vehicles in the Slovak Republic as of 30 June 2020 was as follows: motorcycles (139), passenger cars (2603), commercial vehicles (124), buses (47).



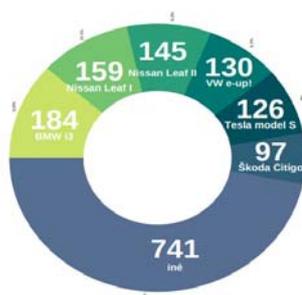
**Figure 3. Development of the number of BEV / PHEV (M1) in the SR Ministry**

Source: Evidence of vehicles in SR, prepared by Ministry of Economy of the SR to 30.6.2020



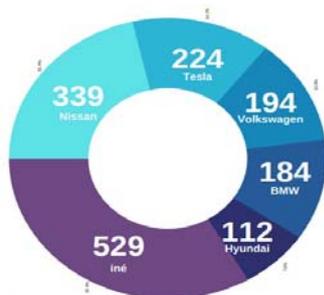
**Figure 4. BEV/PHEV Current fleet**

Source: Evidence of vehicles in SR, prepared by of Economy of the SR to 30.6.2020



**Figure 5. Market share of BEV (M1) models**

Source: Evidence of vehicles in SR, Prepared by Ministry of Economy SR to 30.6.2020



**Figure 6. Market share of BEV (M1) models**

Source: Evidence of vehicles in SR, Prepared by Ministry of Economy of the SR to 30.6.2020

**Technologies in electric vehicles**

During multi-year development, electric drive technologies stabilized in 2018 on the four most used and most widespread models. They differ mainly in whether it is a combination of electric and combustion drive, but also in other technical solutions.

**Hybrid (HEV)** Uses a combination of gasoline and electric propulsion. The vehicle is equipped with a small battery that can drive the car in pure electric mode for 2-3 km. The battery recharges by recuperation during deceleration and braking or while moving from excess power.

It can store energy that other vehicles convert into heat during braking. During steady driving, for example, in the village, it is used to drive the vehicle with the combustion engine switched off. The electric motor helps with acceleration and thus reduces fuel consumption.

**A plug-in hybrid (PHEV)** The propulsion uses basically the same system as the hybrid. The main difference is the larger battery, which can be recharged from the mains. It provides a purely electric ride to a distance of about 40-60 km. Thanks to the internal combustion engine, the vehicle does not rely on the availability of charging during longer journeys. The plug-in hybrid can also function as a regular hybrid with battery charging while driving.

**Battery Electric vehicle (BEV)** It uses a battery as the only source of energy. The battery can be charged from a standard 230 V socket, wall charger, and most models, even with the direct current on fast-charging stations. The electric car uses recuperation while driving, thanks to which it stores energy from braking or driving downhill. The new models have a range of more than 400 km.

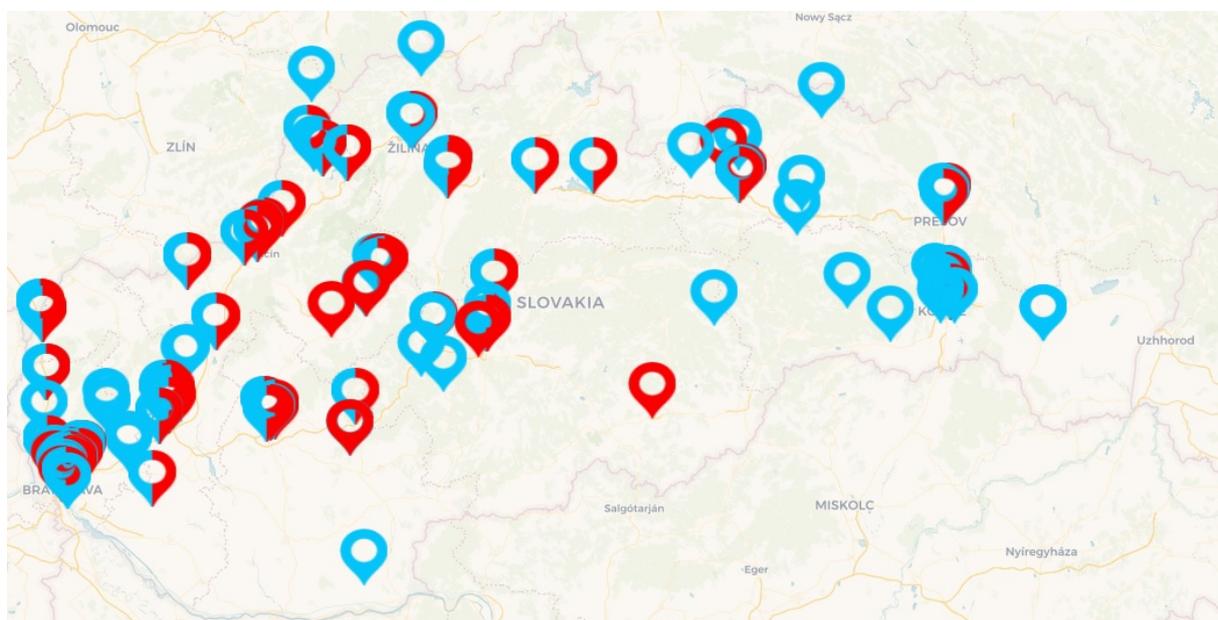
**E + Range extender (REEV)** This is a classic electric car with a built-in small combustion engine (generator) used only for electricity production. Thanks to it, it can extend the vehicle's range by about 100-120 km, and thus it is possible to go on a longer route with it.

### **Charging stations**

One of the most significant incentives for electromobility development is to build a reliable charging infrastructure outside major cities. According to EAFO (European Alternative Fuel Observatory) data, Slovakia is one of the best-equipped

countries in its immediate vicinity, with more than 104 fast-charging stations with an output power over 22 kW and 347 public charging stations with low-power charges. The coverage by charging stations reaches the ratio of about 10 vehicles per 1 quick charger and 2 vehicles per charger in total (at the end of 2017). According to EAFO data, there are enough charging stations in Slovakia for the number of cars in operation. The coverage by fast chargers is very good in most areas, especially regarding the entire route of the D1 motorway from the Czech-Slovak border to Kosice, either through Zilina or Banska Bystrica. The south of Slovakia has weak coverage so far, where the route through Nove Zamky and Lucenec is not covered. However, it can be assumed that work on this route will be carried out in the near future.<sup>4</sup>

If we do not count charging in domestic conditions, 235 charging points were available to motorists in Slovakia at the beginning of 2019. Of which 143 AC (blue icon) publicly accessible charging points with an output power up to 44 kW and 92 DC (red icon) publicly accessible charging points with an output power over 44 kW (including 10 Tesla Supercharger stands).

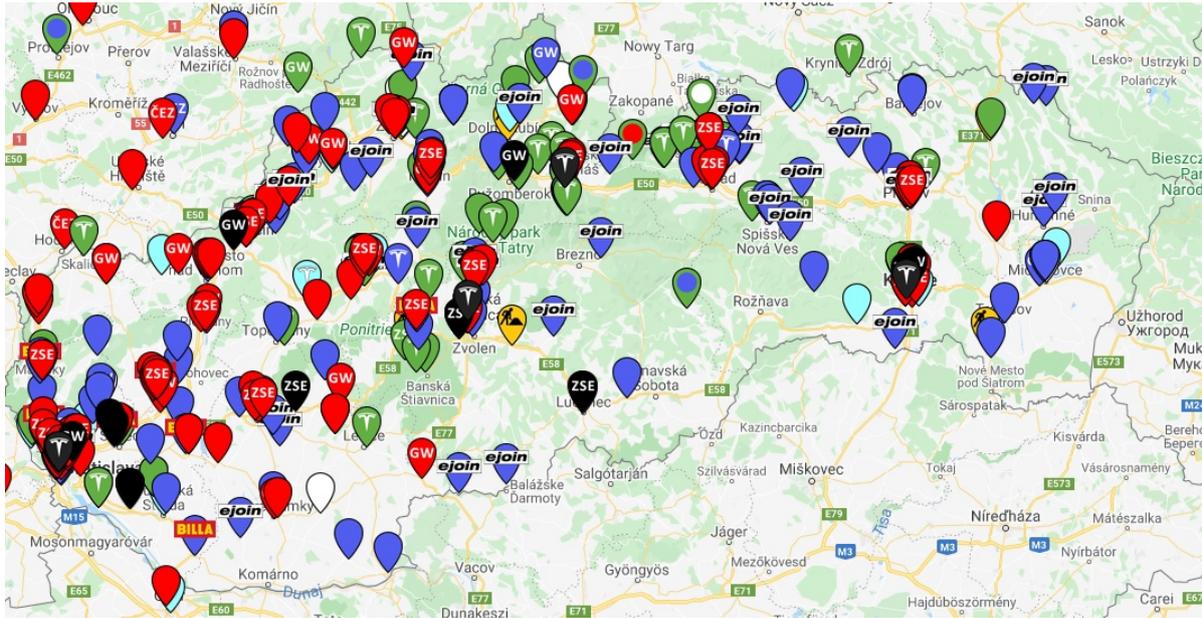


**Figure 7. AC / DC charging points in the Slovak Republic**

Source: <https://e-mobility.sk/elektricke-vozidla>

<sup>4</sup> The largest number of electric cars can be found in Europe in Norway and the Netherlands. Norway has 2267 quick chargers and 8617 public chargers below 22 kW, so there are 91 vehicles per quick charger and 19 vehicles per charger. In the Netherlands, 811 quick chargers and up to 34,021 public chargers are installed. The ratio is 160 vehicles per quick charger, but only three vehicles per charger in total.

Most public fast-charging stations are chargeable. All charging stations, fast and slow, available in Slovakia, are listed on the website [www.nabky.com](http://www.nabky.com), operated by the Tesla club. The largest operators of charging stations in the Slovak Republic are GreenWay and ZSE. In addition, there are several small operators or companies in Slovakia that provide charging for free or for a fee. If charging at the charging station has to be paid, you need an access card or an operator application on your mobile.



**Figure 8. Charging stations in the territory of the Slovak Republic until 3.2.2021**

Source: <http://www.nabky.com/>

-  Accommodation with charging station. Only for registered guests.
-  The charging station is not conditional on accommodation.
-  CHAdeMO or Combo quick charging station (44kW or more)
-  Charging stations Type 2 (22 kW, 3x32A)
-  Charging stations Type 2 (11 kW or more)
-  Charging stations Type 1
-  Sockets 16A, 32A, or a home socket, e.g., in the parking lots in front of the restaurant
-  Fastest charging stations (100 kW and more)

### Charging types

AC charging - charging with alternating current. This charging is used in electric cars and plug-in hybrids. The standard equipment includes a cable enabling charging from a standard 230 V socket. With the help of a special cable, AC charging

can also be used on public chargers. At regular fast-charging stations, the cable is part of the charger. At public stations, it is often necessary to bring a cable. Alternating charging is always slower.

DC charging – charging with direct current. This type of charging can be used in most electric cars. It is designed for fast charging and requires a special charging station. It always contains the necessary cable.

AC charging is used primarily in domestic conditions. Charging with a standard 230 V socket provides charging power of 2.3 kWh. Such charging is suitable as occasional and is slow. For regular home charging, it is advisable to buy a wall charger, the so-called wallbox. That will allow charging with power up to 11 or 22 kW, depending on the available power. However, the charging ability depends on the built-in charger's capacity, which most electric cars have in the range of 3.7 - 7.5 kW. Therefore, installing a charging box with a higher power is unnecessary as the vehicle cannot use it. The power of the built-in charger is specified in the vehicle parameters.

DC charging is mainly used before long journeys. The charging power does not depend on the charger in the electric car, so most vehicles support at least 50 kW, some even more. Charging time is reduced from hours to dozens of minutes. Most current electric vehicles can be recharged to 80% of capacity on a quick charger in 20 to 40 minutes.

### **Type of connectors**

The electric car may have one of the following connectors:

*CCS (Combo)* - the most commonly used connector on all electric vehicles designed for the European market. The charger combines the possibility of AC and DC charging. For AC charging, the part of the connector that is compatible with the Type 2 Mennekes connector is used. For DC charging, the entire connector can be used.

*CHAdeMO* - connector intended for DC charging only. This is a Japanese standard. Currently, only Nissan and Mitsubishi models have it.

*Type 2 Mennekes* - used on all plug-in hybrids for AC charging. It is mostly in the form of a combined CCS connector used for AC charging in electric cars.

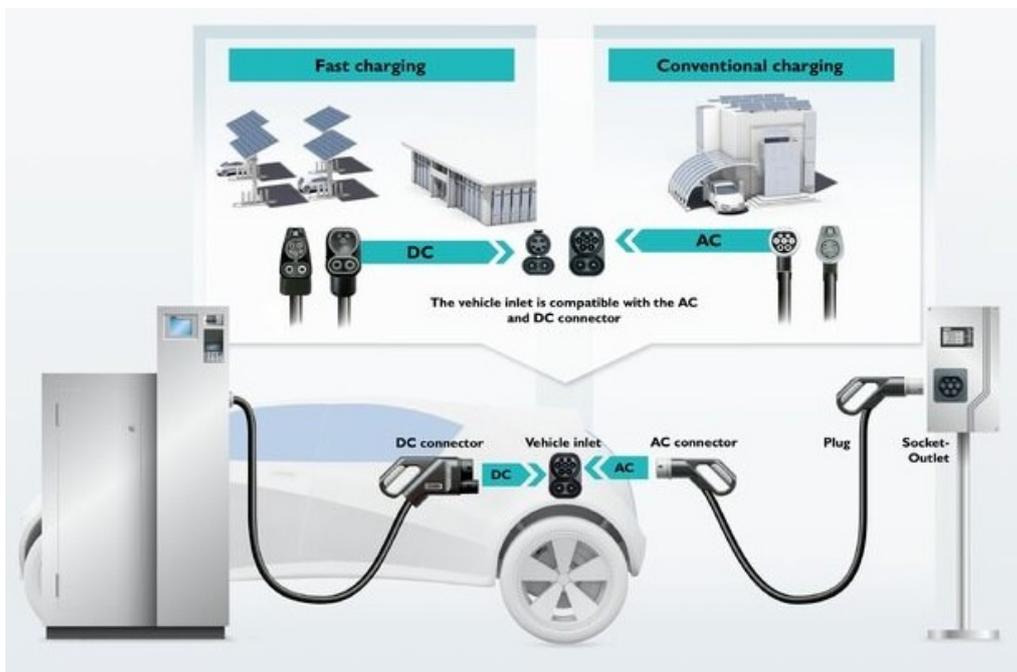
European Tesla models use it for both AC and DC charging, but its connection is incompatible with the type 2 standard.

*Type 1* - this connector is used only on some, mostly older models of Japanese-made electric cars and used for AC charging only.

Current type	Region			
	Japan	America	Europe, rest of world	China
AC				
Plug name:	J1772 (or Type 1)	J1772 (or Type 1)	Mennekes (or Type 2)	GB/T
DC				
Plug name:	CHAdeMO	CCS1	CCS2	GB/T

**Figure 9. Types of connectors used in individual regions**

Source: <https://thedriven.io/2018/12/10/what-is-ccs-charging/>



**Figure 10. Combined Charging System (CCS)**

Source: [https://www.phoenixcontact.com/online/portal/nz?Idmy&urile=wcm:path:/nzen/web/main/products/subcategory\\_pages/Charging\\_cables\\_and\\_charging\\_sockets\\_P-29-03/3f34965c-f842-4adc-a9f6-28126dc0a51a/3f34965c-f842-4adc-a9f6-28126dc0a51a](https://www.phoenixcontact.com/online/portal/nz?Idmy&urile=wcm:path:/nzen/web/main/products/subcategory_pages/Charging_cables_and_charging_sockets_P-29-03/3f34965c-f842-4adc-a9f6-28126dc0a51a/3f34965c-f842-4adc-a9f6-28126dc0a51a)

CCS (Combo) DC charging compatible for vehicles: Hyundai IONIQ Electric, Hyundai Kona Electric, BMW i3, VW e-Golf, VW e-UP!.

CHAdEMO DC charging compatible for vehicle: Kia Soul EV, Nissan Leaf 1,2, Nissan e-NV200, Mitsubishi Outlander PHEV, Citroen C-Zero, Peugeot i-On.

Type 1 AC charging compatible for vehicle: Kia Soul EV, Nissan Leaf 1, Nissan e-NV200, Mitsubishi Outlander PHEV, Citroen C-Zero, Peugeot i-On.

Type 2 AC charging compatible for vehicle: Nissan Leaf 2, Hyundai IONIQ PHEV, Kia Optima PHEV, Niro PHEV, Toyota Prius PHEV, Renault Zoe (22 kW).

Type 2 DC charging compatible for vehicle Tesla (120 kW).

## Conclusion

It is assumed that the prices of electric cars will gradually decrease due to increasing demand so that the customer will get a higher utility value for a lower price. The government support for purchasing electric vehicles may also increase the demand for this category.

In 2018, most manufacturers struggled with the high demand for new models, which they could not meet in real-time, and waiting times for vehicles were increased. The situation had therefore changed quite dramatically. In comparison, in 2015, the most significant obstacles were the high price and the short-range.

## Acknowledgements

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EUROPEAN UNION  
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MINISTRY  
OF TRANSPORT  
AND CONSTRUCTION  
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## **FINANCIAL LEASING AGREEMENT IN TERMS OF VAT**

***Abstract.** Financial leasing also known as a financial lease is a special form of property financing. Financial leasing is a method of acquiring tangible assets based on a lease agreement with the agreed right to purchase the subject matter of the lease. It is a long-term lease, during which the lessee pays the agreed payments to the lessor. In this article, we point out the practice in the Slovak Republic in applying VAT in financial leasing, what changes occurred in 2019 in cross-border leasing, what is the view of financial leasing according to the Court of Justice of the EU, and what is the impact on the application of VAT in financial leasing in SR.*

***Keywords:** Financial leasing, tangible assets, lease agreement*

### **Legal and economic ownership**

Financial leasing is characterized by the separation of legal and economic ownership of the property. During the lease period, the legal owner is the lessor (leasing company), but the economic owner is the lessee, who records the property in his accounting and also depreciates it for tax purposes. After the end of the lease and after payment of all installments, the ownership passes to the lessee.

The difference between legal and economic ownership in financial leasing is evident in cars, where the lessee is registered as the holder in the certificate of registration, but the leasing company is mentioned as the owner of the vehicle. Although the lessee is not the legal owner of the property, he must take care of it as if he were. For example, in the case of a car, the lessee must pay for service, maintenance, motor vehicle tax. Compulsory contractual insurance and accident insurance of the vehicle may be included in the lease payments or may be agreed upon between the lessee and the insurance company individually, but the costs are always borne by the lessee.

### **Financial leasing in the Slovak Republic and value-added tax**

In the Value Added Tax Act, financial leasing is not precisely defined. A finance lease is basically a lease at the end of which an asset is delivered. In practice, two types of leasing contracts are **distinguished for VAT purposes:**

1. Contractual agreement in which the lessor's obligation to sell and at the same time the lessee's obligation to purchase the leased object at the latest by paying the last installment is agreed - financial leasing **is considered delivery of goods** according to § 8 par. 1 letter c) of the VAT Act, i.e. handing over the goods based on a lease agreement, according to which ownership of the subject of the lease agreement will be acquired at the latest upon payment of the last installment.

2. Contractual agreement in which the tenant's right to purchase the leased object is agreed upon - financial leasing **is considered a repeated delivery of the service** according to § 9 par. 1 letter b) of the VAT Act (granting the right to use tangible assets).

In the Slovak Republic, the practice is that for the purposes of tax liability and the possibility of deducting VAT, taxpayers assess financial leasing either as a supply of goods or a repeated supply of a service:

1. In the case of financial leasing of the nature of the delivery of goods, tax liability shall arise and at the same time the right to deduct VAT on the day of delivery of the goods, which is the day of handing over the object of the lease to the lessee.

The lessee shall exercise the right to deduct VAT in full from all future installments at once.

2. In the case of financial leasing of the nature of repeated supply of services, the tax liability shall arise and at the same time the right to deduct VAT on the day of delivery of the service, which in this case is the last day of the period to which the payment for repeated supply of services applies.

The tax base according to § 22 par. 1 of the VAT Act on the supply of a service is everything that constitutes the consideration that the supplier has received or is to receive from the recipient of the performance for the supply of the service, reduced by the tax. The tax base for financial leasing of the nature of repeated delivery of the service is only the amount of the individual installment that the lessee has to pay to the lessor, reduced by VAT.

The lessee exercises the right to deduct VAT gradually during the entire duration of the lease only in the amount attributable to individual lease payments.

The advance payment (first increased installment) is understood in the case of financial leasing of the nature of repeated delivery of the service as receipt/provision of payment before delivery of the service. The tax liability and the right to deduct VAT shall arise on the day of receipt of payment.

The Lessee may exercise the right to deduct VAT if he has an invoice from the Lessor prepared in accordance with Section §74 of the VAT Act, which the Lessor is obliged to issue. According to § 75 par. 2 of the VAT Act, the invoice is also an agreement on rent payments, which is part of the lease agreement (installment payment plan), if it contains data according to § 74 par. 1 of the Value Added Tax Act. The lessor is therefore not obliged to issue an invoice for each repeated delivery of the service.

### **Cross-border financial lease according to the VAT Act effective until 31.12.2018**

Until 31 December 2018, a specific procedure for applying VAT was applied to cross-border financial leases (to another EU Member State or from another EU Member State) in accordance with the applicable VAT Act.

Pursuant to Section 11 (1) of the VAT Act, the acquisition of goods based on a lease with an agreed right to purchase a leased item was also considered to be the acquisition of goods in another member state if exempt from tax (until 31 December 2007, this only applied to new means of transport).

Also according to § 8 paragraph, 7 of the VAT Act with effect, the delivery of goods was considered the handing over of tangible property in general (until 31 December 2007 only a new means of transport) to the payer based on a lease with an agreed right to purchase the subject matter of the lease, if in the lessee's Member State the takeover of the leased object was considered to be the acquisition of goods from another Member State which is subject to tax.

The lessor - payer in the Slovak Republic made a delivery of goods exempt from tax according to § 43 of the VAT Act if the financial lease was made to a person identified for VAT. The tax was paid in the tenant's Member State (self-taxed).

Such a special procedure was justified by the fact that the Member States do not have the same approach to leases with an agreed right of purchase, as some

Member States consider the transfer of the subject of the lease as a supply of goods, while other Member States (including the SR) consider service.

This means that if a financial lease was considered a supply of a service in the lessor's Member State, then the Slovak lessee-payer accepted the service (repeated performance).

The above-mentioned method of applying the tax should have avoided situations where the financial leasing is not taxed in any of the Member States of business partners, resp. to be taxed in both states (non-taxation or duplication of taxation).

### **Cross-border financial leasing under the VAT Act since 2019**

From 1 January 2019, cross-border financial leasing is no longer dependent on tax treatment in another Member State.

From the provisions of § 8 par. 7 of the VAT Act, the sentence has been omitted that the transfer of tangible property by a taxpayer based on a lease with an agreed right to purchase a leased subject is also considered a supply of goods if taking over the object of lease from another Member State *is considered in the lessee's Member State*, which is subject to tax.

From the provisions of § 11 par. 1 of the VAT Act, the sentence has been omitted that the acquisition of goods is also considered to be the takeover of goods based on a lease with an agreed right to purchase the leased item if the transferor's object in the Member State of the lessor is considered a *supply of goods to another tax-exempt Member State*.

Similarly, in connection with new means of transport, § 11 par. 3 of the VAT Act. omitted that for the acquisition of new means of transport is also considered as acceptance of the new vehicle under a lease with the agreed right to purchase the leased object if the Member State of the lessor considers transferring leasehold for the delivery of goods to another Member State exempt from taxes.

The reason for the change in legislation was that the concept of financial leasing is a concept of EU law and should be interpreted uniformly in the Member States.

## **Financial leasing under EU law**

According to Article 14 par. 1 of the VAT Directive, the supply of goods is the transfer of the right to dispose of tangible property as owner. According to Article 14 par. 2 letter (b) the supply of goods shall be deemed to be the actual transfer of goods under a contract for the lease of goods for a specified period or under a contract for the sale of goods with deferred payment which provides that ownership is normally acquired at the latest when the last installment is paid;

According to Article 24 par. 1 of the VAT Directive, a 'supply of services' is considered to be any transaction that is not a supply of goods.

### **Case-law from the EU Court of Justice- Financial leasing**

#### Lease agreement for a motor vehicle based on a leasing agreement

In Case C 118/11, Eon Aset Menidžmānt OOD, the Court of Justice of the EU concluded that a motor vehicle leased under a leasing contract and classified as capital goods is considered to be used for taxable transactions if the taxable person carrying out his activity as such, acquires those assets and incorporates them in their entirety into the assets of his business, deducting directly and immediately the input VAT and any use of those assets for the private purposes of the taxable person or his employees or for purposes other than business shall be deemed to be a supply of services for consideration.

#### Leasing agreement with an option to purchase

In Case C 164/16, Mercedes Benz Financial Services UK Ltd Mercedes Benz Financial Services UK ('Mercedes'), a subsidiary of Daimler AG, offers three standard contracts for financing the use of motor vehicles a standard lease called "Leasing", a lease called "Hire Purchase" and a lease with an option to purchase called "Agility", combining certain characteristics of the two previously mentioned agreements and presented as an agreement, which allows customers to postpone the decision between rental and purchase to a later date after delivery of the vehicle. A common element of these three type of contract is the retention of Mercedes' ownership of the vehicle for the entire duration of the contract and the payment of monthly installments to the lessee.

Type contracts, on the other hand, differ in terms of the possibilities and methods of acquiring a vehicle. The "Leasing" contract excludes any transfer of ownership and sets a maximum number of kilometers, after which the customer is obliged to pay penalties. The "Hire Purchase" and "Agility" type contracts, on the other hand, provide for the transfer of ownership, but under different conditions.

In the first type of contract, the number of installments made each month essentially represents the total selling price of the vehicle, including financing costs. Only a small amount ("option costs") needs to be added to acquire ownership of the vehicle after the termination of the contract. This final payment is stipulated in the contract and does not depend on the exercise of the option. The costs of the option will be paid from the customer's account at the same time as the last installment and the transfer of ownership is thus completed. However, consumer protection legislation in the United Kingdom limits the amount that the seller can claim from the buyer under the terms of the lease, although in practice it is possible for the customer to avoid final payment by terminating the contract before the termination.

In the "Agility" type contract, the monthly payments are in principle lower than in the "Hire Purchase" type contract, so that their sum represents only about 60% of the selling price of the vehicle, including financing costs. Therefore, if the user wants to exercise the option to purchase a vehicle, he must pay approximately 40% of the sale price. This "exempt" amount is an estimate of the average residual value of the vehicle at the end of the contract. Three months before the termination of the contract, the customer is asked to answer whether he wants to exercise the option. According to the national court, about half of the lessees answer in the affirmative.

From a VAT point of view, it is not argued that a "leasing" contract falls into the category of "supply of services" and is therefore subject to taxation at the rate of each month and the taxable amount is the amount of the monthly payment.

Nor is it disputed that a contract of type 'Hire Purchase' constitutes a 'supply of goods' within the meaning of Article 14 par. 2 letter b) the VAT Directive.

Consequently, Article 63 of that directive makes the tax recoverable in full from the supply of the vehicle, the taxable amount being the total price of the supply.

The tax administration declares that the "Agility" type contract, like the "Hire Purchase" type contract, constitutes a "supply of goods" within the meaning of Article 14 par. 2 letter b) the VAT Directive. Consequently, Mercedes applied for payment of the full tax at the time of the handover of the vehicle on that basis.

The questions referred examined whether and to what extent the term 'lease of goods which provides that ownership would normally be acquired at the latest on payment of the last installment' used in Article 14 par. 2 letter (b) of the VAT Directive is to be interpreted as applying to a lease with a purchase option such as the type of contract at issue in the present case.

A lease agreement for vehicles with a purchase option, such as the "Agility" type contract offered by Mercedes, is one of the terms known as a leasing agreement. These contracts have the special feature that they serve as a substitute for the immediate acquisition of full ownership, and the lessee can use the goods without having to pay the full purchase price at the time it is handed over to him.

This type of contract may have similar characteristics to the acquisition of goods, but may not have these characteristics, as the contract may stipulate that the lessee may decide to purchase the subject matter of the lease at the end of the lease term or not to acquire them.

The fact that the transfer of ownership is foreseen at the end of the contract, or that the updated amount of the installments is practically the same as the sale value of the goods, individually or collectively constitute the criteria for determining whether the contract can be classified as a "lease". The classification of a contract as a 'leasing contract' does not in itself make it possible to link the actual supply of goods made under that contract with a category of transactions subject to VAT.

For a contract to be regarded as a 'supply of goods' within the meaning of the VAT Directive, it remains to be determined whether such a contract has as its object the 'lease of goods', which provides that ownership is normally acquired at the latest when the last installment is paid 'in within the meaning of Article 14 par. 2 letter (b) of this Directive. This legal qualification requires the fulfillment of two elements. On the one hand, that provision must be read as a provision that provides that the contract under which the goods are to be transferred contains an express clause

relating to the transfer of ownership of those goods by the lessor to the lessee. As is clear from, Article 14 par. 2 letter (b) of the VAT Directive does not refer to the transfer of the right to dispose of tangible property as owner, as in the case of paragraph 1 of the same article, but more specifically to the 'acquisition of ownership' of those goods. In addition, it should be noted that this provision uses the term "installments", known to leases, and, conversely, unusual in purely lease agreements, which generally use the term "rents".

An explicit transfer of ownership clause may be considered to be present in the contract if the contract provides for an option to purchase the goods that are the subject of the lease. On the other hand, the provisions of the contract, as objectively assessed at the time of its signing, must make it clear that the lessee is to acquire ownership of the goods automatically if the performance of the contract is normal.

Nothing can be inferred from the expression "under normal circumstances at the latest when the last installment is paid" that the payment of the last amount owed by the lessee under the contract entails a full right of transfer of ownership of the goods which are the subject of the contract to the lessee.

As regards, in particular, the fact that the contract contains a clause stipulating, as in the case of the type contract at issue in the main proceedings, that the lessee has the option to exercise a purchase option, it should be noted that the adverb designation 'normally' should be until the end, the foreseeable course of the contract performed in good faith by its parties, in accordance with the principle of *pacta sunt servanda*.

This contractual result in the transfer of ownership is incompatible with the existence of a real economic alternative for the lessee, which would at some point allow him to decide to acquire the goods or return them to the lessor, or to extend the lease, depending on his own interests at the date to whom he should make this choice.

It would be otherwise only if the exercise of the purchase option, however optional from a formal point of view, would seem to be the only economically rational choice that the lessee could make, given the financial terms of the contract. This may be the case, in particular, where the contract provides that, if the option is exercised, the sum of the contractual installments corresponds to the market value of

the goods, including financing costs, and the exercise of the option does not require the lessee to pay an additional significant amount. An interpretation of Article 14 par. 2 letter (b) of the VAT Directive is confirmed in the light of the overall structure of that directive as regards the classification of taxable transactions.

Any other interpretation would force national tax authorities, in the case of contracts which are not objectively linked to taxable transactions at the commencement of their performance, to inquire about order to determine the intention of the taxable person's contractual partner at the time the option is exercised and, if necessary, to make corrections.

It follows from the foregoing that the term 'lease of goods which stipulates that, in normal circumstances, ownership shall be acquired at the latest on payment of the last installment', as referred to in Article 14 par. 2 letter (b) of the VAT Directive is to be interpreted as applying to a type lease with a purchase option if it can be inferred from the financial terms of the contract that exercising the option appears to be the only economically rational option that the lessee will be able to make in a particular the moment the contract is performed until its end.

### **Conclusions**

It follows from the above that in the case of new cross-border financial leasing contracts (concluded since 2019), the transfer of the object of leasing will be considered as a supply of goods. Cross-border finance lease agreements that were concluded before 2019 will continue in the regime in which they were initiated.

The change in the application of VAT in cross-border financial leasing does not affect the application of financial leasing within the country, there are no changes from the current approach.

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## **PRODUCTIVE FORCES DEVELOPMENT AND REGIONAL ECONOMY**

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## **MODERN APPROACHES TO THE FORMATION OF THE MECHANISM OF INVESTMENT SUPPORT FOR INNOVATIVE DEVELOPMENT OF THE REGION**

***Abstract.** This paper investigates the modern instruments for building the regulatory mechanism of investment territorial development that has special platform of indicators and strategic imperatives. The functional aspect is investigated in the work and the system of indicators of investment design of development of territories as an instrumental basis and a number of active general principles of strategy development is resulted. The article presents an instrumental basis for extrapolating and building innovative and investment territories development.*

***Keywords:** direct investment, investment development, investment activity, investment strategy, gross regional product, qualitative indicators, territorial development.*

### **Introduction**

The current state of economic and social development of Ukraine requires an understanding of the effective role of investment policy in the economic system of the state. A kind of catalyst for economic development of any country is investment. The investment process is considered as a vector of strategic development and forms the basis for successful socio-economic development of the state and its regions. Activation of investment processes and effective increase of investments are important factors in the implementation of structural reforms in the economy and the implementation of innovation and investment model of development in Ukraine. Therefore, the implementation of current and long-term objectives of economic and social reforms today requires not only a comprehensively balanced and sound investment policy, but also the formation of effective mechanisms for regulating investment processes, taking into account the current state of economic development.

### **Literary review**

The results of basic research by Ukrainian and foreign scientists clearly indicate that the processes of economic renewal and growth are determined by the size and structure of investments, the quality and speed of their implementation. For example, Drobyazko S. (2020) presents innovative methods for the development of

business economic security at the micro and macro levels. Authors like Elton, Gruber, Brown and Goetzmann (2014) investigate the question of modern portfolio theory and investment analysis. Karpenko (2019, 2020) is working on the issues of innovative trends in the process modelling of international strategies and the systematic of fundamental factor models. Some economists explore development issues of innovation policy of the European Union, such as scientists Mráz and Zubro (2016) investigate the issues of the formation of state policy, the establishment of state boundaries in modern globalization changes.

### **Results**

The purpose of the paper is to study the regulatory mechanism of investment territorial development that has special platform of indicators and strategic imperatives. Authors systematize the instrumental base for investment projection and building the prognostic validity of international investment activity at the state level.

The regional innovation system is a subsystem not only of the national innovation system, but also of the region economic system. It has such a property as synergism, according to which the maximum effect of the system is achieved only in the case of maximum efficiency of the joint functioning of its elements to achieve common goal. There is a need for the purposeful policy of the state on the formation of institutions of innovation, able to integrate all the components of the innovation cycle – from the generation of ideas to the practical use of innovations. Attraction of investments is an obligatory condition of innovative development of the region. When implementing innovation policy at the regional level, there is an urgent need to define approaches to the formation of investment strategy. In modern conditions, economic growth is achieved only on the basis of an intensive type of reproduction within the innovative development scenario, which, in turn, includes the investment component.

The National Association of Insurance Commissioners (NAIC) serves to protect the public interest, promote competitive markets, and improve the state regulation of insurance. The NAIC Financial Data Repository (Database) is updated every year by the National Association of Insurance Commissioners (NAIC) on behalf of and at the direction of its members, the state insurance commissioners.

Today's most successful investment clubs with assets of hundreds of thousands of dollars, a million dollars, or more started out, years ago, with only a few dollars. Most of the members in those clubs had no previous stock market experience, and their investment funds were limited, as was the time available to devote to club activities. Yet they've achieved results that would make many professional investors envious. With the basic principles recommended by NAIC and practiced by successful clubs in the past, you can apply a consistent philosophy aimed at long-term, proven investment objectives. Since 1951, these simple rules have led investors to consistently superior results. Here they are.

**Principle 1: Invest Regularly, Regardless of the Market Outlook.** When you start investing, you may be nervous about timing. What if you commit your capital and the market immediately heads south? Could there be another Black Monday, or worse, after your money is invested?

Time and experience will help allay these fears. The market's overall trend for decades has been upward, at an average annual compound rate of about 10 percent despite intermittent cycles of boom, recession, depression, and recovery. Once you recognize the rhythm of market cycles, fluctuations will no longer distract you; instead, you'll welcome market dips as buying opportunities.

Investors minimize risk when they purchase shares they intend to hold as long as the business operates successfully. In contrast, speculators who try to forecast near-term market fluctuations magnify their risk tremendously. We've found that half of all investment clubs go out of business within the first eighteen months because of conflict between those who believe in long-term investing and those advocating speculative trading. Be sure your members agree on a long-term philosophy before you get started.

**Principle 2: Reinvest All Earnings.** Put your investment earnings back into the market. This will let you maximize your profits through compounding, so you'll earn more than you would have just by keeping your original capital at work. In the examples presented in coming chapters, you will see the amazing effect of compounding made possible by reinvestment.

Principle 3: Invest in Growth Companies. Buy shares in businesses whose sales and earnings are moving ahead faster than the gross domestic product, and whose records suggest they will be far more valuable five years in the future. We'll show you later how to identify growth companies with the best potential.

Principle 4; Diversify to Reduce Risk. Some of your selections will be great successes, while others will post disappointing results. Since it is impossible to predict the future with certainty, you cannot expect every outcome to reach your forecast. With diversification, you need only realize an average advance that meets your goal; an occasional mistake will not prove disastrous.

The next step we are going to research Key Factors in Investment Analysis. Club members should agree that no stock will be purchased without advance analysis. Members are not expected to become professional stock analysts although many investment club members have done so. However, you should become proficient in applying a few essential tests to enhance your prospects for success and reduce your risk in buying and selling stocks.

Management Capability. The drive of a corporation's management is the single most influential element of growth. When investment clubs give undue attention to industry outlook ("Health care is bound to grow") or the product of a company ("Fat-free food ingredients are certain winners"), they ignore, to their later regret, that only the best-led companies succeed over the long run. Growth is most reliable when it is produced by good management.

Apply these three tests of management:

1. Rate of growth: Other factors being equal, over the long term an investment is likely to increase in value at about the same rate that sales grow. The companies you select as possible investments for your club should be those whose sales have increased at least at the expected rate for their size as described above. Further, each company should offer the promise of continuing advances.

2. Pre-tax profit margin: This margin is calculated by deducting costs from sales and then dividing the result, profit before taxes, by sales (see Formula 1):

$$\frac{\text{Pre-tax profit (Sales - Costs)}}{\text{Sales}} = \% \text{ Pre-tax profit} \quad (1)$$

Comparison with other companies in the same industry will show whether the margin is average, better than typical, or under par. Obviously, a higher margin is preferable. Warning bells should ring if the margin is far above the averages of other companies. That could mean there's a distortion in the way profits are being reported, and chances are the high rate won't be repeated. If the high margin is for real, competition will be quickly attracted.

3. Earnings on stockholders' equity: Another mark of good management is a high percentage of earnings on stockholders' equity (which is net earnings divided by the sum of the value of preferred stock, common stock, and retained earnings). Compare the company being considered with others in the same industry. The same caveat applies as before: An unusually high rate of return may indicate distortion in the numbers or a temporary advantage.

### **Conclusions**

The conducted research allowed formulating the following conclusions: One of the main directions of institutional development at the regional level is the creation of strong institutions and effective mechanisms for their interaction to ensure the sustainable functioning of the economic system. The institutional framework for governance at the regional level is the legal, economic and organizational forms of influence on the process of socio-economic development, including:

- ensuring sustainable economic growth in the region;
- providing support to participants in investment activities in the region through the creation of mechanisms to raise funds from budgetary and extra budgetary sources;
- legal and financial support of entrepreneurs who create innovative products and provide filling the market of innovative goods and services;
- ensuring effective social policy.

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## MONEY, FINANCE AND CREDIT

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### IS IT AUTOMATION AND IT REPLACING THE WORKFORCE?

***Abstract.** In an age dominated by the consumer, implementing technology that can track, measure and respond to the key shifts in consumer behavior could well make or break a business. Automation and IT are supplementing the workforce to provide greater levels of efficiency an insight and consumer obsession on the foundation of organizational success in 2019. Digital transformation on the agenda of the organizations for years and in 2020 it is predicted to be a crucial time for leaders to plan for and implement it across industries. So, what does the future hold for digital transformation and what do leaders need to take into consideration in order to plan for its development and implementation? When it comes to a timeframe, 85% of key decision makers feel they have only 2 years to get to grips with digital transformation. While the past few years have seen some movement in digital transformation, there's now an urgency, and considering that 59% of business leaders worry that it's already too late for them to adapt, time is of the essence. By preparing for these changes, business leaders will be able to remain one step ahead of the consumer, retaining the capabilities to form long-lasting relationships that stand the test of time. It seems the time to strike is now. Is it necessary for the organizations to acquire the knowledge they need on emerging digital technologies understand? How their plan will affect the business as well as the end user, leverage data to their advantage, inspire others to move in the right direction? How they will avoid being left behind?*

*In this paper will be done an analyse if is it necessary the upskilling of the staff with relevant digital courses by giving them the tools, time as well as resources to keep building upon their talents. If the organizations will ensure that digital transformation remains at the core of their business strategy?*

**Keywords:** *Economic Effects, Developing Strategies, IT, Leaders, Organizations*

### INTRODUCTION

Google. Amazon. Youtube. Facebook. Twitter. The companies may shift, but enormous digital empires are here to stay—and you need to stay up-to-date on the latest online innovations that connect you to your customers. In an age dominated by the consumer, implementing technology that can track, measure and respond to key shifts in consumer behavior could well make or break a business. Automation and AI are supplementing the workforce to provide greater levels of efficiency an insight and customer obsession is the foundation of organizational success. The technological arena is full of daily advances. It is important to keep customers on the cutting edge of social media and search network trends, so they can continue to engage the audiences online via the sites they visit every day. Digital transformation has been on the agenda of organizations for years and 2020 is predicted to be a crucial time for

leaders to plan for and implement it across industries. The advent of sophisticated digital technologies has turned the traditional way that people communicate, collaborate and do business on its head. With the utilization of modern day intelligence a must, organizations need to embrace the new world of digital by journeying on a digital transformation path. As a stepped program of business improvements to people, processes and tools, digital transformation is geared towards maximizing the potential business contribution of online technologies and media. While many organizations have already embarked on transformation, others are struggling to get off the ground. Even though 87% of companies believe digital will disrupt their industry, only 44% are adequately prepared for projected disruption due to digital trends. As a consequence expert marketers have noted a lack of leadership and alignment amongst management and legacy IT systems, while the shortage of talent and conservative company cultures present considerable hurdles to compete in the ever-changing digital landscape.

**A. Digital Transformation: The Facts.** To get a greater understanding of the impact of digital transformation on business, here are some vital statistics:

- 27% of senior executives rate digital transformation as now being ‘a matter of survival’;
- A third of senior marketing leaders in emerging markets believe that their company will become known as a digital business in five years;
- 71% of digitally maturing companies say they are able to attract new talent based on their use of digital, while only 10% of their early-stage peers can do so;
- 51% of senior executives believe it critical to implement digital transformation in the next 12 months;
- More than  $\frac{1}{3}$  of CEOs say that digital marketing will account for 75% or more of their spending within the next five years;
- Only 16% of marketers feel that their organizations are delivering customer experiences that truly fulfill their brand promises, while  $\frac{2}{3}$  say their efforts in this area are hit or miss with 14% completely missing the mark.

With statistics like this to draw from it's apparent that when it comes to business, embarking on a digital transformation is essential. It's also something that needs to be strategized for and implemented effectively to ensure sustainable commercial success. With so many consumers interacting on a myriad of different digital channels and devices, it's essential for businesses to be able to reach their audiences effectively via all of these mediums to ensure a valuable and long lasting relationship.

**B. The Stages of Digital Transformation.** Like anything in business, there are no foolproof methods to ensure total success. However, when it comes to digital transformation, the best results come from a strategic step-by-step process. There are six stages along with a maturity model which guides purposeful and advantageous digital transformation:

- **Business as Usual:** Organizations operate with a familiar legacy perspective of customers, processes, metrics, business models, and technology, believing that it remains the solution to digital relevance.
- **Present & Active:** Experimentation drives digital literacy and creativity, albeit disparately, throughout the organization while aiming to improve and amplify specific touchpoints and processes.
- **Formalized:** Make experimentation intentional to drive initiatives that are bolder and seek executive support for new resources and technology.
- **Strategic:** Recognize the strength in collaboration as their research, work, and shared insights contribute to new strategic roadmaps that plan for digital transformation.
- **Converged:** The formation of a dedicated digital transformation team to guide strategy and operations based on business and customer-centric goals.
- **Innovative & Adaptive:** Digital transformation becomes a way of business and a new environment and culture is established to identify and act upon technology and market trends in pilot and, eventually, at scale.

It is suggested that by understanding and indeed following this six-stage model, executives will be able to evolve in various aspects of the business. With digital at the heart of their business model and strategy, organizations will be able to compete

effectively against existing and emerging competitors and create an ecosystem of mature business mindsets, models, and operations to outpace competitors. From a consumer perspective, it will increase 'go-to-market' initiatives in ways that are more relevant and rewarding along with developing innovative products and delivering meaningful and priceless customer and employee experiences. For those organizations who have been bold and embarked on a path to digital enlightenment, the end results have been positive and rewarding, resulting in increased revenue and global success.

**C. Digital Transformation In Action.** A digital transformation success story comes from Nokia, a once dominant force in the world of mobile communications. However, due to the rise and dominance of Apple and Android, they ended up falling behind and subsequently exiting the business. To respond, the former mobile phone giant took on its biggest transformation yet. While still investing in its mobile device business, poor results, drying-up resources and only a mildly fruitful 50-50 partnership with Siemens were quickly forcing the company down a path that led to nowhere. When Microsoft came knocking with a proposal to take over the dwindling device business, Nokia took the initiative. Over a six month period, Nokia analyzed the organization, explored business based alternatives and came up with a deal that would change their direction: selling the mobile business to Microsoft. Moreover, Nokia decided to buy out Siemens, ensuring the company had 100% control over the core of the firm. After these announcements, the organization embarked on a strategy-led digital transformation that focused on delivering operational results across its portfolio of three businesses by working on corporate and capital structure, robust business plans, and the management team. Now, Nokia has blossomed once again, and its enterprise value has grown 12-fold with its next cutting-edge venture of returning to mobile phones and tablets on the horizon. In conclusion, to ensure longevity, development and real commercial success, organizations must keep up with emerging trends, tap into the mind of the consumer, understand new markets and utilize the talent and technology available. Gone are the days of rigid company values, antiquated systems, departmental silos and gaping digital skills gaps. Now is

the time for global organizations to lead the way and invest in a well- rounded customized digital transformation to secure its place in the future.

### **Uncertain Future of Work**

Many research organizations and private companies continue to research the issue in order to assess the impact of automation on the workplace and on society in general. With the rise of automation and intelligent technologies such as robots, AI, machine learning and others, the pragmatic search for margin it is introducing a speed of change and uncertainty not seen since the Industrial Revolution. The data shows that job losses will exceed job creation by 2030. And it is pointed out that the entire process of automation it is being driven by customer demand and it is unlikely to slow down any time soon. Because, the customers continue to demand more value, leaving companies in a constant state of transformation, compounded by the economy, tensions between globalization and localization, transparency, data security and ethics, and all multiplied by the acceleration of automation and intelligent technologies. This puts employees, leaders and even robots themselves at odds. Despite a difficult transition ahead to redefine our humanity as a culture, at home and at work — humans can flourish. In this study there are outlines six different consequences of this:

1. Automation must create the adaptive enterprise with an adaptive workforce.
2. Automation influences and is influenced by the gig economy.
3. Ultimately, automation fuels and is driven by shape-shifting organizations.
4. Automation should assume the emergence of personal data twins and more transparent and balanced privacy rules.
5. Automation must create new ways to deliver differentiated experiences and value.
6. Automation evolves value.

These issues are already causing disruption in the digital workplace.

### **Business process automation**

Business process automation (BPA) is the use of technology to automate repeatable, day-to-day tasks. It accelerates how work gets done by routing information to the right person at the right time through user-defined rules and

actions. BPA helps organizations streamline processes such as employee onboarding, accounts payable, contract management and more.

Key elements to identify a process for automation:

- The process requires consistency across the organization;
- The process is repeatable;
- The process needs to be free from error, every time.

It isn't just about replacing paper with PDFs - **business process automation** aims to make processes more cost-efficient, streamlined, error-proof and transparent. With automated processes in place, organizations save time and ensure best practices are implemented to improve overall operational efficiency. Below there is a common business processes and how organizations drove positive change through automation:

- **Example:** Process challenge: The University committed to an initiative that would increase enrollment by more than 65 percent by 2025. This meant the university needed to hire new employees to manage the influx of students while keeping costs down. The legacy HR onboarding process, however, was paper-driven and time-intensive. If the university was going to meet its goal, it needed to eliminate inefficiencies and streamline employee onboarding.

Automating HR onboarding enabled the University to hire more than 3 400 employees in a little over one year. Other departments have also begun reengineering their own processes and sharing successes campus-wide. The new system has created a new culture of collaboration and innovation for the most efficient processes possible.

### **Research Results**

In the paper there are highlight some results from the survey conducted in 76 firms in Albania about the importance and effect of digital transformation.

#### *A. Survey Results – Plans*

**73% of organizations have adopted or have plans to adopt a digital first strategy**

- More than a third of organizations have already started integrating and executing a digital-first approach;

- 9% say they're already an enterprise-wide digital business;
- 39% of IT and business leaders surveyed say their companies are in the very early stages of becoming a digital business – either gathering information or just beginning to formulate a digital-first strategy.

#### B. Survey Results – Obstacles

##### **The biggest obstacles in achieving success with digital business initiatives**

- lack of sufficient budget (34%)
- lack of staff and/or correct skill sets (41%)
- the need to replace legacy systems (19%)
- cultural issues (6%)

#### C. Survey Results – Adoption

- More than a third of organizations (44%) have already started implementing a digital-first approach to business processes, operations and customer engagement.
- Some 14% are in the integration process of making operational and technology changes throughout the enterprise.
- 23% are executing their digital plans and making process, operational and technology changes on a department and business unit level.
- 19% of companies have already fully implemented their digital first approach and are in the maintenance phase.

#### D. Survey Results – Budgets

- 57% of organizations will spend 24% of their budget on digital business initiatives;
- 17% will spend 19% of their budget or more on digital business projects in the next 12 months;
- 26% of organizations plan to spend less than 33% of their budget this year on digital business initiatives;
- But the overall expected average spend varies greatly by company size.

#### E. Survey Results – Desired Business Outcomes

Close to 37% of IT decision-makers say that digital business has already helped their organization achieve revenue growth, with an average of a 29% increase. Meanwhile, 28% of respondents say their digital first efforts have not yet affected revenue, and another 35% don't know.

### **Top objectives were for their digital business strategy**

- Improve process efficiency through automation (51%)
- Create better customer experiences (16%)
- Improve employee productivity (20%)
- 13% of organizations expect digital business to drive revenue growth.

**Importance and Benefits of Digital Transformation.** From the survey there are points out to the top 5 benefits. These are performance orientated benefits and show that digital transformation is proven to increase productivity and helps companies enhance customer experience.

1. **Lift in customer engagement (75%)** – One of the first and most important benefits of Digital Transformation is that it leads to a great lift in customer engagement and experience. Through online channels and communication with customers, any business can get closer to what the customers think, want and how their decisions are influenced. By using digital channels, companies tend to make processes of sales and marketing more web-based which directly puts them in contact with their customers, making them real all of a sudden.

2. **Improved customer satisfaction (63%)** – With the world getting more and more inclined towards using technology, not just for searching and educating themselves but also comparing products and services, it is only natural that a business that is more digitally inclined will be better appreciated. By transforming business activities through digital channels, a business can attain what most are always in the pursuit of customer satisfaction. Only with customer satisfaction can a business retain important consumers and move towards better profitability, thus reaching their ultimate goal.

3. **Higher digital traffic (53%)** – As you move your business and its activities to digital channels, you will observe that a lot of your clients and customers too

would start responding to you on these channels. For example, if you run a website for your business, showcasing its products and services, you will observe a higher digital traffic and response rate. Most consumers look online for desired products and services, and digital transformation holds the key to attracting and retain new and existing customers respectively.

**4. Increased Lead Generation (49%)** – Another very significant benefit of Digital transformation is an increase in Lead Generation. Lead Generation is a term used to refer to the generation of consumer or customer interest and inquiry into the products and services of a business. As you introduce yourself to digital mediums, number of people and a larger percentage of the target audience would be able to reach you, and a greater degree of interest would be generated. It is a fact that lead generation is an important aspect for all businesses and can lead eventually to greater profits. Thus, this gives you another reason to adopt the Digital Transformation concept and apply it more religiously.

**5. Greater conversions (46%)** – Have you ever noticed that a lot of customers may approach you, and only a small percentage of them may purchase your services or products? This simply means that the conversion rate of your consumers is low. But by adopting Digital transformation, this rate can go up, thereby leading to more sales and hence more profit. Digital transformation enables you to market your products to a greater audience and retain their interest through several methods. This thereby leads to a greater conversion.

## CONCLUSIONS

There was a time when the term "automation" was tightly associated with advanced manufacturing plants full of robotics. While it is true that this is a prime example of workplace automation – the process of replacing human labor with machine labor – it is far from the only example. Automation is present in modern businesses small and large, ranging from subtle features in common software applications to more obvious implementation, like self-driving vehicles. There is much debate about where workplace automation will lead the economy, but observers tend to agree on one thing: The trend is only gaining momentum. Every business process, such as human resource management and customer service departments, is

on the table for automation, especially as technology becomes more sophisticated. No matter what the outcome, automation will undoubtedly change the workplace and, indeed, the wider economy. The only question is how much will it drastically transform the workplace? There is no getting away from automation. Whether you believe it will create jobs or eliminate jobs — and there are strong arguments for both — there is no argument that automation will define the future of work. How it will change in the long term remains to be seen, but already there are many tasks and functions that are being changed and mutated with automation driven by artificial intelligence (AI) and machine learning.

*1. The Unknown Future of Automation.* Automation works to streamline workflows that are full of repetitive, manual tasks. Certain types of tasks don't easily integrate into an automated workflow. This is particularly true in the realm of social behavior and creativity, traits that are essential to every business.

However, research suggests that 47 percent of jobs will be replaced by some type of automation within the next 20 years. Independent of the rate of technology advancements, a few factors make the future of automation in the workplace even more complex and uncertain:

- **Technology disruptors:** Future game changers that will shake up how we do things (examples from history: the internet, use of mobile devices)
- **People:** Cultural reluctance to embrace artificial intelligence
- **Politics:** Laws and regulations that hold back or incentivize the spread of automatization.

Automation will continue to impact professional life; it's incredible to imagine how machine learning will evolve. Automation already has a partial impact on our day-to-day work, boosting our productivity for select tasks. These productivity gains are realized through increased output, accuracy, safety, speed and quality of work.

*2. The purpose of business process automation is to save resources for the organization—resources like money, time and manpower. Eliminating manual processes can reduce the volume of paperwork, save employees' time and help organizations be more efficient.*

3. There is a tendency to see digital technology as an opportunity or choice. However, the mounting pressures of a rapidly shifting business landscape are turning digital from a choice into an imperative. The longer a business waits, the more marginalised it will become.

4. The time to strike is now. Acquire the knowledge you need on emerging digital technologies understand how your plan will affect the business as well as the end user, leverage data to your advantage, inspire others to move in the right direction, and you will avoid being left behind.

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## **THE COMMERCIAL INSURANCE MARKET IN THE SLOVAK REPUBLIC BEFORE PANDEMIC COVID - 19**

***Abstract.** The article is devoted to the commercial insurance Market in the Slovak Republic before pandemic COVID - 19. The commercial insurance market is part of the financial market. The Slovak insurance market is a dynamically developing commercial market. As at 31.12.2019 there operated 17 commercial insurance companies on the Slovak commercial insurance market. The evolution of the market in life insurance in recent years is more dynamic than in the non-life insurance. The population is gradually becoming aware of life risks and uses insurance products of life insurance.*

***Keywords:** commercial insurance market, non-life insurance, life insurance commercial insurance companies, indicators of the insurance market.*

**JEL Classification: G22**

### **INTRODUCTION**

Insurance as a non-productive sector is of a vital importance to the national economy of every advanced and modern economy. Insurance, as one of the ways of covering the risks, is part of the finances, namely the finances of all the entities of the national economy. Insurance plays an important role not only in the insurance of business risks, but also in international risks, which we include according to Insurance Act no. 39/2015 Coll. on Insurance in the Slovak Republic among non-life risks. Insurance and insurance intervene directly or indirectly in all areas of human activity, so they affect every business, enterprise, citizen, society, and foreign. All changes in the company are also in some way reflected in the insurance business. The development of science, technology and culture brings new modern products, new activities and new risks to the market.

### **Characteristic the commercial Insurance Market**

Insurance is a specific commodity, the essence of which is the transfer of risk. The insurance market operates on the basis of market principles. The insurance industry, covering the insurance market, has an irreplaceable position in every economy because it offers the risk management tools that the current “venture company” produces. As a result, it is also referred to as a secondary sector of economic activity because it deals with the negative consequences that would have occurred even if the insurance had not existed.

The subject of the insurance market is insurance and reinsurance. Insurance, as one of the important sectors of the market economy, offers its services in the insurance market, or insurance and reinsurance. The insurance industry includes insurance houses, insurance companies, insurance companies from other Member States, branches of an insurance company from another Member State, foreign insurance and reinsurance undertakings from another Member State, insurance intermediaries, insurance supervision, insurance association, insurers' office, insurance institutions offering insurance apart from their main business (banks, leasing companies, car services, etc.) and other entities. In the Slovak commercial insurance market, similarly as in other European Union countries and in the advanced world in a strong competitive environment, commercial insurance companies and their intermediaries are applying for clients – the insured. Similarly, as in other markets, the condition of fair competition includes the creation of quality insurance products and their price evaluation (reasonable price for optimum insurance protection).

The commercial insurance market, its scope, efficiency, and the importance in terms of the national economy can be characterized by several indicators. Among the most frequent indicators we encounter in the literature are the following: the number of commercial insurers, technical premiums, the share of life and non-life insurance in GDP, the ratio of life and non-life insurance, the number of employees of commercial insurers (number of internal and external employees), insurance products, and other indicators.

In the next part, we analyze selected indicators of the commercial insurance market for 2019.

### **Analysis of Selected Indicators of the Commercial Insurance Market in the Slovak Republic**

In 2019, seventeen commercial insurance companies operated in the Slovak insurance market, creating a relatively strong competitive environment among them. Of the total number of insurers operating on the Slovak insurance market, 17 commercial insurance companies were associated in the Slovak Insurance Association as of 31 December 2019. Of the members of the Slovak Insurance

Association, ten commercial insurance companies had universal/general licence; life insurance was provided by four commercial insurers and non-life insurance by three commercial insurance companies. (Spring: Slovak Insurance Association (SAP) Internal Materials, Bratislava, 2020 and Internal Materials, Bratislava 2019).

The most important indicators of the commercial insurance market include technical premiums. Table 1 shows the technical premiums as at 31 December 2018 in thousands of euros and that as at 31 December 2019 thousands of euros. We present both years to compare the development of this indicator of the commercial insurance market.

**Table 1. Technical premium insurance premium as at 31 December 2018 and as at 31 December 2019 in EUR thousands**

Year	Life insurance	Share	Non-life insurance	Share	Total
2018	1,269,677	50.5 %	1,245,551	49.5 %	2,515, 228
2019	1,303,272	50.6%	1,272,410	49.4%	2,575,682

*Source: Internal materials, Slovak Insurance Association, Bratislava 2020, Internal materials, Slovak Insurance Association, Bratislava 201*

In the next part of the paper, we compare the years 2018 and 2019. We will analyse the total technical premium as at 31 December 2018 and as at 31 December 2019 and the technical premium of life insurance and that of non-life insurance as at 31 December 2018 and 31 December 2019. The total technical premium as at 31 December 2018 achieved the amount of 2,515,228 thousand euros. Of this, the technical life-insurance non-insurance premium amounted to 1,269,677 thousand euros and the non-life technical insurance premium was 1,1245,551 tis. euros. As at 31 December 2019, the total technical premium achieved the amount of 2,575,682 thousand euros. Of this, the technical premium of life insurance amounted to 1,303,272 thousand euros, and the technical premium of non-life insurance was 1,272,410 thousand euros. The total technical premium in 2019, was 2,575,682 thousand euros in comparison with the total technical premium in the year 2018, which was 2,515,228 thousand euros – it was higher in comparison with preceding year. The share of life insurance on the total technical premium in the year 2019 was 50.6% and in the year 2018 it was 50.5% – it was a decline in comparison with the preceding year. The share of non-life insurance on the total technical premium in the

year 2019 was 49.4 % and in the year 2018 the amount was 49.5 % – an increase in comparison with the previous year. The ratio of life insurance and non-life insurance in the year 2019 was 50.6 : 49.4 and in the year 2018 it was 50.5 : 49.5 – in favour of life insurance.

Table 2 depicts the technical premium in life and non-life insurance as at 31 December 2019 in thousand euros and the participation of individual commercial insurance companies in the total technical insurance premium on the Slovak commercial insurance market.

**Table 2. Technical insurance premium in life insurance and non-life insurance as at 31 December 2019 in EUR thousands**

No.	Commercial insurance company	Technical insurance premium in life insurance	Technical insurance premium in non-life insurance
1	AEGON Life Insurance company, a.s.	52,336	0
2	Allianz – Slovenská poisťovňa/Slovak Insurance company, a. s.	239,4944	406,408
3	ČSOB Poisťovňa/Insurance company, a. s.	42,624	48,628
4	ERGO Life Insurance company, a.s.	2,824	1,155
5	Generali Slovensko insurance company, a. s.	107,676	153,285
6	NN Life Insurance company, a. s.	75,644	0
7	KOMUNÁLNA insurance company, a.s.VIG	88,403	79,134
8	KOOPERATIVA insurance company, a. s., VIG	356,987	277,267
9	BNP PARIBAS	12,132	20,386
10	Poštová banka	15,155	1,789
11	UNION Insurance company, a. s.	8,895	53,373
12	UNIQA Insurance company, a. s.	30,970	95,191
13	Wüstenrot Insurance company, a. s..	26,837	28,151
14	AXA, insurance company, a. s.	56,927	21,166
16	Groupama insurance company, a.s., branch/agency	1, 927	10,041
17	Youplus Insurance International,AG		3,659
	<b>Total</b>	<b>1,303,272</b>	<b>1,272,410</b>

Source: Internal materials, SAP, Bratislava 2020

The total technical premium in 2019 was 2,575,682 thous. euros. As can be seen from Table 2, technical insurance in life and non-life insurance as at 31 December 2019 (ths. Euro) of the insurance company Allianz – Slovenská poisťovňa, insurance company, a. s., indicates it was the leader in the Slovak insurance market in the life insurance business with 239,494 thous. euros and in non-life insurance with

406,408 thous. euros, the total technical premium in 2019 was 645,902 thous. euros. The second position was occupied by KOOOPERATÍVA, insurance company, a. s. in the area of life insurance amounting to 356,910 thous. euros and also in non-life insurance amounting to 277,267 thous.euros, the total technical premium in 2019 was 634,177 thous. euros.; the third place in life insurance business was taken by the insurance company Generali Slovensko, insurance company, a. s.with 107,676 thous. euros and in non-life insurance with 153,285 thous. euros, the total premium was 260,961 thous.euros.

### CONCLUSION

In conclusion, we can say that the Slovak insurance market bevor pandemic COVID-19 was a dynamically developing commercial market, which forms part of the financial market. The total technical premium in the year 2019 was 2,575,682 thousand euros. The ratio of life insurance to non-life insurance in the year 2019 was 50,6 : 49,4. Allianz-Slovenská poisťovňa, insurance company was the leader in the Slovak insurance market in the insurance business with the total technical premium 645,902 thous. euros. The second position was occupied by KOOOPERATIVA, insurance company, a.s., the total premium was 634,177 thousand euros. The third place was insurance company Generali Slovensko, insurance company, a.s. with the total premium 260,961 thousand euros.

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## **THE IMPACT OF PERSONAL FACTORS ON TRUST AND IMAGE OF E-BANKING CUSTOMERS**

**Abstract.** *Nowadays, banks offer various forms of electronic banking such as informative, communicative or operational. All banks are present online with their website, which provides general information about the bank and the services it offers. However, e-banking goes one step further, as it allows customers to log in to their online accounts online 24 hours a day, 7 days a week, directly from their homes or offices and perform banking transactions that they wish. The purpose of this study is to identify and analyze the factors related to the trust and image of customers towards banks in terms of using e-banking and to present some conclusions in order to improve the situation of e-banking in Albania. The study is based on primary data collected by the administration of 400 questionnaires in three districts of Gjirokastra region. Data were analyzed based on analysis of variance. The analysis of variance revealed significant differences in trust in banks between customers of different genders and different educational levels. On the other hand, this study reports that among customers living in different areas and with different marital status, there are no significant differences in terms of average trust. The results of the study also show differences in the average image of banks among customers with different areas of residence and gender, marital status and different level of education.*

**Key words:** *trust, image, electronic banking, personal factors.*

### **Introduction**

Electronic banking is defined as "a portal through which consumers can perform various types of banking services ranging from paying bills to making investments" (Pikkarainen et al., 2004). With the exception of cash withdrawals, electronic banking gives customers access to almost any type of banking transaction with a click of the mouse (De Young, 2001). Other authors define e-banking as the use of the Internet to offer banking activities such as transferring funds, paying bills, monitoring the current account balance and savings, paying mortgages and purchasing financial instruments and certificates of deposit (Singhal and Padhmanbhan, 2008; Ahasanul et al, 2009). However, it should be borne in mind that electronic banking (e-banking) is not equivalent to the term Internet banking (Internet banking), despite the fact that this is also its most common type. Banks use online banking as one of the cheapest channels for offering banking products (Pikkarainen. T., Pikkarainen. K., Karjaluoto, H., and Pahnila, S. (2004). Such service also saves time and money of the bankers with an added benefit of minimizing the possibility of committing errors from bank counters (Jayawardhena, C., & Foley, P. (2000). Wise

and Ali (2009) argued that many banks in their country want to invest in ATMs for reduce the cost of affiliates since customers prefer to use them instead of using a affiliate to do business.

### **Literature review**

In the banking industry, customer-bank relationship relationships remain a key issue where businesses invest to maintain a higher competitive advantage in the market (Kandampully, J. and Duddy, R. 1999). The relationship between banks and corporate customers is the most important factor in the success of new financial services. An important step that banks must take before undertaking any kind of transformation is to ensure proper online banking risk management. This is very difficult for both customers and banks in order to determine the best way to use online banking. Faith also plays a very important role. It is very difficult to analyze trust as a phenomenon and it may be almost impossible to analyze trust in the context of e-commerce due to the complexity and risk of e-commerce. Trust will be the deciding factor for the success or failure of e-banking.

Various authors have also highlighted the impact of demographic factors on the intention of customers to use e-banking. Barnett as well (1998) showed that young customers felt more comfortable when using electronic banking. Karjaluoto (2002) in his study showed that the users of e-banking were younger than those who used traditional banking channels. As far as marriage status is concerned, when considering the electronic banking services, Stavins (2001) has identified that married customers were much willing to use these services. The results of Katz and Aspden (1997) showed that males are more willing than females to use e-banking. Similarly, Karjaluoto (2002) showed that e-banking users were dominated by men. Using the results from these studies it can be proposed that gender influences the choice of e-banking services. Studies of Al-Ashban and Burney (2001) and Stavins (2001) have shown that with the increase of qualified and educational level of customers, the satisfaction and approval to get such e-banking service is also increased. Chan (1997) in his study has identified that the income was the only most important variable that implicated the use of credit cards. Empiric results of positive income implication in

the approval of electronic banking can be found in the studies of Al-Ashban and Burney (2001), Stavins (2001) and Karjaluoto (2002).

### **Trust**

E-banking customer trust helps banks build a long-term relationship with their customers. Researchers have focused on the essential role of trust in building and maintaining long-term relationships (Rousseau et al, 1998; and Singh and Sirdeshmukh, 2000). This is also known in marketing theory as a fundamental policy in developing and maintaining long-term relationships (Crosby et al, 1990; Ritter, 1993; and Doney and Canon, 1997). Factors such as the speed and efficiency of transactions; fast and efficient services; services provided at the promised time; range of products and services; willingness of employees to help; the cordiality and friendliness of the bank employees; the availability of 24 hour banking services such as ATM, Online Banking, and call center (Muslim and Zaidi, 2008) influence the establishment of a long-term relationship with the bank. Morgan and Hunt (1994) have stated that trust exists only when one party has faith in the other party's trustworthiness and integrity. Doney and Cannon (1997) also added that the partner must also have the ability to continue to meet its obligations to customers within the cost-benefit relationship; thus, the client must not only anticipate positive outcomes but also believe that these positive outcomes will continue in the future.

### **Image**

According to Kang and James (2004), a favorable and well-known image is seen as a valuable asset and in many respects the image has an impact on customers' perception of the firm's communication and operations. Kang and James (2004) explained that if a customer has a positive image of the service provider, they tend to forgive small mistakes made by the service provider.

The exact relationship between image and fidelity has remained a matter of debate. Sirgy and Samli (1989), for example, reported a directly positive relationship between image and fidelity. Another empirical study shows how image, perceived quality of service, and satisfaction determine loyalty in a banking environment. Globally the results of a large-scale study show that image is indirectly related to bank loyalty through perceived quality. On the other hand, the quality of service

directly and indirectly affects bank loyalty through satisfaction. The latter has a direct effect on bank loyalty.

### **The purpose and objectives of the study**

The purpose of this study is based on the current state of e-banking use in Albania to evaluate the impact that personal factors have on trust and image customers of banks in view of use of this banking product. In view of the above purpose the paper has the main objective:

Identification and assessment of personal factors relating to satisfaction and loyalty, of customers to banks in view of the use of e-banking. (focus on the region of Gjirokastra)

### **Hypothesis and Methodology**

In the context of electronic banking, reviewing the literature allows us to identify the factors that affect the attractiveness of consumers in the use of e-banking.

The decision to use electronic banking services is the function of several variables (measured at 7 degrees according to Likert) and personal characteristics.

Variables will include: customer trust and image. Personal factors will include: age, gender, marital status, educational qualification and area of residence.

The hypothesis of the study are as follows:

**Hypothesis 1:** There are no differences between areas, gender, marital status, and education related to trust

**Hypothesis 2:** There are no differences between areas, gender, marital status, and education related to image

To measure and evaluate the impact of personal factors affecting trust and image of Gjirokastra district customers was conducted a questionnaire in three districts of Gjirokastra. Based on the analysis of multifactorial variance (ANOVA), was realized processing of survey data from which emerged the findings and certificates or not submitted hypotheses.

Variables that we get are mostly ordinal nature (the persons interviewed can be sorted by the values of variable 1-7), but also the nominal level (gender, area, education, marital status).

## Data analysis and findings

The variance analysis (ANOVA) was used to measure and evaluate the impact of personal factors on customer trust and image. In the analysis of personal factors is considered gender, age, marital status, level of education and area of residence. Table 1 presents detailed information on sample composition according to personal factors.

**Table 1. Sample by personal factors**

	Frequency	Percent
<b>A. PERSONAL FACTORS</b>		
<b>1. Gender</b>	<b>350</b>	<b>100.00 %</b>
a) Female	186	53.14 %
b) Male	164	46.86 %
<b>2. Age</b>	<b>350</b>	<b>100.00 %</b>
a) below 18 years old	5	1.43 %
b) 18 -25 years old	88	25.14 %
c) 26 -35 years old	97	27.71 %
d) 36 -5 years old	68	19.43 %
e) 46 -55 years old	64	18.29 %
f) More than 56 years old	28	8.00 %
<b>3. Marital status</b>	<b>350</b>	<b>100.00 %</b>
a) Married	195	55.71 %
b) Single	132	37.71 %
c) Widowed	8	2.29 %
d) Divorced	15	4.29 %
<b>4. Education level</b>	<b>350</b>	<b>100.00 %</b>
a) Low education	13	3.71 %
b) Secondary Education	96	27.43 %
c) University education	211	60.29 %
d) Postgraduate education	30	8.57 %
<b>5. Area of residence</b>	<b>350</b>	<b>100.00 %</b>
a) Urban areas	287	82.00 %
b) Rural areas	63	18.00 %

*Source: Developed by author*

Variance analysis

**Hypothesis 1:** There are no differences between areas, gender, marital status, and education related to trust

**Table 2. Analysis of variance for trust**

<i>Source</i>	<i>Sum of squares</i>	<i>Df</i>	<i>Mean square</i>	<i>F-Ratio</i>	<i>P-Value</i>
<b>MAIN EFFECTS</b>					
A:Gender	6.50303	1	6.50303	3.86	0.0503*
B: Area of residence	5.65968	2	2.82984	1.68	0.1880
C: Marital status	3.78401	3	1.26134	0.75	0.5238
D: Education level	28.8355	3	9.61184	5.70	0.0008***
Residual	572.865	340	1.6849		
<b>TOTAL (CORRECTED)</b>	622.399	349			

*Source: According to data processed in the statistical program EViews*

*Note : \*, \*\*, \*\*\* indicates that the results are significant at the 10,5 and 1 percent respectively.*

Table 2 shows the average trust based on factors such as gender, education, marital status and area of residence. Based on gender data the results show a higher average confidence for female customers ( $m = 5.52$ ) compared to male customers ( $m = 5.14$ ). Fisher test statistics ( $F = 3.86$ ,  $p = 0.0503 < 0.10$ ), support the above result thus showing that female customers have more confidence in banks compared to male customers.

Regarding the average trust by settlement areas, it is demonstrated that there are small differences between the constituent groups. Based on the Fisher test ( $F = 1.68$ ;  $p = 0.1880 > 0.10$ ) these changes are generally statistically insignificant. This result shows that regarding the area of residence there is no change in customers' trust in the bank.

Based again on the data in Table 2 we see that there are insignificant differences between groups of customers by marital status in terms of trust in banks. Fisher test  $F = 0.75$ , turns out to be insignificant with value  $p = 0.5238 > 0.10$ . This result suggests that there is no change in customers' trust in the bank referring to marital status.

Statistics show that there are differences in terms of average trust for clients with different educational levels. Fisher test  $F = 5.7$ , turns out to be significant with value  $p = 0.0008 < 0.10$ . This result suggests that there is a difference in customers' trust in the bank referring to groups of customers with different educational levels.

**Hypothesis 1:** Is proved for the area of residence and marital status

**Hypothesis 2:** There are no differences between areas, gender, marital status, and education related to image

**Table 3. Analysis of variance for Image**

<i>Source</i>	<i>Sum of squares</i>	<i>Df</i>	<i>Mean square</i>	<i>F-Ratio</i>	<i>P-Value</i>
<b>MAIN EFFECTS</b>					
A: Gender	6.01422	1	6.01422	5.09	0.0247**
B: Area of residence	7.98242	2	3.99121	3.38	0.0353**
C: Marital status	18.0562	3	6.01875	5.09	0.0018***
D: Education level	17.8099	3	5.93662	5.02	0.0020***
Residual	401.717	340	1.18152		
<b>TOTAL (CORRECTED)</b>	459.882	349			

*Source: According to data processed in the statistical program EViews*

*Note : \*, \*\*, \*\*\* indicates that the results are significant at the 10, 5 and 1 percent respectively.*

Table 3 demonstrates the image average based on factors such as gender, education, marital status, and area of residence. Statistics show that the average image for women is higher ( $m = 5.79$ ) than the average image for men ( $m = 5.47$ ). Fisher test  $F = 5.09$ , turns out to be significant with value  $p = 0.0247 < 0.10$ . This result suggests that women have a more average positive image towards banks than men.

Referring to the data for the residential area the results show a higher average of the image for the customers of the rural areas compared to the customers of the urban areas. Fisher test statistics ( $F = 3.38$ ,  $p = 0.0353 < 0.10$ ), support the above result thus suggesting that rural customers have a more positive average image towards banks compared to urban customers.

Based again on the data in Table 3 we see that there are differences between groups of customers with different educational levels in terms of image towards banks. Fisher test  $F = 5.02$ , turns out to be significant with value  $p = 0.0020 < 0.10$ . This result suggests that there is a difference in the average image of customers towards the bank referring to groups of customers with different educational levels.

In terms of image average by marital status, it is demonstrated that there are differences between the constituent groups. Based on the Fisher test ( $F = 5.09$ ;  $p = 0.0018 < 0.10$ ) these changes are statistically significant. This result shows that referring to marital status there is a change in the image of clients towards the bank.

### **Hypothesis 2: Is not proved**

### **Conclusions**

This study aims to identify and assess the impact of personal factors on customers' trust and image of banks in terms of e-banking use.

The analysis of variance revealed significant differences in trust in banks between customers of different genders and different educational levels. Female customers have higher average trust than male customers, on the other hand customers with higher and postgraduate education have higher average trust than customers with secondary and lower education. On the other hand, this study reports that among customers living in different areas and with different marital status, there

are no significant differences in terms of average trust. These findings are generally in line with the studies of Sathye (1999) and Polatoglu and Ekin (2001) who found that the reliability dimension was an important determinant for customers who used electronic banking. Moreover, Sathye (1999), and Liao & Cheung (2002) found that reliability was positively associated with the use of electronic banking services. They concluded that the more confident consumers perceive e-banking, the more likely they are to use e-banking.

The analysis of variance also revealed differences in the average image towards banks among consumers with different areas of residence and gender, marital status and different level of education. Clients in rural areas have a higher average image than consumers in urban areas, female consumers present with an average higher image than males. While analysis of variance shows that married and single consumers have higher average image than divorced and widowed consumers, higher education consumers have higher average image than postgraduate, lower and secondary consumers.

The results of this study show that banks should pay more attention to increasing the trust and image that customers have towards banks to help banks in building a long-term relationship with their customers.

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## ACCOUNTING, ANALYSIS AND AUDIT

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## FACTORS FOR ENSURING THE QUALITY CHARACTERISTICS OF REPORTED FINANCIAL INFORMATION

***Abstract.** The authors proposed to consider the quality of the company's financial information as an element of the common system that also includes the following components: product quality, labour quality, and management quality. They carried out the content-analysis of the definition of quality of financial and reporting information. They also developed a system of factors of ensuring qualitative features of reporting data, consisting of two groups: exogenous and endogenous factors. The authors considered directions for improvement of qualitative features of reporting financial data in conditions of levelling the asymmetry of reporting information.*

***Keywords:** financial reporting, information quality, accounting and analytical support, users.*

### INTRODUCTION

In present-day conditions, financial reporting is an important prerequisite for organization efficient business relationship between the market participants. To become a real factor of business turnover, the information, included the enterprise's financial reporting should be distinguished by qualitative characteristics, and convey meanings, necessary for interested users. The qualitative characteristics of reporting financial information determine the usefulness of financial reporting for making decisions by different user groups and are the "estimation standards," confirming the usefulness of this information.

Quality is a sophisticated integrating notion. According to the definition of the International Organization for Standardization, the notion "quality" is referred to as a cluster of properties and specific attributes, product or service characteristics, giving them an ability to meet the specified or estimated needs (Onuorah, A. C., & Friday, I. O. (2016)).

In a market economy, the quality, characterizing the efficiency of financial and economic activities of public production entities, acts as the most important factor of investment attractiveness the enterprises. Herewith, the quality of financial information is considered as a component of the common quality system, which also includes the following components: product quality, labour quality, and management quality.

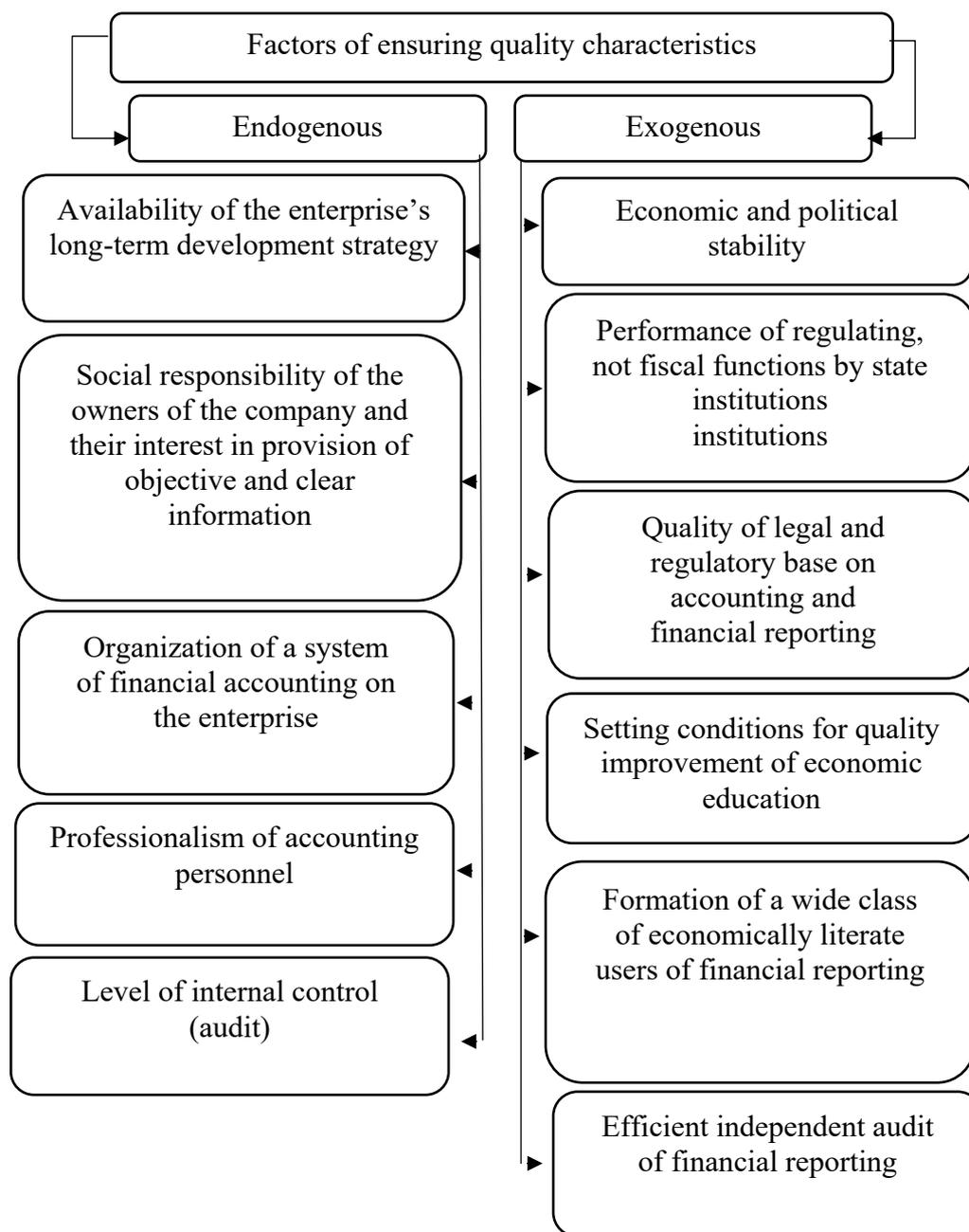
First of all, particular scientists (García-Meca, E., & García-Sánchez, I. M. (2018)) formulate qualitative characteristics of reporting (accounting and analytical), rather than financial, information. On the one hand, this may mean that they equate the notions of accounting and financial information, and, therefore, determine additional attributes, on the other hand – vice versa, they separate them.

Secondly, the researchers separately identify the requirements to accounting (financial) data or reporting itself (which, in our view, are vestiges of the Soviet accounting system), herewith, some – identify them as qualitative characteristics (Abbott, L. J., Daugherty, B., Parker, S., & Peters, G. F. (2016)), other, vice versa, highlight them (Mbobbo, M. E., & Ekpo, N. B. (2016)), although the range of requirements and characteristics, given by such authors, often coincides. It should be noted that requirements are imposed by users, but not to information, included in reporting, but to reporting itself, its format, and the methodology of compilation. And the information is the content, essence, nature of reporting, corresponding to certain attributes (characteristics) for the acquisition of usefulness.

Thirdly, there is an ambiguity of views in the scientific literature, regarding the list of the most qualitative characteristics. Thus, to the qualitative characteristics of accounting (financial) information, different authors attribute: reliability, timeliness, security, relevance, operability, integrity, completeness, accuracy, urgency, confidentiality, selectivity (Gros, M., Koch, S. , & Wallek, C. (2017)); continuity, cyclicity, massiveness, significance, the complexity of calculation (Kantudu, AS, & Samaila, IA (2015)), openness, verifiability, accountability, neutrality (objectiveness), regulation, transparency, and completeness (Kamolsakulchai, M. (2015)). Sometimes, as a part of the characteristics, one enlists separately its components (Chu, L., Dai, J., & Zhang, P. (2018)).

## RESULTS

The quality of information, reflected by financial reporting, depends on a number of exogenous and endogenous factors (Figure 1). This division, in some sense, is conventional, but it helps to present the structure and functioning of the mechanism for ensuring the quality characteristics of the reported financial information of the enterprises. The improvement of quality of financial reporting resides in reduction (or elimination) of the negative and enhancement of positive effects of these factors.



**Fig. 1. Factors of ensuring quality characteristics of reported financial information** (systematized by the author)

The solution of problems, related to the influence of external factors belongs to the area of competence and powers of state bodies. The responsibility for the enhancement of internal factors is laid on the owners and business managers. At the same time, it is important to solve the specified tasks with consideration of a close relationship between the external and internal factors.

To effectively solve the problem, it is necessary to eliminate the reluctance of state bodies to more actively involve a professional community to the participation in the creation of a regulatory framework on accounting and financial reporting. The business owners and managers, in their turn, are forever interested in the improvement of the quality and transparency of the reporting procedure.

Despite the importance of the influence of all above-mentioned factors, the provision of quality characteristics of reported financial information, the article proposes to consider issues, related to the nature and qualifications of the modern accountant, and the trends in the accounting profession and education.

Since financial accounting is often the only relevant and credible information, an accountant should be able to hold a rational, well-ordered, objective, and clear analysis and deliver verdicts even on the basis of insufficient information.

The variability of accounting methods and procedures, the shift away from the rigid prescriptions for selecting methods and procedures, the appearance of fundamentally new accounting categories and objects, the need for consideration of the risk factors, and the ambiguity of estimates require broad-based economic knowledge, related, in its turn, to the need for the application of professional judgment of a person, which prepares financial accounting.

While in the Western practice (in particular, the countries belonging to the Anglo-American accounting system) professional judgment plays a vital role, in the theory of domestic accounting, this notion is a fairly new phenomenon, the need for application of which is not fully understood by practitioners. This situation is due to the fact that the system of accounting and reporting (especially the one regarding taxation), existing for a relatively long period of time, has taught accountants to strictly follow the instructions and recommendations, specified by regulatory and supervisory authorities.

## CONCLUSIONS

To improve the quality of formation of financial accounting, one offers a mixed model for regulation of the accounting and financial reporting system through the interaction of state bodies with professional social organizations. This includes a transfer of functions of draft regulations development and methodological support for the application of IFRS to a non-profit professional body, and enhancement of state's authorities in determining the strategies for development of accounting and financial reporting; approval of normative legal acts and performance of control functions upon the implementation of their regulations.

Summing up, one should mention that an important place among the primary factors, ensuring quality characteristics of financial accounting belongs to advanced training of accounting professionals and transformation of the norms of professional ethics into everyday behavioural rules. The need for compliance with the diligence norms (objectivity and ethics of accounting) will become the key engine for the gradual acquisition of a wider spectrum of powers by the finance managers and accountants to improve efficiency of the enterprise's activity and its financial accounting.

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## **TRANSPARENCY OF FINANCIAL REPORTING IN THE CONDITIONS OF MODERN INFORMATION TECHNOLOGY**

***Abstract.** In the article, the authors carried out a theoretical generalization. They proposed a new solution of the pressing scientific and practical problem, regarding the harmonization of financial reporting of the domestic enterprises with the international standards and formation of accounting information for efficient management of the enterprise. The primary objective of this article is the study of the current state of Ukrainian financial reporting, identification and development of theoretical and organizational methodological provisions on its harmonization with international standards and requirements of management. The authors used a dialectical method, which enabled the disclosure of informational nature of financial reporting; based on the systemic approach, they generalized the scientific experience and grounded the conceptual provisions and recommendations on the improvement of the financial reporting formation methodology for meeting the needs of financial management. The complexity of data collection, processing, and aggregation, the availability of cross- and redundant information, and the complexity of its analysis as a result of incompatibility of formats of reporting, became an agent for the development of the technological tools for formation and delivery of financial reporting. The application of XBRL in Ukraine includes the development of the XBRL taxonomy according to the national P(S)FR or sector-specific extensions for enterprises of different types of activity. This promotes the expansion of informational space, increases the level of transparency of financial reporting, and ensures more reasoned and efficient management.*

***Keywords:** XBRL instruments, financial reporting, financial management, international standards*

### **Introduction**

The process of reformation of financial reporting in Ukraine lasts for over twenty years. Nonetheless, financial reporting of the domestic enterprises is not yet compliant to the market-focused approaches to information disclosure. There is a range of problems, hindering improvement of quality of financial reporting, drafted according to Ukrainian legislation.

The most vital of them are the assignment of development functions on a state, approval of P(S)FR, and control over their implementation; the imperfection of the methodology of the transformation of information, accumulated on the accounts of financial reporting into accounting information; the prevalence of legal form over economic content; untimeliness of adaptation of domestic legislation to the changes

in IFRS, which hinders the harmonization process; insufficiency of feedback between the users of reporting information and the developers of statutory and regulatory acts in the area of accounting and financial reporting; insufficient attention to professional behaviour and the qualification level of the reporting draftsmen.

The development of the Internet has radically influenced the world business. It can be said that today digital technologies are the main engines of progress because every day in the international foreign exchange market people conclude trillion-dollar agreements using modern communication technologies, including the Internet.

Thanks to the worldwide network, individual and professional investors can be as close to the company as possible, even if they are at the other end of the world. Accordingly, investors become more demanding to accessibility, transparency, clearness, comparativeness, and speed of financial information about the company they are interested about.

The primary objective of this article is the study of the current state of Ukrainian financial reporting, identification and development of theoretical and organisational methodological provisions on its harmonization with international standards and requirements of management. Due to a big number and diversity of the studied problems, the attention is focused on those of them, which are referred to as the most relevant and important.

### **Literature Review**

Kuzina, R.V. (2015) state: the unconditional achievement of the information disclosure system in Ukraine is that it was initially focused on the electronic form. The most active work in this direction is observed in the bodies of the State Fiscal Service of Ukraine, as well as the National Securities and Stock Market Commission (Potryvaeva, N.V., & Korenovskaya, T.O. (2015)). Nevertheless, the formats, used for reporting in these bodies are not yet compatible with each other. Therefore, the issue of drafting and application of a single format for electronic reporting to all monitoring and regulatory bodies is an urgent task today.

One of the most significant mechanisms of modernization of reporting is the integration of information technology achievements into the process of development, presentation, and analysis of this information. The distribution of financial

information through the Internet creates a new dimension in the system of corporate reporting (Ball, R., Li, X., & Shivakumar, L. (2015)). Operational, real-time, information in the near future can replace the established historical financial reporting, which is nowadays submitted by companies for interested parties (Tschopp, D., & Huefner, R. J. (2015)).

To the modern methods of financial reporting, one should include the use of web technologies for placement of reporting on the Internet, as well as the use of the flexible language of business reports XBRL (extensible Business Reporting Language) (Sanad, Z. R., Al-Sartawi, A., & Musleh, M. A. (2016)).

According to the survey results, held by the leading information technology consultants and financial controllers, XBRL is recognized as one of the seven advanced technologies, which is expected to have a great influence on doing business and will stage a coup in reporting of the corporation (Milanes Montero, P., Pérez Calderón, E., & Lourenco Dias, A. I. (2020)).

Here are the prerequisites that contributed to the spread of XBRL in practice:

1) severization of the requirements of the external users to transparency, volumes, and speed of the report handling (Andries, K., Gallemore, J., & Jacob, M. (2017));

2) the universality of accounting systems as a result of the convergence of the national standards of financial reporting and IFRS, due to which, one observed an increase in the need for drafting a report in the electronic format (Johannesen, N., & Larsen, D. T. (2016));

3) expenditures for publication of financial reports (Mohammadi, J., & Khozain, A. (2017)).

Before the appearance of the XBRL standard, financial reports were distributed among users in interactive digital formats (official websites of the companies), applications (MS Word, Adobe Acrobat) or in a printed version (Jatmiko, B., & Setiawan, M. B. (2020)). In the last-mentioned cases, to use reports for analysis and other purposes, one had to transform it into an electronic document first. This required additional time and caused problems when exporting data from one program to another.

Their study contributes to the development of the theory and methodology of accounting and financial reporting. At the same time, the globalization of the world economy, the European integration processes in Ukraine, the entry of the domestic enterprises into international capital markets, the changes in market conditions, permanent development of international standards, and expansion of capabilities of the Internet technologies require modernization of theoretical and methodological provisions and the development of the latest concept of financial reporting, in particular, with regard to disclosure of information. The solution of the mentioned issues will improve the quality and transparency of financial reporting, as well as ensure confidence to reported information from a wide range of users.

### **Methods**

The theoretical and methodological basis of the study included the general scientific and empirical methods of cognition of the studied phenomena and processes.

The use of the dialectical method enabled the disclosure of the information nature of financial reporting; based on the systemic approach, the authors generalized scientific experience, justified the conceptual provisions of financial reporting, and the recommendations on improvement of the methodology of financial reports formation for meeting financial management requirements. The research also included the use of the historical and logical methods for the study of the prerequisites for the emergence and objective regularities of the evolution of the harmonization process in financial reporting with international standards. The comparative analysis made it possible to determine the differences between the requirements of the B(S)FR and the provisions of IFRS. The methodologies of synthesis and grouping were used for classification of the detected differences.

### **Results**

In the real conditions of the information economy, the enterprises have to respond to the growing demand of society for transparency, which is largely due to the awareness of transparency as a common idea of modern civilization, a big number of investors, and rapid development of the mass media. Transparency or openness

means the creation of conditions, when information about the existing situation, made decisions, and actions is available and clear to all market participants.

Although transparency can not prevent a financial crisis, it can at least provide a restrained response of the market participants to bad news, reduce the likelihood of panic and other disastrous consequences. Financial transparency helps to attract targeted and effective investment and credit resources, which is especially important for small and medium-sized enterprises that lack sufficient collateral support. The world practice shows that enterprises which have good prospects and high-quality financial reporting but do not have collateral support, have more chances to obtain a credit since banks receive more information for making credit decisions, which makes it possible to reduce requirements collateral.

In Ukraine, transparency of financial reporting, as well as corporate reporting as a whole, is still of relative importance only for large companies, since in domestic practice, there is traditionally a trend towards the closure and non-proliferation of information, even one that is usually not referred to as confidential.

Among the main reasons of the Ukrainian companies' unwillingness to fully disclose information about their activity in reporting are: competition, high reporting costs, as well as a low culture in a matter of corporate ethics. Most companies do not pay due attention to information disclosure issues and do not consider such practices as an important component of communication with stakeholders.

Considering that information of financial reporting helps not only to establish the level of financial stability, profitability, and liquidity of the enterprise but also predict its development, one can state that: the quality of managerial decisions significantly depends on the level of transparency of the financial reporting of the enterprise. Based on the above-given details, one can speak of the importance of the concept of information disclosure in financial reporting of the enterprises as the mechanism of their transparency provision, which will contribute to the growth of confidence in them from various reporting information users.

It should be noted that the process of transparentization will be more efficient if the enterprise voluntarily seeks to self-disclosure and building its activity according to the idea of transparency. Selective transparency is unacceptable when, for

example, the enterprise drafts a report upon IFRS, but it includes no other, non-financial, information.

The disclosure of information in financial reporting is traditionally associated with notes to financial reports. Due to the presentation of the four primary forms of financial reports in the aggregate form, the information included in them only partially reveals the enterprise's activity. Moreover, assessment of individual balance sheet items and reporting on financial results may differ in different national systems of accounting and IFRS. Therefore, the full disclosure of these sheet items in the notes section makes it possible to obtain the necessary information, needed for management and making decisions.

The analysis of the financial reporting of public companies revealed at SMIDA showed that not all enterprises of Ukraine fully compile and publish the notes to financial reports. It is worth to mention the positive dynamics in this direction, which is primarily due to the introduction of IFRS – a standards system, providing a higher level of disclosure. Despite the fact that the general requirements to the disclosure of information in financial reporting are specified in NP(S)FR 1 “General Requirements for Financial Statements,” and the requirements for the disclosure of individual assets and liabilities – in the corresponding P(S)FR, there is a fractional and chaotic nature of the published notes to the financial reports. This is due to the absence of information disclosure principles, recommendations on the assessment of the significance of information, and the layout of notes with an approximate list in the domestic regulatory framework.

The main causes, which lead to complication of the notes to financial reports and a decrease in their significance and clarity, are referred to as follows:

- severization of requirements to the disclosure of standards by the developers for increasing a transparency level of financial reporting, as it is considered that bigger quantity of information will prevent financial crises. The notes are considered as a means of compensation for non-compliance with recognition and assessment principles, rather than as a “guide” to primary financial reports;

- the complication of business operations, which resulted in severization of requirements to financial reporting and provision of more information in it;

- complexity of the practical application of professional judgment on significance of information that should be disclosed;
- the choice of reporting by the draftsman and the approach to “control list” (“checklist”) of requirements by the regulating bodies, etc.

The above-given information highlights the need for development and substantiation of the requirements to the disclosure of information in the notes section at the same level as it is with the requirements to recognition and assessment of elements of financial reports.

Sorting of principles and requirements to the disclosure of information in the notes section to financial reporting requires a comprehensive solution. We consider two equally possible ways of its implementation:

1-st variant (recommended): the development of a separate document, for example, provision (standard) of financial reporting titled “Disclosure of information in the notes section to financial reporting” or

2-nd variant (alternative): presentation of NP(S)FR 1 “General requirements to financial reporting” in the new section titled “Disclosure of information in the notes section to financial reporting.”

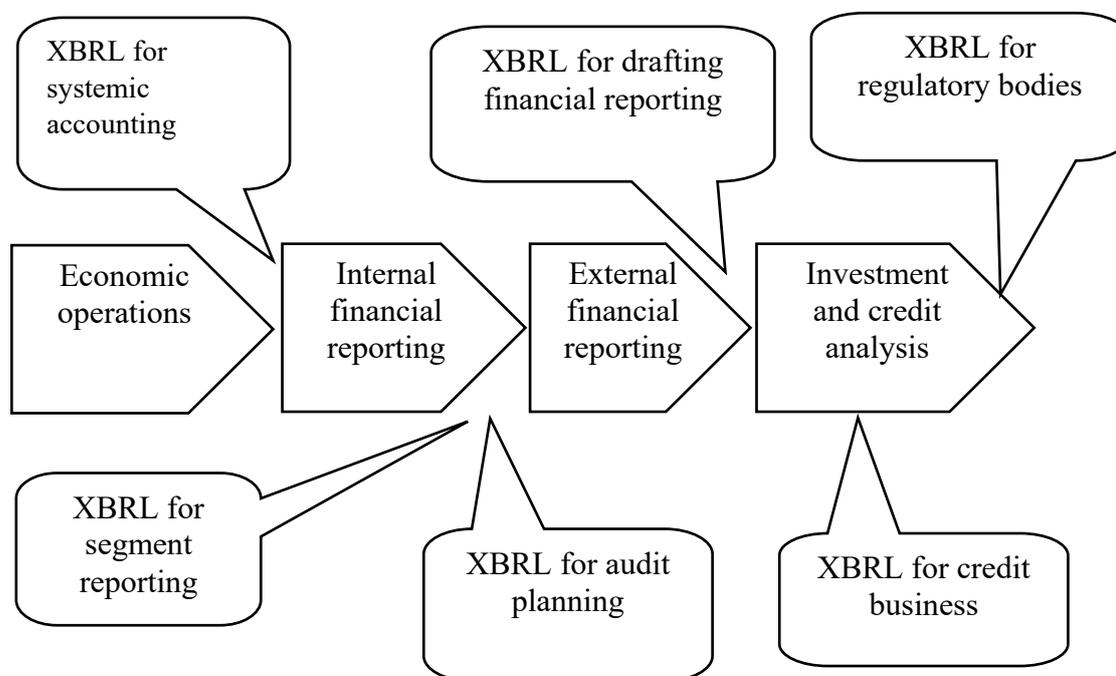
The mentioned document should provide the flexibility of requirements to the disclosure, avoidance of repeated data in financial reporting, and active application of judgment on the significance or make notes to financial reports more informative, coordinated, and concise.

Alongside the problem of handling electronic-financial reporting in a single resource, there is also a need for solving the problem of a single format for drafting a report, which would make reporting more comparative and suitable for analysis by software.

The environment of the XBRL use covers all parts of the Corporate reporting supply chain (CRSC), which is related to people and processes, involved in the preparation, approval, audit, analysis, and use of financial reporting (Figure 1). All links in this chain should be of high quality and closely interconnected.

The XBRL technology allows software tools, supporting XML, to automatically read any information, in particular, annual financial reports, drafted in

accordance with requirements of IFRS, U.S. GAAP or other national accounting and financial reporting standards; sort, analyze, store, and exchange it with other computers. In other words, XBRL is a technical tool that collects information, presented in a specified form and transmits it over the Internet (or internal corporate network) in a form that is clear to any end-user.



**Figure 1. XBRL in the chain of ensuring corporate reporting**  
(systematized by the author)

It is important to note that the Notes to financial reporting are one of the most important information sources for making managerial decisions regarding the business entity. This requires the development and substantiation of requirements to the disclosure of information in the notes section at the same level as it is with requirements to recognition and assessment of the elements of financial reporting. The unit discusses a number of ideas on establishing such requirements for prevention of duplication of information in financial reporting as a whole and eliminate irrelevant disclosures, but achieve clarity, comparability, and efficiency of information, included in the notes section to the financial reports. The foundation of information disclosure in the notes section should ground on the concept of appropriateness and its subelement – significance, which will mean the following:

- orientation of the notes' content at the needs of specific users;

- disclosure of information that will meet and provide achievement of the objective of the financial reports and notes to them;
- elimination of template disclosure, individualization of information;
- reduction of the load on the notes due to the establishment of commensurate requirements to them;
- promotion of the active application of professional judgment, demonstration of creativity and innovation.

Support by various institutions (regulators, draftsman, auditors, and scientists) and the development of the given requirements and principles will contribute to improvement of the process of transferring financial information about the enterprise to users of reporting, improvement of its transparency, which will make it possible to make adequate economic decisions.

The key concepts in the XBRL standard include taxonomy and sample of a document.

XBRL taxonomy is the categorical instrument by means of which one determined and arranged the XBRL-tags; it is a kind of a dictionary of terms that should be clearly understood by all users and programs. Such accounting notions as assets, cash, and depreciation are represented in taxonomy. The taxonomy also establishes their relationship, semantics, used formulas (for example,  $\text{Assets} = \text{Commitment} + \text{Equity}$ ), way of their reflection, and other descriptive characteristics. Physically, the taxonomy consists of a set of the XBRL files.

The taxonomies are distinguished by the objectives of reporting, type of reported information, and requirements to its presentation. Hence, the company can use one of the taxonomies for handling a report to a stock exchange and another one – for reporting to the Securities and Stock Market Commission.

Taxonomies allow you to realize three capabilities of XBRL:

- 1) usual translation from the national language into English, which was laid as the foundation for the standards;
- 2) adaptation, i.e. bringing the conceptual reporting apparatus to a single standard;

3) transformation of reporting. If the company maintains the accounting and drafts a report upon the national standards that do not comply in all material aspects to IFRS, when integrating XBRL into the accounting system, it is possible to quickly generate records in accordance with the requirements of IFRS.

A sample document (XBRL instance document) is an XML document that corresponds to an XBRL format and usually contains the necessary information in a specific financial report. It includes articles (tags), corresponding to the terms and relationships, described in the taxonomy. The company's annual report, full or partial, and press release, which contains financial information or operational data, is referred to as a sample document.

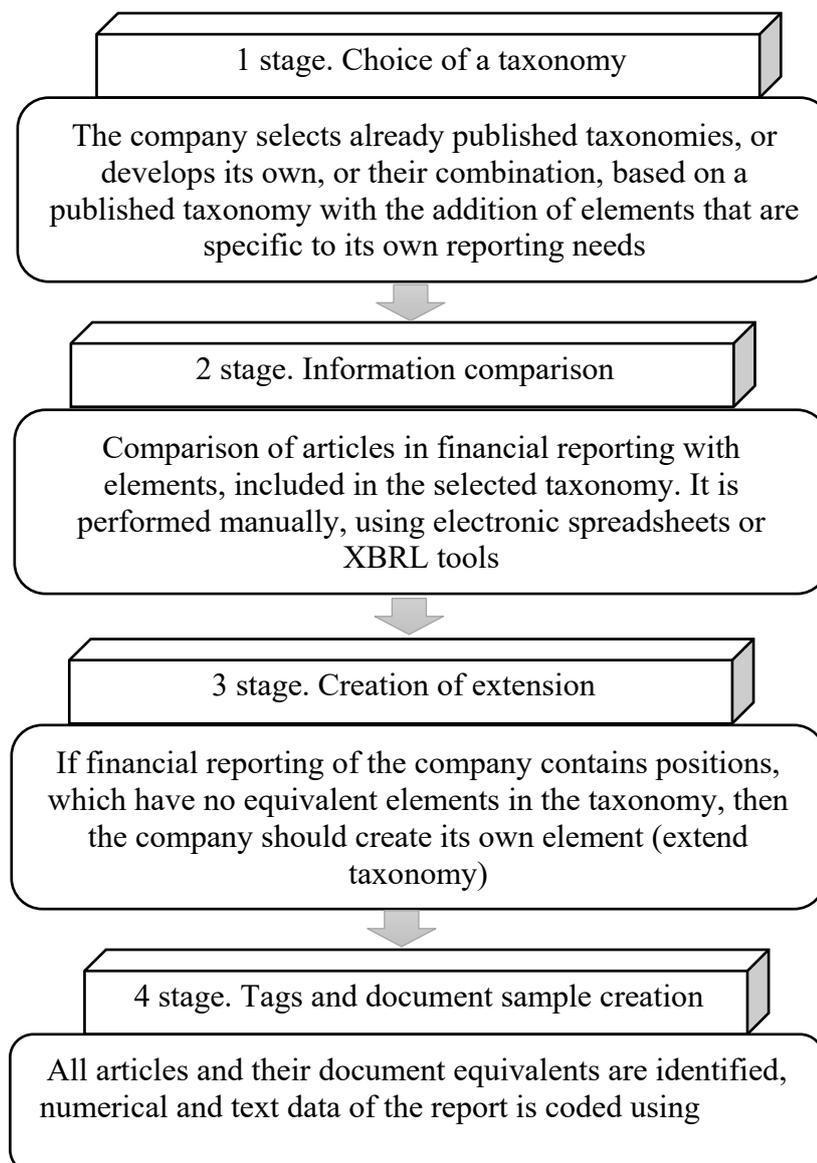
Taxonomies can be created both at the level of national financial reporting standards and the level of accounting standards, applied in specific market segments and consider requirements of accounting standards in a particular industry. This makes it possible for enterprises to draft reports in a single standard for this industry, while for investors and other users – to effectively assess the results of companies' activity by comparing them within the industry. In this case, XBRL works as a technological mechanism for transmission and analysis of the information at the macroeconomic level.

One can also create taxonomies at the level of individual departments within an individual company. In this case, we are talking about XBRL as an effective technological instrument of management accounting, used at the microeconomic level.

XBRL becomes a global standard for corporate reporting. It is developed by an international consortium of 450 global companies, including regulators, government agencies, information agencies, and software suppliers. As of today, taxonomies have been formally developed and approved in 18 countries: Australia, Belgium, Great Britain, Germany, Denmark, Ireland, Italy, Spain, Canada, Korea, Luxembourg, the Netherlands, OAE, USA, France, Sweden, South Africa, and Japan. A taxonomy of IFRS has also been developed. The interactive scheme of XBRL application in the world can be monitored regularly on a special website <http://www.xbrlplanet.org>.

The active process of convergence of IFRS and U.S. GAAP strengthens XBRL's position as a single standard for electronic reporting. To this end, a group of XBRL has been established under the IFRS Board. The aim of the group's activity is the creation of a conceptual basis of sequential decisions and implementation of XBRL with the help of high-quality taxonomy of IFRS, developed by the IFRS Foundation simultaneously with the development of international standards.

Stages of XBRL implementation in financial reporting of Ukraine are presented in Figure 2.



**Figure 2. Stages of implementation of XBRL in financial reporting of Ukraine**  
(systematized by author)

For successful implementation of the latest technologies, including XBRL, drafting and transmission of financial reporting, the following prerequisites are required:

- 1) the developed infrastructure of telecommunication facilities;
- 2) availability of consumers interested in financial information.

As of today, in Ukraine, only the state operates in the field of electronic reporting standards. The enterprises-economic entities, investors, auditors, and software developers only respond to the introduction of new forms and formats of reporting.

Alongside this, preparation and analysis of financial reporting regardless of the size of the company is a difficult task for Ukrainian enterprises. The difference in the formats of the handed reporting and the mistakes of made by personnel, which is responsible for figures preparation and verification, results in non-coincidence of the final data of the annual report with the figures of the reports, submitted to the supervisory authorities or with information, published on the company's website, – this is a platform for a shift to XBRL.

Respectively, the main obstacles on the way to implementation of XBRL will be the same as on the way to implementation of IFRS, namely, “immaturity” of the domestic financial markets, and, as a result, absence of demand for financial information; disinterest of owners and management of enterprises in the disclosure of financial information, in particular, its publications on the Internet; non-transparency of business; deficiency of culture and trust to electronic documents; the existence of distrust to the Internet as a source of information for analysis, forecasting, etc .; absence of experience and knowledge of the technological aspects of XBRL from the accounting and financial professions.

Despite the listed difficulties, Ukraine is becoming increasingly involved in the process of globalization, and an increasing number of international exchanges strongly recommend that companies submit financial statements in the XBRL format. The complexity of the corporate structure and the development of e-commerce also determine the need for a shift to XBRL.

The nature of regulation of the accounting and financial reporting system is an important factor, affecting the development and approval of accounting and financial reporting standards. An analysis of accounting regulatory systems in economically developed countries shows a significant increase in government control in the countries with an Anglo-Saxon accounting model and an increase in participation of public-professional organizations in the regulation of financial reporting in the countries with a continental accounting model. This leads to the fact that when developing and approving statutory regulations by professional organizations, one primarily considers the interests and requests of the priority user group. The functions of the state body reside in monitoring over implementation of legislation and protection of interests of reporting users.

Despite significant achievements in the process of accounting reformation, the question, regarding the degree of correspondence of financial reporting, compiled based on P(S)FR, to the one, which is compiled based on IFRS, remains an open question. This is not so much due to subjective as to objective reasons, caused by the differences in socio-economic relations in Ukraine and the countries with developed economies.

All differences, appearing in financial reporting upon P(S)FR and IFRS can be united into three large groups: regulatory, declarative, and conceptual. Regulatory differences are conventionally divided into three groups:

- 1) non-essential, which will not affect the usefulness of the information in financial reporting and, therefore, do not require elimination or harmonization;
- 2) essential, which can be excluded through application of the corresponding changes and additions to the text of P(S)FR;
- 3) essential, which can be excluded only through the transformation of information when preparing financial reporting. Nonetheless, any transformational adjustments can significantly affect the analytical indicators, in particular, the profitability of the enterprise, its liquidity, and other indicators, which are calculated based on financial reporting, which can cause significant consequences when assessing the financial condition of the enterprise and making managerial and investment decisions.

The priority direction of reforming the domestic accounting and reporting system, which will ensure the transparency and reliability of reporting data, the financial stability of the enterprise, is the improvement of the domestic regulatory framework in the field of accounting and its further harmonization with IFRS, as well as education of a new generation of accounting and reporting professionals in Ukraine, which would meet modern challenges of postindustrial economy.

Despite the fact that today there is an increasing criticism towards financial reporting and indicators, for which it acts as a source, that it has lost value for management and investors, the survey, held by the author confirmed the usefulness of its information. Nevertheless, the developments on solving the problem of low information content of existing forms of reporting remain relevant.

The priority ways for increasing the usefulness of financial reporting are recognized as follows: provision of stability of accounting standards, strengthening of comparability of reporting indicators, simplification of reflection of its key indicators, the introduction of various types of forecast information, and highlighting of trends in the growth of profitability, as well as disclosure of information on risk management. This demonstrates the need for the development of a concept of financial reporting, oriented at the accountability of all participants of economic relations at all levels of government for decisions made on managing all types of resources.

### **Discussion**

We consider the priority direction to reside in the development of the XBRL taxonomy for financial reporting in accordance with the national P(S)FR. These taxonomies can be developed for trade and industrial enterprises, non-profit organizations, share investment funds, and other large business formations. It is a continuous process because it is very important that the taxonomies develop according to the changes in the market and be kept up to date.

Although XBRL demonstrates the possibilities of presenting the quantitative and descriptive data in a digital form, reflecting financial reporting, there is a problem of processing information, included in other sections of corporate reporting, in particular, in the notes section to financial reports, management reports, etc.

Since XBRL capabilities make it possible to improve financial analysis and risk management, the software providers are required to provide for the development of artificial intelligence software agents and informants, which are used for removal of the XBRL-encoded data from the corresponding sources for prediction, for example, the financial condition of the enterprises.

Finally, coding of accounting data in XBRL should promote the effective institutionalization of the process of continuous monitoring and report in the enterprises. This, in its turn, will improve the efficiency of the business and help with the implementation of business objectives. All participants of the business process – accountants, regulators, financial analysts, investors, lenders, government, software suppliers – and many other people will benefit from the use of XBRL.

The development of instruments of financial reporting transfer with the help of the Internet technologies directly influences the expansion of the information space and enables the making of more reasoned economic decisions. As of today, the academic community of Ukraine is offered great plenty of interesting prospects for research during study of the possibilities of XBRL.

### **Conclusion**

The study revealed that to the modern ways of formation and reporting, one should also include the use of the web-technologies for placement of reporting on the Internet as well as the use of the extensible business reporting language of XBRL, the biggest advantage of which is the reduction of the information asymmetry due to incompatibility of the reporting formats.

The priority directions of work for the successful application of XBRL in Ukraine are regarded as follows:

- the development of the XBRL taxonomy with consideration of the legal framework of Ukraine separately for trade and industrial enterprises, non-profit organizations, share investment funds, and other large business formations;
- solution of a problem of processing information, given in other sections of corporate reporting, in particular, in the notes to financial reports, management report, etc.;

- development of software agents and informants of artificial intelligence, which are used to for extraction of the XBRL-encoded data from relevant sources for forecasting, for example, of the financial condition of the enterprises;
- coding of accounting data in XBRL which will promote efficient institutionalization of the process of continuous monitoring and reporting in the enterprises.

The development of instruments of financial reporting delivery with the help of the Internet technologies directly influences the expansion of informational space and ensures making of reasoned managerial and investment decisions.

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## STATE ADMINISTRATION, SELF-GOVERNMENT AND GOVERNMENT SERVICE

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### VISION OF THE DEVELOPMENT OF EDUCATIONAL ACTIVITIES OF COMMUNICATIONS DEPARTMENTS OF HIGHER EDUCATIONAL INSTITUTIONS OF THE STATE SECURITY AND DEFENSE SECTOR IN THE TRAINING OF MILITARY SPECIALISTS AT THE EDUCATIONAL LEVEL “BACHELOR” (“MASTER”)

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### ВІЗІЯ РОЗВИТКУ ОСВІТНЬОЇ ДІЯЛЬНОСТІ КАФЕДР ЗВ'ЯЗКУ ВИЩИХ НАВЧАЛЬНИХ ЗАКЛАДІВ СЕКТОРУ БЕЗПЕКИ ТА ОБОРОНИ ДЕРЖАВИ В ПІДГОТОВЦІ ВІЙСЬКОВИХ ФАХІВЦІВ ЗА ОСВІТНІМ РІВНЕМ “БАКАЛАВР” (“МАГІСТР”)

***Abstract.** The article considers the directions of development of communication departments of higher educational institutions of the security and defense sector of the state in terms of educational and scientific activities, training of military specialists in the fields of information technologies, electronics and telecommunications. The further development of the internal system of quality assurance of higher education and training of highly qualified scientific personnel has been identified, by strengthening ties with scientific institutions of Partner countries and introduction of progressive educational models according to NATO standards.*

***Keywords:** department of communications, education process, communications training system, NATO standards.*

***Анотація.** У статті розглянуто напрями розвитку кафедр зв'язку вищих навчальних закладів сектору безпеки та оборони держави за освітньою та науковою діяльністю, щодо підготовки військових фахівців у галузях інформаційних технологій, електроніки та телекомунікацій. Визначено подальший розвиток внутрішньої системи забезпечення якості вищої освіти та підготовки наукових кадрів вищої кваліфікації, шляхом посилення зв'язків з науковими установами країн-партнерів та впровадження прогресивних освітніх моделей за стандартами НАТО.*

***Ключові слова:** кафедра зв'язку, освітній процес, система підготовки фахівців зв'язку, стандарти НАТО.*

Останнім часом в вищих військових навчальних закладах України спостерігається тенденція щодо внесення змін у вимогах замовників до підготовки майбутніх фахівців зв'язку.

Зокрема військові фахівці зв'язку за освітнім рівнем “бакалавр” (“магістр”) повинні володіти новими компетентностями та сучасними управлінськими технологіями за напрямком організації зв'язку та автоматизованих систем управління, питаннями захисту інформації з обмеженим доступом та кібербезпека, безпека секретної інформації та кібероборона держави, при цьому враховуються нові підходи до управління кар'єрою та скорочення відриву слухачів від служби (роботи).

Одним з шляхів вирішення такого “підходу” є визначення основних цінностей, принципів та завдань у наданні відповідних освітніх і наукових послуг освітньо-науковим закладом стати конкурентоздатною інноваційною установою по наданню послуг у сфері безпеки та оборони за напрямком забезпечення системи зв'язку складових сектору безпеки та оборони України.

Враховуючи зазначене та проаналізувавши візії розвитку освітньої діяльності військових навчальних закладів сектору безпеки та оборони держави в підготовці військових фахівців освітнього рівня “бакалавр” (“магістр”) за напрямком підготовки фахівців зв'язку авторами запропоновано зосередити свою діяльність на розробці концепцій, стратегій та наступних візій за такими складовими:

### **1. Загальні положення.**

Кафедра зв'язку – повинна користуватися повагою серед наукових і науково-педагогічних працівників, здобувачів вищої освіти, слідувати своїм традиціям, бути укомплектована підготовленим, мотивованим персоналом, оснащена сучасними апаратно-програмними комплексами, озброєнням та військовою технікою, спроможна діяти самостійно та спільно з іншими кафедрами університету (інституту), науковими установами інших складових Сил оборони (далі – СО) за напрямком підготовки фахівців зв'язку.

Мета Візії кафедри зв'язку – сформулювати загальне бачення та наміри, визначити орієнтири розвитку освітньої та наукової діяльності за найкращими

національними та світовими практиками і стандартами, сумісними з освітніми програмами країн-партнерів.

Місія кафедри зв'язку – підготовка військовослужбовців та цивільних працівників професійно-орієнтованих та мотивованих на навчання, з широким використанням дистанційного навчання та сертифікації, спрямованого на самостійне покращене рівня професійної майстерності.

## **2. Основні пріоритети розвитку кафедри зв'язку:**

трансформація системи підготовки фахівців зв'язку, шляхом розмежування тематик відповідних дисциплін, щодо організації зв'язку та автоматизованих систем управління, занять з питань захисту інформації з обмеженим доступом та кібернетичної безпеки, безпеки секретної інформації та кібероборони;

адаптація існуючого освітнього процесу до діючої моделі організації освітнього процесу за стандартами та процедурами держав-членів НАТО;

надання пріоритету колективній та об'єднаній підготовці фахівців зв'язку всіх складових СО, розширення переліку спільних теоретичних та практичних заходів, які стосуються всього спектру спільного виконання ними завдань;

динамічне реагування на зміни у вимогах замовника до підготовки майбутніх професіоналів зв'язку з внесенням відповідних корегувань до програм (робочих програм) навчальних дисциплін, зокрема щодо володіння новими компетентностями та управлінськими технологіями у сфері інформатизації з врахуванням нових підходів до управління.

## **3. Основні принципи:**

Виховання офіцера-лідера.

Прагнення до цінностей Європейського Союзу та стандартів НАТО.

Впровадження прогресивних освітніх моделей та стандартів НАТО.

Використання в освітньому процесі освітніх програм сумісних з міжнародними класифікаціями та стандартами вищої освіти.

Прагнення до опанування, впровадження і використання нових технологій навчання, широкого використання сучасних інформаційних технологій в навчальному процесі.

Поглиблення партнерства з країнами-членами НАТО, у т.ч. в рамках діючих проєктів трасових фондів НАТО в Україні з питань удосконалення системи командування, управління, комунікації та комп'ютеризації (C4) та кіберзахист [1].

#### **4. Завдання та шляхи реалізації**

У сфері освітньої діяльності

##### *4.1. Створення кафедри кібербезпеки та бойового застосування сил*

і засобів кібероборони у складі інституту оперативного застосування військ (сил) та кібероборони, що дозволить:

сформуванню теоретичний зміст предметної області в сфері кібербезпеки та кібероборони;

підготувати обґрунтування академічних вимог до фахівців у сфері кібербезпеки та кібероборони;

визначити (переглянути) переліки компетентностей, які висуваються до фахівців тактичного, оперативного та стратегічного рівнів, а також до науково-педагогічного персоналу у сфері кібербезпеки та кібероборони держави;

здійснити оцінку стану існуючої системи підготовки кадрів у сфері кібербезпеки;

здійснити заходи щодо попереднього формування та уточнення держзамовлення на підготовку фахівців тактичного, оперативного та стратегічного рівнів, ад'юнктів та докторантів з кібербезпеки та кібероборони на 2022 та наступні роки [2];

здійснити попередню оцінку спроможності перспективної системи підготовки фахівців з кібербезпеки (кібероборони) для органів управління та органів військового управління військ (сил) Збройних Сил України (далі – ЗС України) до виконання завдань за призначенням;

здійснити заходи стосовно визначення джерел фінансування

та всебічного забезпечення робіт щодо створення, реформування, розвитку

та забезпечення функціонування системи підготовки фахівців з кібербезпеки

та кібероборони для органів військового управління та військ (сил), включно джерела військово-цивільного та міжнародного партнерства.

З огляду на вищезазначене, на підставі визначених в Стратегічному оборонному бюлетені пріоритетних напрямів розвитку ЗС України, система підготовки та підвищення кваліфікації фахівців у сфері кіберзахисті та кібербезпеки, має розглядатися як система підготовки фахівців у сфері кібербезпеки та кібероборони, що вимагає удосконалення і розвитку системи військової освіти і науки [3].

#### *4.2 Впровадження ідеології:*

- CIS (Communication & Information Systems) – зв'язок та інформаційні системи, дозволить проводити оцінку рівня знань слухачів щодо здатності планувати зв'язок в інтересах стратегічного розгортання СО, протиповітряної оборони України, територіальної оборони України, руху опору, операції СО. Забезпечити необхідний рівень знань, умінь та навичок навчаємих з організації, функціонування та забезпечення системи зв'язку ЗС України та інших складових СО, обміну інформацією в інформаційних системах Міністерства оборони України та ЗС України, іншими системами (забезпечити сумісність та інтеграцію системи C4ISR з єдиною інформаційною системою управління оборонними ресурсами), здійснювати їх сертифікацію відповідно до вимог стандартів та інших документів НАТО.

- C4ISR (C4 Command and Control (C2) Communications, Computers, Intelligence, Surveillance, Reconnaissance) – система оперативного (бойового) управління, зв'язку, розвідки та спостереження є основою доктрини мережоцентричних операцій.

Введення в навчальний процес зазначеної системи дозволить слухачам досконало усвідомити:

- об'єднану структуру управління, взаємодії та прийняття рішень, динамічно в залежності від обстановки яка склалась;

- порядок інтеграції військових частин (підрозділів) на всіх ланках управління, поєднання інтелектуальних об'єктів, їх наповнення

і розповсюдження у єдиному бойовому просторі;

- організацію розгортання мереж передачі даних, засобів супутникового, короткохвильового та тропосферного зв'язку на одній платформі;

- створення єдиної Common Operating Picture дозволить здійснити найшвидший шлях до сумісності ЗС України з стандартами НАТО.

- Active Cyber Defense (є складовою колективної оборони НАТО, яка спрямована на захист своїх телекомунікаційних мереж в мирний час та особливий період (операцій, бойових дій).

Впровадження її основ дозволить слухачам практично:

- зробити оцінку ризиків телекомунікаційним мережам та інформаційним системам ЗС України від кібердій противника, що проводяться в інтересах обороноздатності держави (проаналізувати політику безпеки, регуляторів галузі, ЗС України, інших складових СО, служб оперативного реагування, правоохоронних органів і т.ін.);

- розташувати по пріоритетах власні об'єкти критичної інформаційної інфраструктури, які підлягають кіберзахисту, в залежності від впливу

на суспільство, економіку та громадян (за основу можна взяти стандарт "Framework for Improving Critical Infrastructure Cybersecurity" розробки Національного інституту стандартів і технологій США (NIST, National Institute of Standards and Technology);

- під час проведення заходів колективної підготовки розробити план конкретних дій для кожного задіяного суб'єкта СО держави, визначити конкретні дії, які відповідатимуть завданням національної системи кібербезпеки, визначити основні критерії оцінки та результативності діяльності відповідальних сторін.

- AJP-3.20 (Allied Joint Doctrine for Cyberspace Operations – Спільна доктрина Альянсу проведення операцій в кіберпросторі) – впровадження

в навчальний процес теоретичних та практичних основ з планування, застосування та оцінки проведення операцій в кіберпросторі, дозволить спеціалістам зв'язку ЗС України та складових СО України поглибити знання щодо процесів та процедур оперативного планування, відпрацювання

оперативних документів, перелік, форми та структура яких є складовою частиною оперативної архітектури НАТО [4].

Введення в освітній процес АJP-3.20 дозволить слухачам:

- розробити навчальну симуляцію кібервійни під час заходів проведення заходів об'єднаної підготовки;
- створити систему реагування на комп'ютерні надзвичайні події, усвідомити порядок розроблення сценаріїв операцій в кіберпросторі;
- змодельювати ключові процеси функціонування спеціального віртуального полігону на кшталт Northrop Grumman;
- долучитись до проведення спільних американсько-європейських кібернавчань Cyber Atlantic;
- практично засвоїти Спільну доктрину союзників про проведення операцій в кіберпросторі, дасть змогу для теоретичного усвідомлення засад застосування СО в кіберпросторі [5].

*4.3. Продовження розроблення та введення в дію перспективних магістерських програм за освітнім ступенем “магістр” оперативного та стратегічного рівнів, що наближатимуться до кращих практик країн-членів НАТО, а саме:*

впровадження перспективної моделі освіти та підготовки, яка включає поєднані компоненти: систему курсів підвищення рівня військової освіти (“рівневих”, “кар’єрних” курсів) (тактичний, оперативний, стратегічний); магістерські програми оперативного та стратегічного рівня; програму бакалаврату тактичного рівня; систему курсів удосконалення фахової компетентності військовослужбовців; курси перепідготовки та підвищення кваліфікації за профілем кафедри для підготовки цивільного персоналу Сектору безпеки та оборони держави.

*4.4. Удосконалення організації та порядку підготовки фахівців зв’язку СО держави, механізмів організації та проведення заходів об’єднаної підготовки санкціонує:*

налагодження та удосконалення взаємозв’язків між суб’єктами і об’єктами об’єднаної підготовки щодо порядку організації зв’язку та

інформаційних систем в операціях ЗС України (СО), координації їх дій та створення умов для якісного планування зв'язку, ІС, ЗІОД, КБ в ході підготовки і проведення спланованих заходів об'єднаної підготовки та їх забезпечення [6].

У сфері наукової діяльності зосередитись на:

науково-теоретичній та експериментальній діяльності, спрямованій на одержання нових знань про закономірності розвитку управління ЗС України та науковій і науково-технічній діяльності, спрямованій на одержання і використання знань для забезпечення воєнної безпеки держави, підвищення ефективності військового управління, розвиток форм і способів підготовки та застосування всіх видів забезпечень автоматизованих систем управління, розвитку озброєння і військової техніки;

проведені досліджень проблем розвитку воєнної стратегії, концептуальних засад підготовки та застосування військ зв'язку ЗС України, видів функціональних структур ЗС України та їх всебічного забезпечення;

дослідженні розвитку інформаційних технологій, апаратного забезпечення, комп'ютерних мереж, програмних платформ, удосконалення автоматизованих систем управління [7];

науковому супроводженні та впровадженні результатів наукової роботи.

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## DIGITAL TRANSFORMATION OF PUBLIC ADMINISTRATION

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## ЦИФРОВА ТРАНСФОРМАЦІЯ ПУБЛІЧНОГО УПРАВЛІННЯ

**Abstract.** *The work deals the issues of transforming electronic government into digital as part of the digitalization process. Digital government, being the development of electronic government, is uniquely different from it, being an overarching concept and having a number of specific aspects that should become key strategic elements of the policy of the state carrying out digital transformation.*

**Keywords:** *e-government, digital government, digitalization, digital transformation, public services*

**Анотація.** *В роботі розглядається питання перетворення електронного уряду в цифрове в рамках процесу цифровізації. Цифровий уряд, будучи розвитком електронного уряду, унікально відрізняється від нього, будучи всеосяжної концепцією і володіючи рядом специфічних аспектів, які повинні стати ключовими стратегічними елементами політики держави, що здійснює цифрову трансформацію.*

**Ключові слова:** *електронний уряд, цифровий уряд, цифровізація, цифрова трансформація, державні послуги*

На сучасному етапі світова економіка вступає в новий етап цифрового розвитку, який характеризується в тому числі активної трансформацією інститутів і механізмів публічного управління. В останнє десятиліття проблеми підвищення ефективності та якості управління виступають найважливішим напрямком досліджень, результати яких визначають принципи реформування інститутів державного управління.

В Україні на даний час помітно істотний прогрес в створенні інфраструктури і сервісів електронного уряду. Ці успіхи обумовлені рядом

причин: від прискороного розвитку сфери інформаційних послуг в цілому до спеціальних зусиль держави в цьому напрямі — таких як програми розвитку інформаційного суспільства. Критерієм розвитку є позиції України в рейтингу по індексу готовності до електронного уряду (за методикою ООН).

Так, у 2020 році Україна зайняла 69-е місце у рейтингу країн із найбільш розвиненим електронним урядуванням, що на 13 позицій вище, ніж у 2018. Рейтинг був створений на основі дослідження Організації Об'єднаних Націй "E-Government Survey 2020". Дослідження узагальнює показники держав щодо розвитку електронного урядування за період з 2018 до 2020 року [5].

В 2019 році запроваджено експериментальний проект «Держава в смартфоні». Серед ключових завдань цього проекту - впровадження цифрових технологій і платформних рішень в систему державного управління і надання державних послуг. Однак успішна реалізація даної програми можлива тільки за умови досягнення консенсусу у визначенні стратегічних цілей обраної суспільством моделі соціально-економічного розвитку, що базується на фундаментальному розумінні ролі, завдань і функцій держави в умовах цифрової економіки. У зв'язку з цим концепція реформування і цифровий трансформації інститутів державного управління вимагає осмислення і розробки нових базових положень. Цифрова трансформація України є колосальним інвестиційним ресурсом, оскільки дає змогу звільнити мільйони годин, які люди проводять у чергах, за оформленням документів, за узгодженням реєстрів або довідок та спрямувати їх на розвиток економіки.

За словами Прем'єр-міністра України Дениса Шмигала, використання цифрових технологій дає низку переваг. «Цифровізація — це створення високої доданої вартості для держави, підвищення ефективності економіки та бізнесу. Всі ці заходи стануть геополітичною перевагою України» [1].

В цілому розвиток цифрових технологій створює базові передумови для переходу від моделі «сервісного управління» до моделі «об'єднаного уряду», більш відповідної глобальним викликам і ризикам розвитку української економіки. У зв'язку з цим стратегічною метою цифрової трансформації інститутів публічного управління має стати не тільки фрагментарне

впровадження технологій вдосконалення діяльності інститутів управління, а підвищення якості публічного управління для ефективної реалізації національних проектів, що забезпечують стійке зростання і конкурентоспроможність економіки нашої країни.

Процеси цифровізації публічного управління визначаються міжнародними правовими нормами і регулюються вимогами українського законодавства відповідно до цілей державної політики розвитку та успішного застосування ефективних електронних технологій і використання інформаційних ресурсів. В даному випадку слід зазначити спеціальні положення Хартії Європейського союзу, відповідно до якої затверджується міжнародне право поширювати інформацію без будь-якого втручання з боку органів державної влади [3].

Як приклад побудови цифрового уряду необхідно звернути увагу на європейський «План розвитку електронного уряду на 2016-2020 роки. Прискорення цифровий трансформації уряду». Цій план спрямовано на впровадження інноваційних соціальних технологій, охоплює всі технологічні напрямки і спирається на розвиток інтероперабельності [4]. Крім цього Україна долучається до ISA<sup>2</sup> Programme – програми Європейської комісії, яка підтримує розроблення цифрових рішень, що дозволяють державним інституціям надавати підприємствам та громадянам Європи якісні електронні послуги завдяки використанню єдиних принципів, стандартів та сумісних/інтероперабельних систем [2]. Серед основних відмінностей даної програми потрібно визначити наступне:

- нові мобільні сервіси спрощують взаємодію громадян з спільнотою та державними організаціями, тим самим підвищуючи якість життя;
- постійно доступні ІТ-послуги залучають нові компанії і вносять свій внесок в місцеву економіку;
- вбудовані інтелектуальні функції підвищують безпеку даних і дозволяють приймати обґрунтовані рішення.

Цифрова платформа публічного адміністрування являє собою сукупність інформаційних технологій, застосовуваних в якості основи створення інформаційних комунікацій, що дозволяють отримати синергетичний ефект застосування сучасних електронних засобів приведення до певного порядку, обробки і використання інформаційних ресурсів в рамках надання публічних послуг.

З огляду на специфіку діяльності структур публічного адміністрування та характер партнерства з представниками бізнесу, можна виділити кілька різновидів цифрових платформ на базі їх функціонального призначення:

1. Корпоративні платформи - формування цифрових форм організаційного адміністрування в системі функціонування підрозділів органів публічного управління з узгодження дій з наданням комплексних публічних послуг приватним організаціям з урахуванням реалізації державних закупівель та розміщення замовлень в приватному секторі економіки.

2. Промислово-технологічні платформи - сукупність засобів електронно-цифрової систематизації процесів виробництва будь яких товарів при виконанні функцій проектування технологічних процесів, використання спеціалізованих операційних систем і інфраструктури зберігання інформаційних даних

3. Інструментальні платформи - в їх основі функціонує програмний або програмно-апаратний комплекс інформаційних продуктів, що дозволяють розробляти програмні рішення прикладного призначення. Застосування таких платформ виступають засобом в сфері ведення публічного адміністрування надання визначених типових функцій і інтерфейсів на основі наскрізної технології роботи з даними.

4. Інфраструктурні електронно-цифрові структури - діють за допомогою активності суб'єктів «ринку інформатизації», що забезпечує державне регулювання процесу ринкових відносин, в яких беруть участь суб'єктів малого і середнього бізнесу з підвищенням рівня електронного забезпечення їх діяльності із використанням наскрізних цифрових технологій.

5. Прикладні платформи - це бізнес-моделі руху відомостей економічного характеру у вигляді алгоритмізованого обміну між невизначено безліччю суб'єктів інформаційних комунікацій за допомогою проведення транзакцій в єдиному електронно-цифровому середовищі, що призводить до зниження транзакційних витрат.

Застосування зазначених цифрових платформ значно розширює функціональні можливості органів публічного управління, так як за допомогою використання сучасних електронних технологій можна отримати наступні результати:

1) значно знижені фінансові витрати при наданні публічно-управлінських послуг;

2) прискорення реалізації необхідних інновацій в електронному забезпеченні публічно-адміністративної діяльності;

3) удосконалення інформаційних комунікацій в партнерстві офіційного управління і представників приватного підприємництва з метою забезпечення обміну необхідними відомостями;

4) формування спеціального простору діяльності для онлайн-посередників (у вигляді окремих фахівців або приватних організацій), здатних створити продуктивну електронну площадку, за допомогою якої посадові особи органів державного управління здатні підтримувати стабільні контакти з представниками бізнесу.

Використання зазначених цифрових платформ значно розширює функціональні можливості органів публічного управління, так як за допомогою використання сучасних електронних технологій можна отримати наступні результати:

1) знижені фінансові витрати при наданні публічно-управлінських послуг;

2) прискорення реалізації необхідних інновацій в електронному забезпеченні публічно-адміністративної діяльності;

3) удосконалення інформаційних комунікацій в партнерстві офіційного управління і представників приватного підприємництва з метою забезпечення обміну необхідними відомостями;

4) формування спеціального простору діяльності для онлайн-посередників.

У свою чергу, дані електронно-цифрові умови дозволять провести модернізацію системи чинного публічного управління з метою побудови електронного адміністрування, заснованого на тісному партнерстві структурних елементів зазначеного управління і суб'єктів приватного бізнесу.

Модернізація діяльності органів публічного адміністрування з метою підвищення ступеня електронного забезпечення офіційно управлінських функцій може виражатися в наступних заходах:

1) узагальнення можливостей декількох мереж цифрової взаємодії і багатоканального узгодження різних точок зору на одну й ту ж проблему в системі розробки і прийняття офіційних управлінських рішень;

2) формування ефективної цифрової бази обробки значних масивів вихідних даних;

3) розширення форм застосування технології електронної ідентифікації і аутентифікації в діяльності державних і муніципальних органів управління; 4

4) використання хмарних технологій зберігання інформації економічного характеру;

5) організація запобігання та усунення кіберзагроз при підтримці правового характеру використання інформаційних ресурсів;

6) формування і подальший розвиток режиму «одного вікна» надання публічних державних послуг. Забезпечення електронного обліку порядку розгляду скарг, поданих на рішення і дії (бездіяльність) відповідних органів публічного управління;

7) реалізація всебічного моніторингу подій і дій офіційних управлінських структур при міжвідомчій взаємодії при своєчасному усуненні розбіжностей за єдиними питаннями державного регулювання бізнес відносин. Моніторинг процесу аналізу запитів, що виходять від структурних одиниць державного і регіонального рівнів;

Названі заходи дозволять сформулювати засади електронного адміністрування та конструктивної співпраці державних управлінських

структур і приватного бізнесу. Зокрема, це дозволить оптимально встановлювати порядок технічного оснащення підприємницьких виробничих систем.

У свою чергу, дані електронно-цифрові умови дозволять провести модернізацію системи чинного публічного управління з метою побудови електронного адміністрування, заснованого на тісному партнерстві структурних елементів зазначеного управління і суб'єктів приватного бізнесу.

Розглядаючи електронний порядок надання публічно-управлінських послуг, слід підкреслити, що в даному випадку необхідна координація по-різному спрямованих дій в системі застосування інформаційно-комунікаційних технологій з надання публічних послуг, відповідних якісним стандартам задоволення суспільних потреб і часових параметрів взаємозв'язку з населенням.

Ефективне надання таких послуг в системі електронного адміністрування може бути забезпечено шляхом реалізації відповідних перетворень:

- електронно-цифрового забезпечення надання інформації невизначеному колу споживачів на основі застосування сучасних цифрових технологій збору відомостей шляхом аналізу ситуації в різних сферах соціально-економічних відносин;
- надання послуг відбувається за допомогою використання майна різних форм власності - в залежності від характеру партнерства державних і муніципальних органів управління один з одним і представниками приватного бізнесу.

Таким чином, цифровізація публічного управління в Україні реалізується на основі розробки і використання різних інформаційних систем, за допомогою яких відбувається розширення можливостей в прискореному режимі обробляти значні масиви інформації. Дані системи дозволяють підтримувати систематизувати й упорядкувати різноспрямовані інформаційні потоки, які підтримуються в структурі надання та споживання державних послуг при всебічному результативності та ефективності їх, а також ступеня доцільності та продуктивності використання державних фінансових коштів. При чіткому

структурному функціонуванні позначених інформаційних систем створюється єдиний електронно-цифровий простір, в якому забезпечується впорядковане державно-приватне співробітництво.

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## MANAGEMENT

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### ARE ELECTRIC CARS REALLY GREENER?

**Abstract.** *The last decade was marked by the popularity of electric cars. Electric vehicles have been identified as a key technology in reducing future emissions and energy consumption in the mobility sector. The fundamental difference between conventional, thermal cars and electric cars has to do with the process of transforming the potential (stored) energy into kinetic (movement) energy. In thermal cars, this energy is stored in a chemical form and is released through a chemical reaction inside the engine. On the other hand, despite also having chemically stored energy, electric cars release it electrochemically without any kind of combustion, thanks to lithium-ion batteries. This means that there is no fuel being burned and therefore no air pollution through CO<sub>2</sub>. But not always. If the source of energy to power these cars does not come from solar panels, wind turbines or even nuclear or hydroelectric, their CO<sub>2</sub> emissions will be much higher. The purpose of this article is to compare how much are electric cars greener than classic cars.*

**Keywords:** *electric cars, battery, diesel, environment, green energy*

## INTRODUCTION

When Henry Ford created a motor vehicle for the masses in the early 1900s he revolutionized transportation. For much of the 20th century, governments across the developed world have encouraged, supported, and subsidized the personal motor car market, and necessary oil industry, and built the roads needed for it (Sarah, J., 2019).

The introduction of electric vehicles marks the beginning of the end for conventional motor vehicles. The main reasons for switching to electric vehicles are the need to reduce polluting emissions from engines and dependence on expensive fuels (Pandey, A., Manocha, S., Saini, P., 2020).

Electric and hydrogen cars do not pollute in operation. According to the US Department of Energy's Office of Energy Efficiency and Renewable Energy, "EVs convert about 59%–62% of the electrical energy from the grid to power at the wheels. Conventional gasoline vehicles only convert about 17%–21% of the energy stored in gasoline to power at the wheels" (Lampert, D. J., et. al., 2015).

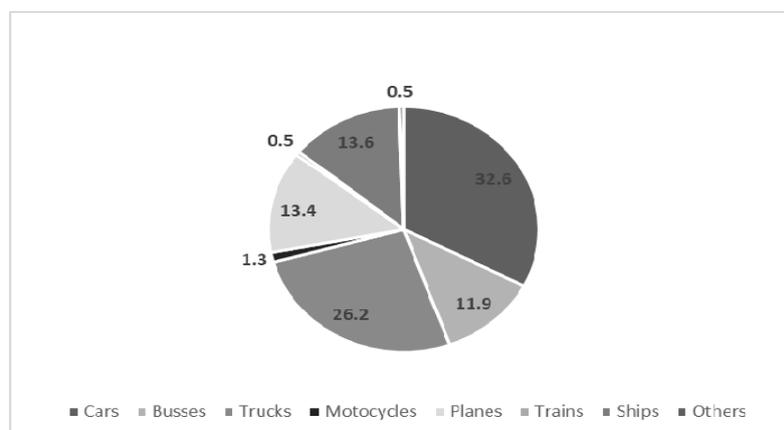
It is estimated that between 85% and 90% of the electricity delivered and stored in an EVs' battery is used by the car's electrical motor. In other words, up to 90% of the energy generated is used for work by the vehicle (Sanguesa, J. A., et al., 2021).

In the United States, the EPA estimates that if all conventional vehicles were replaced by 100% electric vehicles, an investment of about \$10 billion would be needed to develop a power station infrastructure. But if all cars ran on hydrogen, it would take at least \$500 billion to replace gas stations with hydrogen stations - 50 times as much! Globally, the power ratio would be about \$100 billion for charging station infrastructure vs. at least \$5 trillion for hydrogen station infrastructure (Dale H., Nic L., 2018; Kessler, R., 2013).

Classics cars are driven by an internal combustion engine. The basic principle is to transform the longitudinal movement of the piston into a rotational movement at the wheel, starting from the explosion of a mixture of air and fuel in a cylinder. The operation of the internal combustion engine produces polluting emissions. So, de-pollution systems are also needed, which are extremely complex and greatly increase the costs of conventional engines. More complicated technical solutions also affect the reliability of the engines, which induces higher risks of malfunctions, so lost time and additional costs (Anjum R., Bhatti A.I., Yar A., Ahmed Q., 2019).

According to the EEA (European Environment Agency), Romania has a pollution level of about 200 g CO<sub>2</sub>/kWh, while the European average is over 250 g CO<sub>2</sub>/kWh (Maarten M., 2000).

In Germany, for example, cars are responsible for 60% of all traffic-related CO<sub>2</sub> emissions (European Environment Agency, 2017). The diagram below shows the emission of pollutants depending on the type of transport in Romania:



**Fig. 1. CO<sub>2</sub> emissions according to with the type of cars from Romania**

Gasoline used in internal combustion engines can have significant effects on the local environment and also contributes to global carbon dioxide emissions.

Gasoline can enter the unburned environment, both as a liquid and as a vapor, from spills and handling during production, transportation, and delivery (e.g. from storage tanks, spills, etc.). As an example of efforts to control such leaks, many underground storage tanks must have extensive measures in place to detect and prevent such leaks (U.S Energy Information Administration, 2016). Gasoline contains benzene and other known carcinogens (Kessler, R., 2013; United States Environmental Protection Agency, 2010; United States Environmental Protection Agency, 2014).

Studies by the University of Belgium - Vrije Universiteit Brussel - showed in 2017 that in Poland, which uses large amounts of coal to produce electricity, electric vehicles produced a quarter fewer emissions than diesel when they went through a study of complete life cycle modeling. The reduction of CO<sub>2</sub> emissions on the cleanest European electricity generation network in Sweden was 85%, falling by about half for countries such as the United Kingdom. This is due to the high degree of green sources used to produce electricity. This study estimated emissions for Poland at 650gCO<sub>2</sub>/kWh - significantly lower than the calculations made by the Joint Research Center - European Commission last year (911gCO<sub>2</sub>/kWh). Experts say that, on average, globally, electric vehicles will emit half of the CO<sub>2</sub> emissions of a diesel car by 2030, we include here the production emissions (Maarten M., 2000).

To make a comparison between electric cars and diesel cars we need to consider four elements:

- impact during production,
- impact at street level,
- energy consumption per hundred kilometers,
- sources from which this energy is produced.

The cycle of making a car starts with raw materials being extracted, refined, transported, and manufactured into several components that will be assembled to produce the car itself. This process is very much the same in both conventional and electric cars.

According to a study by the Union of Concerned Scientists, the production of an electric car is 15% to 68% more polluting, in terms of CO<sub>2</sub> emissions, than the

production of a normal car. However, this difference in CO<sub>2</sub> emissions is canceled out after several tens of thousands of kilometers of driving an electric car, usually in the first 5 years of use (U.S Energy Information Administration, 2016).

There are problems with cobalt and other elements used in the production process, but they are being solved and are smaller than those caused by the production of gasoline or diesel. At the street level, an electric car does not produce any pollutant emissions, except for the micro particles resulting from the use of tires.

Compared to any car that has an internal combustion engine, the electric ones are incomparably cleaner. The same applies to hybrid cars, but only when running in full electric mode. If only electric cars were circulating on the streets of a big city, the effects would be spectacular: about 75-90% of the polluting emissions would disappear.

Energy consumption varies depending on the model and especially the driving style of each. A BMW i3s declares a consumption of 14.3 kWh per 100 kilometers, while a Renault Zoe would consume only 13.3 kWh. In reality, consumption in urban areas, where the car will be used 80% of the time, is between 15 and 17 kWh per hundred kilometers, depending on the mode of use. In money, this means that you can cover 100 kilometers with only 6-7 RON, compared to at least 25 RON with a normal car.

By comparison, a new diesel car emits, in conditions of urban use, about 145 grams of CO<sub>2</sub> / km, but also a lot of carcinogenic micro particles. Even the cleanest internal combustion engines, which are equipped with functional micro-particle filters, still emit these micro particles, which are missing in the case of electric cars. If the car is powered by a renewable power source (for those who live at home and have electrical panels), CO<sub>2</sub> emissions will be up to 10 times lower and the pollutants virtually non-existent. Not only does it eliminate harmful emissions from the street, but also the overall CO<sub>2</sub> emissions of an electric car are about 50% lower.

## **CONCLUSIONS**

So, considering the entire life of an electric car - no, it's no more polluting than one that uses fossil fuels. But no, electric cars are not zero-emissions vehicles. As for energy production, if the car is being powered with energy from burning fossil fuels,

it is still releasing CO<sub>2</sub> in the atmosphere, not from the tailpipe but some distant power plant. When it comes to batteries being recycled, it is still an expensive and ongoing process and most batteries are not being recycled yet. Despite this, solutions to make electric cars greener and more eco-friendly, and sustainable are being developed. And although there is room for improvement, we have also seen that electric cars, as they are today, are already, in general, more eco-friendly along their lifecycle than conventional fossil fuel cars, especially if they are powered with clean electricity.

With a smart station system, the batteries will be charged when the network is less demanding and the current is cheaper, or when there is a surplus of energy in the system. When no battery power is needed, it can be sent back to the grid, with a small profit for the car owner (up to 27 kWh in Romania, according to the law). Public transport must also be electrified, and much less polluting forms of transport (bicycles, electric scooters, etc.) must be encouraged.

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## PSYCHOLOGY, PEDAGOGY AND EDUCATION

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### THE ASSIGNMENT OF CASE TO THE SUBJECT NOUN PHRASE OF THE ALBANIAN LANGUAGE

**Abstract.** *The paper we are presenting in the following line is an attempt to introduce into Albanian linguistic domain the contemporary linguistic generative theory and more concretely the assignment of case under the influence of X-bar theory, Theta Theory and Case Theory. Considering the fact that Albanian is a synthetic language the case marker, case assigners and case assignment model is not an easy task as there are needed functional projections for the licensing of the semantic and morphological features and free positions for their generation. In this context, various universal principles, filters or hypothesis have made it possible for the Albanian language NP to be first realized under the SpecVP position, licensing the theta role of the Agent and it moves toward SpecTenseP and SpecAgrP to interpret the [+tense] and [+agreement] uninterpreted features and be assigned Nominative case.*

**Keywords:** *X-bar theory, Nominative case, case marker, case assigner, Internal Subject Hypothesis, Split InflP*

### INTRODUCTION

I opt to open my paper with a statement extracted from Chomsky’s “Syntactic structures”: “The fundamental aim in linguistic analyses of a language L is to separate grammatical sequences ,which are sentences of that language L , from the ungrammatical ones which are not sentences of that language L and to study the structure of grammatical sequences” (Chomsky 1957, p.13).

Chomsky together with his followers, driven by such a humble target, developed a revolutionary theory of linguistic structure based upon constituent analyses and the definition of such grammar as a set of initial strings  $\Sigma$  and a finite set of instruction formulas of the form  $X \longrightarrow Y$ , interpreted as “X is rewritten Y”. What is stated above, is what Chomsky labeled as one of the most important modules of his generative theory, X-bar theory which is regarded as a process that generates sentences not from the left to the right, but from top to the bottom (generating sentences to their terminal constituents).

What was at that time considered a novelty in the grammatical domain was immediately followed by the introduction of four other fully-fledged linguistic modules known as: Government and binding theory; Theta theory; Control theory; Case theory.

The whole Minimalist Program aimed at constructing a linguistic theory that will generate all the grammatical sentences of any language in the simplest way possible with a focus on the simplification of the whole system.

It is quite clear that the study object is the structure of the sentence, as a grammatical sentence is made up of smaller linguistic units known as constituents, whose boundaries vary from a lexical free morpheme to a string of such morphemes that serve a certain syntactic structure. The way these constituents are structures or distributed within a sentence is mostly and completely related to the Case theory. The latter is determined by the generative linguists as the core module of the Chomskian theory.

Traditionally, the term case refers to the different forms nominals (mostly nouns and pronouns) can take depending in the different functions they perform in a sentence. Furthermore, the traditional analyses of case system of a language examine the different uses of case in somewhat semantic terms. Whereas, the contemporary generativist approach treats case as a universal abstract category independently from its case markers, word order, inflectional bound morphemes or the use of prepositions. Case markers have been treated as surface structure reflexes introduced by various kinds of deep structure and surface structure relations.

As many generative linguists have stated (Heageman 1991, p. 141-145), (Chomsky 1957, p.46) the theory of case requires that every NP phonetically realized has to be assigned (Abstract) case” (Case Filter).

For the first time in the Albanian linguistic historical evolution we as researchers have been introduced to the recent linguistic term “Abstract Case” which seemed confusing, but it was a successful attempt to veer our linguistic focus away from the morphological assignment of case that compromised a differentiation in the word form according to their sentence usage.

We are oblivious that there are languages where case is realized morphologically (the Albanian language) and there are others where abstract case is possible (English for example). In this context languages vary as to whether abstract case is morphologically realized or not. But, nevertheless, Abstract case assignment is a Universal Principle that incorporates the Albanian language morphological assignment of case. Such a statement was considered productive enough by the Albanian linguists in explaining the instances when Nominative and Accusative of the indefinite form (sing and plural) of nouns share the same phonetic realization:

**Albanian Indefinite form singular**

*Nje djale/a boy*

Nom: **nje djale**

Gen: I, e nje djali

Dat: nje djali

Acc: **nje djale**

Abl\*: prej nje djali

**Albanian indefinite form plural**

*disa djem/ some boys*

**disa djem**

i, e disa djemve

disa djemve

**disa djem**

prej disa djemve

\* I am tempted to use Ablative case (defined as denoting a noun that is the object of a prepositional phrase in Latin) as the best representative for the Albanian language fifth case (rasa rrjedhore) because the noun in this case is preceded by the preposition “prej” meaning “from”

We conclude such an introductory briefing on case theory by welcoming our avid reader to the coming sections of Nominative case typological classification and assignment in Albanian language.

## I. TYPOLOGICAL CLASSIFICATION OF NOMINATIVE CASE

A great deal of research has been devoted to the history, evolution and assignment of Nominative case in the Albanian language and foreign linguistic domain. In Albanian, Nominative has been labeled as a quite distinct case concerning its duality of forms (definite and indefinite for both numbers singular and plural) and for its semantic and functional distinctness.

In the late 90' both Albanian and foreign linguists have typologically classified Nominative case as follows:

### a. Nominative as a case of pure reference:

The Albanian linguist Riza (1982) in his early studies published in the linguistic journal “Studime filologjike” (Philological studies, 1982) designated

Nominative as a “naming case” due to its naming or labeling function. But it results to me that such a designation is encountered earlier in the studies of Fillmore (1967, p.9) stating: “To the Greek and Latin studies of case system where Nominative was completely ignored and the classification criteria which ought to have been kept distinct were often confused”. Fillmore (1967, p.9) goes further by explaining that such a neglect of Nominative springs from the etymological meaning (deviation) of the Greek term for case, “ptosis” which vexed grammarians to limit the term case to the inclusiveness of the non-Nominative case forms only.

Furthermore, Blake (1994), referring also to Aristotelian assumption that Nominative simply represents the noun not one of its case forms which are in addition recognized as the noun case system.

#### **b. Nominative as a grammatical or syntactic case.**

Such a classification is mostly based on the grammatical and syntactic function of Nominative. In Albanian language its grammatical and syntactic function is that of representing the subject of the sentence.

#### **c. Nominative as a grammatical form**

The third classification holds true for the so called inflectional languages (Albanian) in which Nominative is represented by its dual definite/indefinite case forms realized morphologically via case inflections.

<b>Indefinite/singular</b>	<b>Definite/singular</b>	<b>Indefinite plural</b>	<b>Definite plural</b>
<b>nje djale</b>	<b>djali</b>	<b>disa djem</b>	<b>Djemte</b>
(a boy)	(boy-the)	(some boys)	(boys-the)

The all three classifications above take in isolation do not cover the whole range of distinctive distributive features of Nominative case forms, but what is most fascinating is the tendency that at least the majority of today and previous linguists agree that Nominative represents the subject of the sentence.

To McCloskey (1997, p. 203-204) the notion subject is fundamental not only in Aristotelian logic but in almost every western philosophical tradition and grammatical thinking. According to him the syntactic notion of subject covers a whole range of phenomena:

*a. The subject is the bearer of a certain kind of semantic roles, mostly Agent.*

- b. the subject is more prominent than any other argument of the main verb.*
- c. the subject is formally, morphologically and positionally marked.*
- d. It is claimed that every sentence should have a subject which is phonetically expressed. (universal principle plausible to all languages)*
- e. Subjects are almost and always nominals represented by binary features [+N;-V].*
- f. Subjecthood is central in the system of promotion and advancement of nominals.*

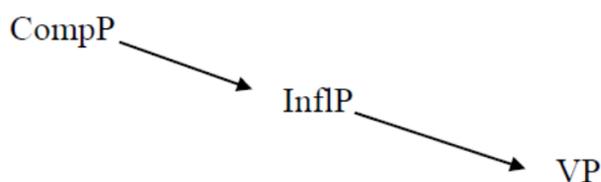
The main aim of relating the grammatical nominative form with the syntactic subject argument of the sentence merely serves the purpose of identifying the nominative case assigner and the corresponding case assignment model.

Prior to wrestling with the above phenomena we have to become familiar with how the clause structure is represented under the assumption of three structural layers as instantiations of X-bar theory (Rizzi, 1997).

**1. The lexical layer** headed by the verb as the only clause element responsible for the assignment of theta roles or semantic roles.

**2. The inflectional layer** headed by functional heads (morphological instantiation of the verb) responsible for the licensing of case and agreement.

**3. The complementizer layer** headed by a free functional morpheme hosting: interrogatives, relative pronouns, focalized elements, ect.

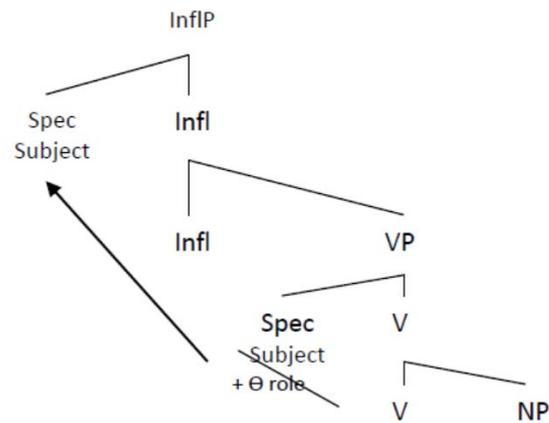


In mid-eighties as the X-bar representative of clause structure was broadly accepted the InflP (inflectional phrase) was based on two assertions:

Firstly, the sentence is an inflectional projection and secondly this projection (InflP) is generated according to the X-bar schema.

According to Stowell (1981) such an X-bar projection of a sentence opens up the possibility for the specifier position to be uniquely a subject-agreement position.

Schema



As it is also illustrated in the above schema the subject is first generated in the specifier position of the VP (SpecVP) (representative of the lexical layer) headed by the verb licensing the semantic role of the agent according to the Internal Subject Hypothesis (McCloskey 1997, p. 203-204). Afterwards, it moves toward the specifier position of the InflP (SpecInflP), a projection representing the inflectional layer responsible for the licensing of the morphological and syntactic features.

## II. DETERMINING THE ASSIGNER OF THE NOMINATIVE CASE AND THE MODEL IT REPRESENTS

The verbal inflections make up a determining linguistic feature, even though their morphological realization is not the same in every world language. So, the verbal paradigm has the tendency to be divided in two subgroups:

1. The one including all the finite verbs marked by the morphological features of mode, tense and person (in Albanian the inflectional system is visible, evident and moderately rich).

2. The infinite verbal forms lacking the above morphological features and as so they do not enable the subject-predicate agreement.

a. Djali mberin ne mbremje. (finite verb form – subject-predicate agreement)

Boy-the arrives in the evening.

b.\*Djali per te mberitur ne mbremje. (infinite verb form – no subject-predicate agreement)

Boy-the to arrive in the evening.

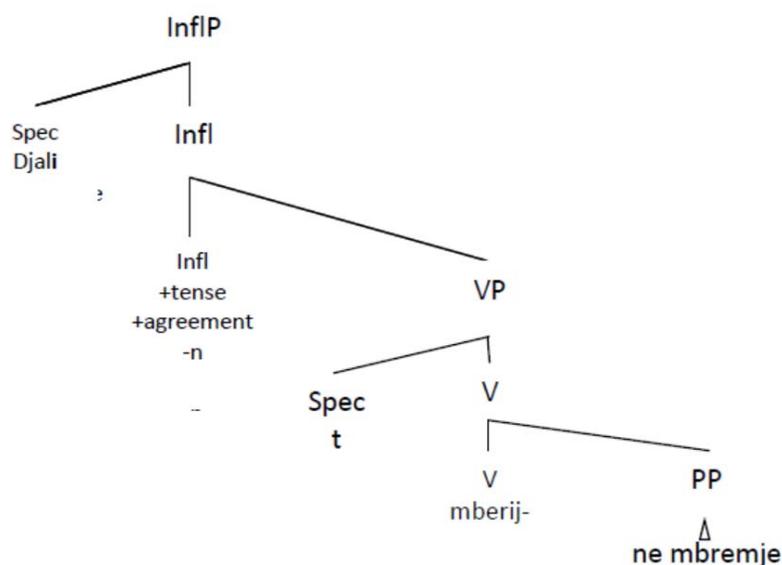
\* Internal Subject Hypothesis compromises two classifications of arguments:

- Lower origin argument – Arguments characterized by the movement from SpecVP to SpecInflP
- Lower position arguments – arguments of certain languages characterized by the word order VSO where the subject cannot move from SpecVP toward SpecInflP

In the second example the ungrammaticality accounts for the mere fact that the lack of the verbal inflections due to the infinite form of the verb used. The subject-predicate agreement is non-existent. The above illustrative examples affirm the proposition that InflP makes an extension of the verbal system and it is represented by the morphological features of [+tense] and [+agreement] that are accepted as possible assigners of Nominative.

In the late 80' and early 90' Pollock (1989) and Chomsky (1993;1995) argued that in inflected languages (Albanian included) the verbal head should move toward the inflectional head in order to satisfy its morphological framework and license the morphological features of person, number and tense.

#### Schema

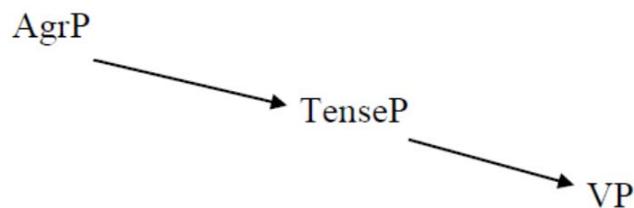


The proposition of verb raising from V-head to Infl-head even though by Pollock (1989) was an inflectional-language preserved feature. It was Rizzi (1996) that over generalized this proposition to include inflectionless languages such as English. So, the verbal head movement from a head position of the VP to a head position of the InflP triggers the movement of the nominal subject from the SpecVP position of the lexical layer to the SpecInflP position of the inflectional layer to license its case properties.

It was Pollock (1989) in his further studies that proposed the Split of Inflectional Projection into two other functional projections, correspondingly TenseP (tense phrase) and AgrP (agreement phrase) arguing their structuring:

InflP → TenseP → AgrP → VP

Belleti (1990) driven by the Mirror Principle proposed by Baker (1986) and by the fact that agreement features are realized outside the morphology of tense proposes the generation of these two functional projection:



The sentence subject first realized under the SpecVP position due to the Internal Subject Hypothesis to fulfill its semantic requirements and take the thematic role, mostly of the Agent, double moves, first toward the SpecTenseP and then toward the SpecAgrP.

According to Graffi (2008) the position where the sentence subject is licensed is that of SpecTenseP which is characterized by the features [+assign Nom] to the subject NP and eliminates the uninterpreted features [ $\pm$ Nom] of the subject.

## CONCLUSION

All the above hypothesis, propositions and principles above beginning with Internal subject Hypothesis, Split InflP, Mirror Principle came really in handy to the generation of the morphologically complex Albanian sentences characterized by a rich verbal inflectional system and in the assignment of the Nominative case to the NP internal argument or better saying subject NP. What is the most important conclusion we come up with is the fact that Nominative case is assigned by the tense features and licensed by the agreement features of the verb under the specifier position of both AgrP and TenseP. Furthermore, for an inflected language as Albanian the split InflP and the introduction of two other functional projections (TenseP, AgrP respectively) it is very helpful to the generation of free positions for various inflectional or morphological markers to be realized and differentiated

specifier positions for the NP argument (sentence subject) to realize and license both lexical and morphological features (theta features and case features).

It also highlights the fact that, no matter the morphological properties a language L displays (inflected, free order – Albanian or inflectionless strict word order – English) case is assigned under one and the same specifier TenseP position assisting Albanian researchers to define the case of the same nominal indefinite (singular or plural) form (*nje djale* – a boy) used both in Nominative and Accusative.

- a. **Nje djale** takoi nenen.  
(A boy (Nom) met his mother)
- b. Nena takoi **nje djale**  
(Mather-the met a boy (Acc))

One and the same phonetic form “*nje djale*” (a boy) occupying different structural positions in the sentence is assigned different case depending on the argument they represent (external argument (Nom) or internal argument (Acc)); their syntactic function (subject (Nom) / object (Acc)) and their structural position (SpecTenseP (Nom) / VP +NP – VP internal argument)

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## **NAMES OF PEOPLE WITH ANIMAL WORLD NAMES IN ALBANIAN LANGUAGE**

***Abstract.** The object of the present article is specifically the names of people with names of wildlife, who, within the macro field of names of people according to physical and moral features as a whole, form a lexical-semantic field that carries some general features: a) is unified from the lexico-grammatical, lexico-word-forming and lexico-semantic point of view; b) has internal systemic and ideographic connections both from the point of view of the source of the names, as well as from the point of view of marking and characterization, according to a regular typology; c) has undergone semantic developments and movements that can be described and systematized into larger semantic categories.*

*The main purpose of the article is to look at the whole lexical field of the names of people with wildlife names to see more closely and in depth all the semantic developments that have occurred in it by analyzing especially the metaphorical blocks that are created as a result of these developments. Metaphorical blocks are actually semantic blocks that are created, along with other semantic blocks, within the semantic structure of words, but we have called them here, metaphorical, to show that the semantic derivation of the nouns we are talking about has based on the metaphor, as one of the main transplants on the basis of which these names have been reinterpreted thus obtaining figurative meanings that characterize people according to physical and moral features.*

***Keywords:** names; semantic block; semantic categories*

### **INTRODUCTION**

In the lexicon of the Albanian language there are dozens of lexical, semantic and word-formation classes, which expect to be studied in more depth, mainly on their most important side, in the semantic plane. One of them is the lexical class of human names according to physical and moral features, which forms a lexico-semantic macro field that includes, in addition to qualitative, indistinguishable adjectives and phraseological units, also a number of animal world names, to which they are subject. the process of resemanticization and have developed figurative meanings that are used in Albanian to name the physical quality and quality of the character or mental nature of man.

By physical features here are understood the external qualities of the human body and its special parts (shapes and dimensions, size and smallness, thinness and

thickness, length and brevity, dexterity and clumsiness, purity and impurity, elegance, delicacy, etc.), while moral traits mean inherent qualities of man (qualities of character, personality, formation in general, temperament and behavior, vices, virtues, qualities of the human mental world, etc.)

In summary, we can say that the current studies in Albanian linguistics have seen the names of people according to physical and moral features, ie the names of people with names of the animal world that are the object of this article, from a purely grammatical point of view and thus, although they have managed to clearly distinguish what is grammatical in these names, bringing at the same time, even empirically, some elements of lexical semantics, they have not been able to adequately illuminate their lexico-semantic plane.

Our main goal is to analyze the semantic developments that have occurred among the names of the animal world as a result of their involvement in the process of linguistic metaphorization, which, in our opinion, has at least two main characteristics: a) the parallel coexistence of the first meaning of the word and the metaphorical meaning. The second, that is, the figurative metaphorical meaning, is projected, as it were, on the first and is clear and understandable only because it emerges in its background. The coexistence of meanings provides opportunities for the formation of metaphors on the basis of which stands the opposition of two different planes of meaning: direct and figurative; b) the abstraction of a salient feature of reality, which can be easily figured. Thus, the name partridge for a beautiful girl is associated with the image of beauty, while the name wolf for a savage and greedy man is associated with the image of savagery and greed. These traits (beautiful and wild and insatiable) that can be easily figured, abstracted and form the basis of metaphorical meanings: partridge "beautiful girl"; wolf "wild and greedy man".

Also, the article aims to point out the social perception, the "usufruct" of the names, as well as to argue the personal character of the process of reinterpretation for some living things that have undergone this process and have become symbols of some human attributes, the word comes, the donkey is a symbol of stupidity, but also of patience and stoicism.

## **LITERARY REVIEW**

Albanian studies in the field of semantics (Thomai J., 1989, 2009; Memishaj V., 1999; Metani I., 2019), this "poor daughter of linguistics", as the well-known French linguist AJ Greimas called this linguistic discipline in the beginning of the seventies of the last century (Greimas A.J., 1972), are few and somewhat delayed, therefore the semantic analysis of the Albanian language, which constitutes its essential part, remains even today less studied than form. The content side of language is indeed a wide field with complex issues, but at the same time very important to understand the whole mechanism of language functioning, to go into its depth and to discover from there the infinite qualitative value that it hides, especially lexical semantics.

Likewise, as we have stated somewhere above, the names of the people with the names of the animal world that constitute the object of this article have not been studied to date in their entirety, although they have constantly attracted the attention of linguists, who, in the bosom of Indirect studies of this class of words have sometimes pointed out aspects of its semantics and sometimes its richness and diversity from the point of view of formal construction.

The main purpose of this article is to explore the semantic structure of wildlife names to see the changes that have occurred in their semantics due to the inclusion of these names in the process of resemanticization or, as it is otherwise called, linguistic metaphor.

## **METHODOLOGY**

Studies in the field of semantics (Ullman S., 1957; Lyon J., 1977) have already proved that the lexical meanings of words present in their semantic structures are constructed of minimal semantic units, which were originally called semantic components and, most after, according to various authors (Katz J-Fodor J., 1963; Prieto L., 1964; Chafe L., 1967) the linguistic directions they follow: semantic components, semantic features, sema, plerema, noema, semantic units etc., while the method by which these components are discovered within the structure of meaning was named the method of component analysis (E. Nida, 1949).

Through this method that is widely used in the present article in conjunction with the semantic analysis method as well as the method of comparing and juxtaposing semantic structures, we have been able to penetrate in depth the semantic structures of wildlife names to analyze, as we have said somewhere above, all the semantic changes that have occurred between them as a result of their involvement in the process of reinterpretation.

## RESULTS

The names of people with wildlife names can be further divided into several lexical micro-fields:

Names of people with pet names: father "saddle horse" and "strong man, agile, good at work"; atkin "saddle" and "young, strong, agile girl and woman for work"; livestock "pets or livestock kept for production and agricultural work" and "fat and uneducated man; ignorant man "; balash "horse either with a white bald spot on the forehead or with bald on the body", "man with completely white hair or facial hair" and "shameless man, a man whose skin has cracked"; balo "dog or has a white ball on the forehead or in the mug", "man with completely white hair and facial hair, white" and "man who everyone knows is bad, a man with a mark"; forehead "cow with a white forehead" and "a woman or girl with a wide and beautiful forehead, glowing"; white "dog, horse or has white" and "man with white hair, balash"; white "white or white pet (cow, goat, mare, mule)" and "girl or woman with very white, whitish skin"; bec "little lamb" and "wise and gentle man (usually for children)"; "completely white sheep" and "young, white and beautiful girl"; bisbiq "sheep or ram with a slender, weak body, usually untamed and separated from the herd" and "a man with a small body and removed, but very mobile; talkative and confusing, mischievous "; borrokoç "young calf, foals; has unbreakable; small-bodied bull "and" young boy with a compact and strong body "; bryme "goat with gray hairs in the dark" and "almost gray woman"; buffalo "animal with a large and heavy body" and "man with a large and heavy body, clumsy and fat in mind"; sheep "petite pet, with soft fur" and "very wise and undefiled man; a hooded and obedient woman or girl "; bull "has a young and undefiled" and "a healthy and strong boy"; pig "animal with thick body and neck", "very persistent man, strong and stubborn" and "very fat and fat man; man

who does not keep himself clean; stupid man from the stubborn mind; filthy and evil man, masquerade ”; dredyl "horse with a large and strong body" and "man with a large and healthy body"; jade "old and weak horse" and "man with a long and very weak body; a poor old man ”; piglet "the little pig" and “chubby children; very healthy children ”; donkey "big-headed animal, kept at home for cargo" and "stupid man, stupid"; grivol "horse with gray hair" and "half-gray man, gray"; ftujak "male kid from one to two years old" and "young and healthy boy, but still immature and inexperienced in life"; beast "cargo animal" and "stupid man"; stallion "unbreakable horse, held for exchange" and "well-fed, strong and incontinent man"; hergjele "herd of cargo animals that are left free to graze in nature" and "young and healthy girl or woman; incontinent and frantic woman ”; animal "living being unable to think and act consciously" and "stupid and rude man"; carcass "corpse of a slain or dead animal", "very lean, lean meat" and "very weak human body"; "lamb or kid that was born later than others", "child born later than others", "small and weak child" and "immature man"; the “little donkey” and the young boy, not smart or foolish or inexperienced in life; immature man ”; kuqal “ka, goat etc. with red hair ”, “ man with red hair and face ”and“ man with big belly and healthy body ”; red "animals (horse, dog, ram, goat, etc.) with red hair" and "man with red hair and face"; lac "the little buffalo" and "strong man, with a compact body and well connected"; lakoç "has a castrated horse" and "a man incapable of sex"; lingua "fast dog, with agile body that hunts well" and "agile and sharp man, who sniffs things quickly"; laro "diverse dog" and "treacherous and treacherous man; one who serves as another dog to profit something from it; he who sells himself for a bone ”; lepec "is old" and "a man of old age and ill health"; cows "diverse cows" and "man who eats a lot, big eater, glutton"; lush "male dog" and "unrestrained man, one who pretends to be furious"; llangos "dog that barks and does not eat you, street dog" and "talkative man, man who wanders door to door and stays idle"; cabbage "little lamb" and "small child, small"; cat "small pet, with strong claws", "very poor woman or girl" and "quarrelsome wild woman or girl"; cat "male cat" and naughty man, who does not stay wise and quarrels; cunning man ”; pets "gentle lamb, accustomed to follow the shepherd or lord" and "wise and pet child, not shared with parents"; mortality "animal corpse",

"very weak man, barely able to stand" and "man who is not good at anything"; ogi "wise lamb, who goes after the shepherd or a child" and "wise, obedient man, who always goes after someone"; perjor "ram or goat leading the flock" and "man leading others in war or hard work"; dogs "very good-smelling pets" and "bad man, treacherous and very low"; lamb "the little sheep without filling the year" and "gentle and wise man (usually for children)"; role "there is an old man who no longer works in the pen", "an old and fallen man" and "a man incapable of work"; "old cow" and "old and fallen woman" roles; sheleg "lamb that has not filled the year" and "wise and gentle child"; pig "pig" and "strong man, with great patience, steadfast and steadfast; a man who does not ask for anything"; calf "the youngest of a cow, deer or some other animal up to one year" and "immature man; an obese and inexperienced man"; calf "age calf" and "immature man"; greyhound "hunting dog", "obedient and humble servant of someone" and "man or boy who wanders the streets in vain and wanders after women"; blacky "black cow or sheep" and "dark hair woman or girl" etc.

Looking at the above names in the semantic plane, it turns out that they are created, as we said somewhere above, in the process of linguistic metaphorization according to a quality, characteristic or feature of the animal, when man is similar in that quality, characteristic or feature. As such we can mention:

A) colour: a) according to the white color of the whole body of the animal is named a young, whitish and sleek girl; a girl or woman with very white skin; a man with white hair: beige, bardhan, bardhonjë, bardho; b) according to the white color of a special mark on the forehead or on the mug of the animal, a person with completely white hair and facial hair is named; a man who everyone knows is bad, a man with a mark: balo; c) according to the white color of a mark or bale on the forehead or of many waves on the body of the animal is named a shameless man, whose skin has cracked at all: balash; ç) according to the various colors of the animal's body, a treacherous and treacherous man is named, who serves as another dog to benefit something from him, who sells himself for a bone; a man who eats a lot: laro, cow; d) according to the red color of the animal's hair, a man with red hair and face is named as well as a man with a big belly and a healthy body: red, kuqo; e) according to the black color of the animal's body, a woman or a girl is named ezmere: xebë, zekë; e)

according to the dark gray color of the goat hair, a woman is named almost completely gray: frost; f) according to the gray color of a horse's hair, a half-gray or gray-haired man is named: grivol;

B) age: a) according to the age up to one year of the calf or calf is named an immature man; a little girl, healthy and beautiful; an obese man from the inexperienced mind: viçok, viçoqe, viç, viçe; b) according to the age from one year to two years of the kid is named a young boy, healthy, but still immature and inexperienced in life; a young, young and healthy girl: ftujak, ftujë; c) according to the age of a cow or an ox, an old and fallen woman is named, as well as a man of old age and ill health: rrole, lepec;

C) body of animals, according to which a person with a very large or very small body is named: a) the size of the animal body, according to which a person with a large and heavy body is named: buall, buallicë, lope; b) the smallness of the animal body, according to which a small and young man is named: mi, miush, lepurush; c) the weakness of the animal body, according to which a very weak man is named from the body, bone and skin, who can barely stand on his feet; a man who is not capable of anything: kërmë, ngordhësirë;

D) appearance of a ram or a goat with a broken horn, as well as the duke of the little pig or buffalo, after whom a healthy, handsome, and handsome man is named, a chubby and very fat child; a strong man, with a compact and well-connected body: dash, gic, loc;

E) sexual ability of the animal, after which a woman or girl with a crooked tail is named; an unrestrained man, acting like a madman; a sexually incompetent man: kuçkë, lakoç, lush, lushë, zagar;

F) the animal unconscious according to which a stupid and uneducated man is named, an ignorant or rude man: bagëti, hajvan, kafshë, shtazë;

G) the gentleness or wisdom of some small, fluffy pets, after which a very wise and undefiled man is named, as well as a humble and obedient woman or girl: dele, qengj.

As a semantic topic (semantema) for naming people with pet names serves not only one of their qualities, but there may be two or three of them. We are mentioning

some of them: a) wisdom or gentleness + the habit of following after the gentle lamb, according to which a wise and pet child is named, who is not shared with parents or anyone else; a wise and well-nourished man, who always goes after someone: bec, pet, oğiç; b) body size + awkwardness in movement that usually ruminants and two-hoofed pets with large bodies, according to which a large and heavy man is named; a clumsy and mentally obese man: buall, buallice, lope; c) barking + pulling dogs after a bitch, according to which a talkative and troubled woman is named; a lewd, wicked, slutty woman with a wagging tail: gorre, meçkë, shake; d) the size of the head + the length of the donkey's ears, according to which an ugly and stupid man is named, stupid: donkey; for women: donkey; e) young age + the smallness of the body of the little donkey, the chicken, according to which a young boy is named, not smart or frivolous, who has no experience in life, immature: kërkë, këriç, pulisht; f) young age + life + ability to cope with heavy work of the horse or saddle, according to which is named a strong and agile man, capable of work, as well as a strong girl or woman agile and e capable: father, atkin, mule; g) young age + tenderness + wisdom of the little sheep that has not reached the age of one, according to which a wise, gentle and obedient child is named: lamb, sheleg, shelege; h) old age + bodily weakness of a horse or saddle, or of an ox, according to which a man with a long and very weak body is named; an old man too fallen, incapable of work: jade, roll; i) bodily weakness + mobility + the habit of separating from the herd of a sheep or ram, according to which a man is usually named small and removed, but very mobile; a wise, talkative, and mischievous man: bisbiq; j) thickness of body and neck + impurity + clumsiness + stubbornness of a pig or a dosa, according to which a very fat man is named; a man who does not keep himself clean; a very persistent man, strong and stubborn; a fat man from the stubborn mind; a fucking, wicked and masked man: pig, pig, pig, piglet; for females also great fertility: dosa; k) strength + energy + sexual ability of an undefiled horse kept for exchange, according to which a well-fed, strong and unrestrained man is named: stallion; l) young age + smallness + weakness of the body of a milk brood of an animal, according to which a small and weak child is named; an immature man: kërthi; m) dexterity + speed + the ability to

hunt the dog, according to which is named an agile and sharp man, who smells things quickly: *langua*.

We have given here only a few cases, but enough, to highlight that feature, quality or feature of an animal, which becomes the motive of semantic metaphorization, serving as a semantem of figurative meaning in naming people according to them. But there are endless such motives for semantics in all areas of life, in spiritual and non-spiritual, concrete and abstract, second or third, fourth, etc. of figurativeness. These motives based on semantics constitute the specificity of the semantic origin, of the semantic formation for each field.

2. Names of people with wildlife nouns: scorpion "black poisonous animal, with two claws in front and a flexible thumb from behind", "stingy man" and "wicked man, treacherous and insidious"; bear "wild animal with large and heavy body" and "heavy and clumsy man, but strong; rude and rude man "; bear "wild animal with large and heavy body" and "strong and brave man; a man who never tires "; started "little rabbit" and "cowardly man"; beasts "wild predatory animals" and "very wild and cruel man"; jackal "a predatory animal that emits a loud roar" and "a bloodthirsty and greedy man who threatens others by screaming"; deer "agile mammal" and "very fast and agile boy"; fox "cunning animal" and "very cunning man"; savage "wild predatory animal" and very wild and soulful man; ruthless, cruel and rude man; a man who treats others badly "; elephant "an animal with a very large and heavy body" and "a man with a large and thick body, heavy in walking"; the hyena "a predatory wild animal that feeds on carrion" and "a bloodthirsty, predatory and ruthless man"; hippopotamus "wild animal with a large and heavy body, with a quadrangular head and a wide mouth" and "a man with a very large body and an ugly face, clumsy in walking"; roe deer "a mammal with slender and agile legs" and "a fat, strong and agile boy or man"; rabbit "an animal that runs very fast and is known as a coward", "a man who is very afraid" and "a man who walks very fast"; plays "wild animal, strongest in battle with others" and "brave, courageous and strong man"; female: lioness; *mi* "small mammal with elongated snout, which stays in holes and feeds on food waste" and "worthless and cowardly man; a man who hides in closed and dark places and who is in the habit of looking for something in the holes, or who

works or acts secretly ”; skile "animals like foxes, cunning" and "cunning, cunning man"; deer (sorkadh) "mammal with slender and agile legs" and "boy with a slender and thrown body, very light and agile" female: sorkadhe; sut "agile and wise mammal" and "graceful and agile girl; wise and gentle girl ”; animal "animal" and "stupid and rude man; a savage, cruel, and ruthless man ”; tiger "wild animal, strong, fast and predatory" and "wild and cruel man" etc.

The naming of people with the names of wild animals is done according to the qualities or characteristics of these animals, among which we are mentioning: a) the fear of the rabbit, according to which a coward is named: rabbit; b) the tenderness of the female deer, after which a wise and gentle girl or bride is named: deer; c) the cunning of an animal, after which a very cunning man is named: fox; d) the strength of an animal, according to which a brave, courageous and strong man is named: lion, lioness, tiger; e) weaving dense nets of very thin threads from an animal to catch prey, according to which a man is named who clings to someone and harms him: spider; f) dexterity and speed of animals, according to which a very fast and agile boy is named: deer, roe deer, rabbit, sorkadhe; g) the poisonous ability of an animal, according to which a wicked, insidious, dangerous and treacherous man is named: scorpion.

More than one quality, characteristic or feature of animals can serve as motives for semantics; in this case the naming of people with these names includes in the mark as much as they represent the qualities, characteristics or features of animals: a) body size + heavy weight + clumsiness of an animal, according to which a person with a large body is named e thick; a heavy and clumsy man; an uneducated man, who behaves rudely: gold, bear, elephant, hippopotamus, rhino; b) the beauty + dexterity + tenderness of an animal, according to which a sleek, beautiful and agile girl is named; a wise and gentle girl: deer, sorkadhe; c) the savagery + unconsciousness of animals, according to which a fat man is named, who understands nothing; a savage, cruel, and ruthless man: beast, animal; d) savagery + abduction ability + the way of feeding an animal, according to which a ruthless, bloodthirsty, predatory and filthy man is named: hyena; e) savagery + roar + abduction ability of

an animal, according to which a bloodthirsty and greedy man is named; a man screaming threatening others: jackal.

3. Names of people with bird names: a "goose bird" and "a foolish woman or girl, stupid"; whistle "bird known as the best singer among all birds" and "man who sings very beautifully; man who speaks quickly beautiful; a sharp man, who quickly catches something "; owl "a bird with a large, round head, which sings at night as if mourning", "a boy or a man with unruly, uncombed and combed hair; man unshaven for many days; and "a sluggish and foolish man"; female: sideboard; ciripupe "a bird that walks while jumping" and "a very frivolous and unstable man"; heron "bird with a neck and long legs" and "weak and thin woman"; "a bird that makes a croaking sound" and "a foolish girl or woman who constantly quarrels with others"; dudi "bird with feathers and feathers in bright red color, mixed with yellow and white, and with an arched spot behind the neck" and "a very beautiful and attractive girl or woman"; falcon "bird of prey with strong claws" and "lively, agile, brave and courageous man"; fugue "small-bodied, gray bird" and "small, fat and clumsy girl"; gallof "a bird with a gray head and black wings and tail, sluggish" and "a man with a large body, not agile and ugly; a man obese in mind "; gollak "a long-legged rooster that sings with a thick, hoarse voice", "a man with a thick and hoarse voice" and "a foolish man"; grifsha "mobile bird with a croaking voice" and "talkative and quarrelsome woman or girl, who screams and shouts a lot"; "chicken with a feather tuft on the chest"; coo "bird with a body covered with gray feathers in blue and with various wings" and "clean and handsome boy"; guguçe "bird with feathers and feathers in bright red color, mixed with yellow and white and with an arched spot behind the neck" and "clean girl, beautiful and playful"; guguftu "bird with feathers and feathers in bright red, mixed with yellow and white" and "beautiful and playful girl"; guhak "wild dove with gray feathers, standing for a long time somewhere motionless" and "confused and inattentive man; rooster "angle" and arrogant man; a man who swells and swells and holds himself to the foremost; a man who seeks only strife "; gjeluc "small and very weak rooster" and "boastful man, but weak and incompetent"; gjelkokosh "angle" and "arrogant kapadai man"; the hawk "the agile and predatory bird" and the "agile and agile woman"; hut "bird with a large, round head, which

sings at night as if crying" and "a man thick in mind; stunned man matuf"; you catch "angles" and "a man who sells his mind, who boasts like a rooster and boasts, a proud man"; the canary "beautiful songbird with usually yellow feathers" and "beautiful girl with a beautiful voice"; karabullak "big bird ..." and "man with a big body, fat in mind, stupid"; the angels "a domestic bird with a beak on its head and a turned tail" and "a man who sells his mind, a haughty man who boasts and boasts"; cock "angle" and "arrogant man, who boasts and sells mind"; laraska "a bird with a long tail and a mottled feather, which makes a croaking sound" and "a girl or woman not beautiful, with a weak and dry body, talkative and quarrelsome"; stork "bird with a neck and a long beak and long legs" and "a man with a slender body, with a long saddle and a long body"; swan "a beautiful bird, bigger than a goose, with a long, curved neck, usually white and shiny feathers" and "a young, beautiful and wise girl or woman"; parrot "a bird with a colorful feather, which has the ability to pronounce words imitating man" and "a man who speaks or mechanically repeats the words of another, without delving into what he says"; petrit "a bird of prey with strong claws and wings" and "a young, brave, strong, agile and brave boy or man"; pigeon "beautiful bird, usually with white feathers, held as a symbol of tenderness, purity, beauty and peace" and "little boy or boy, beautiful and loving"; chicken "a small bird, with a small body, which lays eggs" and "a wise man, laid back, obedient, silent and timid; a coward who submits easily"; rroc "white dove, without hood" and "small and healthy child"; hawk "bird of prey with strong claws" and "brave and impetuous man in attack"; falcon "a bird of prey with strong wings and claws" and "a boy or a man usually tall, brave and skilful"; female: sokoleshë "girl or woman, usually tall, distinguished for bravery and dexterity at work"; spurdhjak "small and weak bird" and "small and inexperienced child, kalama"; female: spurdhjake "little girl with no experience"; partridge "beautiful bird that sings beautifully" and "beautiful girl or bride"; videos "female pigeon" and "beautiful woman"; "young chicken" and "young and beautiful girl or woman".

As can be seen, the naming of people with bird names is done according to some of the qualities of the latter, among them we can mention: a) the size of the body of the bird, according to which a fat woman or girl is named from mind as well

as a man with body big and mentally thick: gallof, carabul; b) the smallness of the body of a bird, according to which a small, fat and clumsy girl is named; a small child full of health; a small child without life experience: ferrak, fug, gjeluc, rabeckë, rroc, spurdhjak, spurdhjake, jijimës; c) the physical beauty of a bird, according to which a beautiful man is named: kanarinë, mjellmë, pëllumb, pëllumbeshë, sokol, vidë ; d) the beauty and peculiarity of the voice of the birds, according to which a man who sings very beautifully is named; who speaks quickly and beautifully, who is sharp and who quickly grasps things: whistle, choke, griffin, canary, quail; e) the way of walking of a bird, according to which a very light and unstable man is named: ciripupe, lark. f) the color of the bird's feathers, according to which a clean and beautiful boy is named: coo, pigeon; g) the density of the feathers and feathers of the bird, according to which a stuffed man is named; a confused and inattentive man; a man obese in mind: owl, hut; g) the swollen and swollen feathers of the angle, according to which a swollen, arrogant and kapadai man is named; a man who strives to hold himself to the foremost; a menacing man: rooster, cockroach, capo, angle, cock; h) the abduction ability of a bird of prey, according to which a fast and agile man is named: hawk, peregrine falcon, hawk; g) the length of the neck, beak and legs of a bird, according to which a man with a slender body, with long saddles and a long neck is named i) the ability of a bird to imitate man, according to which a man is named who speaks or mechanically repeats the words of another, without delving into what he says: parrot; j) the young age of the bird, according to which a young and beautiful girl or woman is named: zog, zogez.

Here, too, we have cases when two or more qualities, characteristics or features of birds serve as a motif of the semantics of names: a) the color of feathers or feathers + the shape of a special mark on the neck, according to which a girl or woman is named beautiful and attractive, as well as a clean and beautiful girl: dudi, guguçe, guguftu; b) the abduction ability + the strength of the claws of a bird, according to which a lively, agile, brave and courageous man is named: falcon, hawk; c) the size of the body + the peculiarity of the voice of the bird, according to which a stupid and light-minded man is named: gollak; d) the beauty of the body + the beauty of the voice of a singing bird, according to which a beautiful girl is named who has a

beautiful voice: whistle, canary, dove; e) the size of the head + the shape of the head + the way of singing of a bird of prey, according to which a boy or a man with uncut, uncut and combed hair is named; a man unshaven for many days; a sluggish and stupid man: owl hut, owl; f) the length of the legs + the length of the neck + the detail of the beak of a waterfowl, according to which a weak and slender man is named: heron, stork; g) the length of the tail + the color of the feathers + the peculiarity of the sound of a bird, according to which a girl or a woman is not named, with a weak and dry body, a talkative and quarrelsome woman: lark, crow; h) tenderness + fear + silence of a bird, according to which a wise and timid man is named, a very gentle man; a cowardly man, who submits easily: chicken.

4. Name of people with insects names: arez "poisonous invertebrate" and "wicked man who hurts others and hurts them"; "a pest that pierces holes in trees" and "a man who pokes his nose everywhere, one who interferes in the affairs of others, biramel"; cockroach "small inverter" and "man with a small body"; cilivile "little inverter that glows like a spark, that lights up and goes out at night" and "agile and smart girl"; cikelore "little inverter that shines like a spark, that turns on and off at night" and "foolish woman"; "flying inverter" butterfly and a very fast and agile woman, bride or girl; very easy woman or girl ", wasp" invertebrate that has a poisonous thumb "and" man who seeks to do harm to others, wicked man, wrongdoer "; ginkgo "invertebrate that emits a prolonged and buzzing sound in the heat" and "a man who does not rest his mouth, talkative"; locust "long-legged invertebrate that jumps deftly and flies away" and "man with a long, slender and weak body; a man with a light body who moves and jumps a lot "; ticks "a parasite that clings to the skin of cattle, etc., sucks their blood and causes contagious diseases" and "a parasitic man who lives at the expense of others; a man who clings and does not part "; lobster "ten-legged animals, which allow him to walk in all directions" and "a very mobile man, who does not move; an unstable and cunning man, who himself does not stay calm and does not leave others alone "; cockroach "big ant with a horn up" and "a man who snorts and flaunts like a rooster; a man who thinks he is very good and boasts in front of others "; fungus "a parasitic microorganism that multiplies by spores and develops in the body of a plant or food" and "an undesirable person that suddenly

appears somewhere and leads a parasitic life"; ligavec "a kind of snail without a shell" and a slimy and slippery man, dragged away all his life; a man who does not act with courage, a man without bones, a weeper "; microbe "a very small single-celled organism that rots and poisons organic matter or causes various diseases" and "a parasitic person, harmful to society; a man who is not separated from us, who bothers us a lot and we can not stand him "; mole "an inverter that eats woolen things, furs, grains, various things" and "a man who sews and does not part, a man who eats and eats the soul"; murrjelë "an insect that bites the bovine and drinks its blood" and "a man who does not leave you comfortable, who constantly teases you"; pulith "invertebrate that lives like a parasite" and "insidious man; master "; dragonfly "slender inverted body and long wings" and "fast and playful girl"; flea "parasite that jumps a lot, bites and sucks blood" and "not a good man, unstable and boring"; guard "bees fleeing from their hive" and "talkative woman"; spark "an inverter that glows like a spark and that lights up and goes out at night" and "a man agile and quick in work and action"; caterpillar "a parasitic worm that clings to animals in their bodies to drink their blood", "a man who clings to and does not part with his work" and "a savage and heartless exploiter, bloodthirsty"; tartabiqe "a small invertebrate that sucks people's blood at night when they sleep", "a small and petite woman or girl" and "a man who constantly bothers you about his work, an annoying and cheeky man"; fly "little flying inverter", "man with very small body" and "worthless, insignificant man; a weak man, without strength that can be easily defeated "; sparkler "little inverter that shines like a sparkler and that lights up and goes out at night" and "a foolish girl or woman who likes to look and wander and who does not know how to preserve her beauty and honor" etc.

The naming of people with insect names has as a source some of their qualities, among which we can mention: a) the way of feeding some harmful insects (holes are drilled in the tree), according to which a person is named who inserts his nose everywhere, who interferes in the affairs of others: birues; b) the smallness of the body of an invertebrate with strong wings, according to which a man with a small body is named: cockroach; c) the ease of movement of some flying insects, according to which a girl or bride is named very fast, agile and easy: butterfly; d) the stinging or

poisoning ability of the invertebrate, according to which a person who seeks to harm others is named, a wicked and evil-doing man: wasp; e) the duration of the buzzing of the inverted voice, according to which a man who does not rest his mouth is named, a talkative man: ginkgo; f) the ability to walk in all directions of the crab according to which is named a very mobile man, which does not take place; an unstable and cunning man, who himself does not stay calm and does not leave others alone either: lobster; g) the biting ability of an invertebrate with two pairs of wings, according to which a man is named to be sewn and not divided, a man to bite and eat the soul: mole; h) the smallness of the body and wings of a flying invertebrate, according to which a man with a very small body is named, as well as a man of no value or importance; a weak man, without strength, who can be easily subdued: fly; i) the ability of the zebra to bite and suck the blood, according to which it is named a man who leaves you uncomfortable, who constantly teases you: hawthorn; j) parasitism of the chicken lice nest, according to which an insidious and mischievous man is named: pulith; k) the detail of the body of an invertebrate, according to which a fast and playful girl is named: dragonfly; l) the way it illuminates the night at the beginning of summer (turning off and on within less than a second), according to which a man agile and quick at work and in action is named: spark; m) biting ability + the way of feeding a bee as small as a bee, according to which a wicked man is named who falls on the necks of others and makes them bad: nut; n) ease of flight + the way it illuminates the night at the beginning of summer (turning off and on within less than a second), according to which a nimble and smart girl, a light-hearted woman, and a girl or woman light-minded, who likes to look and wander and who does not know how to preserve her beauty and honor: civil, cyclical, sparkling; l) the size of the body + the position of holding a part of it (with a horn upwards) of a large ant, according to which a man is named who is proud and boasts like a rooster; a man who thinks he is very good boasts in front of others: cockroach; o) parasitism + the ability to suck the blood of a small parasite in the shape of a spider, according to which a parasitic person named who lives at the expense of others is named; a man to be clung to and not divided: a tick; p) the way of nutrition (rots and oxidizes organic matter causing various diseases) + parasitism of a very small single-celled organism,

according to which it is named a parasitic person, harmful to society, a person who is not divided and to bothers a lot by becoming impatient: germ; q) the ability to attach to the body of humans and animals to suck their blood + the parasitism of a freshwater worm, according to which a person is named to be attached or separated for a job, as well as a savage and heartless man who cruelly exploits others: caterpillars; r) the smallness of the body + the ability to suck the blood of a small insect, according to which a small and petite woman or girl is named, as well as a man who constantly bothers him about his affairs, an annoying and impudent man: tartabique; s) the tenderness of the body + the manner of movement (crawling on the ground) of a type of snail without a shell, according to which it is named a slimy and slippery man, who is dragged all his life; a boneless man who does not act boldly: ligavec; t) jumpability + the ability to suck the blood of a very small parasite, according to which a bad, unstable and boring person is named: flea; u) body size + leg length + jumping dexterity + ability to fly away of an invertebrate, according to which a person with a long, thin and weak body is named; a man with a light body that moves and jumps a lot: locust.

5. Names of people with reptile names: astrit "great serpent, swift and agile" and "very agile man, brave and fearless"; bullar "a snake with a thick body and quite clumsy in motion" and "a boy or a man obese or clumsy"; a serpent "footless reptile, with a crooked and twisted body, which has its teeth poisoned, or that wraps itself around its prey and clings to it", "a wicked and treacherous man, a cunning man" and "a very agile man, very lively and brave "; serpent "footless reptile, with a bending and twisting body" and "wicked and troubled woman"; chameleon "reptile that changes the color of the skin in accordance with the color of the environment in which it is located" and "shaky and multi-faceted man, who often changes his attitude or behavior to protect his interests"; crocodile "big crawler with a crushed head, big mouth and strong teeth" and "a man who uses deceptive methods to satisfy his evil desires"; viper "poisonous snake, with two teeth in its mouth" and "very wicked and treacherous man; overly mischievous and insidious man; a man who has a bitter and sharp tongue, to slaughter and poison you with words "; "poisonous snake" and "evil woman and viper, viper"; reptile "short-legged animal that crawls on the ground", "a

man who crawls in life, a backward man who does not walk with others" and "one who bows before others, one who becomes vig bridge; kissing man "etc.

From what can be seen, the naming of people with reptile names is done according to some of their external qualities, among which we are mentioning: a) the ability to adapt to the environment of a reptile of warm places, according to which a human being is named shaky and multi-faceted, often changing attitudes or behaviors to defend its interests: chameleon; b) the manner of walking (sliding or crawling) of a reptile or invertebrate animal (such as a snake, snake, lizard, etc.), according to which a person is used who uses deceptive methods to satisfy his evil desires, a a man who crawls in life, who lags behind and does not walk one step with others, as well as a man who bows before others, who becomes their bridge and vig and kisses the feet of others: crocodile, reptile; c) the way in which the venomous snake attacks the prey, according to which a very bad and treacherous man is named; a very mischievous and insidious man, who has a bitter and sharp tongue and who stabs and poisons you with words, as well as a bad and vicious woman: viper, snake; d) the speed + dexterity of a large snake, according to which a very agile, brave and fearless man is named: astrit; dh) body thickness + awkwardness in movement of a non-venomous snake, according to which a boy or man is named obese or clumsy: bullar; e) dexterity + flexibility of the snake female body, according to which a wicked and confusing woman is named: snake; f) the lack of a part of the body + the way it attacks the prey + the dexterity of a reptile without legs, according to which a bad and treacherous man is named, a cunning man, as well as a very agile man, very lively brave: snake.

6. Name of people with fish names: whale "large and heavy mammal" and "girl or woman with large body, clumsy to walk"; chaff "tall fish with wide belly" and "agile and sharp child"; seal "large-bodied mammal with short neck and shovel-like legs" and "fat, heavy and clumsy man, who moves with difficulty"; carp "big fish" and "stupid and not agile"; sea bass "fast-swimming fish" and "man with a fast and agile body"; lake fish "long-bodied fish with flat mug" and "stupid man, stupid"; eels "fish with a body as long and slender as a snake" and "a cunning man who knows how to make a tail and escape difficult situations"; octopus "eight-winged shellfish, which emits a black liquid to protect itself" and "wicked and mischievous man, who

tries to spread his harmful activity as widely as possible without noise"; the shark "a predatory fish, with a large and powerful body, with strong and sharp teeth" and a predatory and ruthless man, who attacks others and exploits them savagely; one who gets rich by mercilessly exploiting others "; mullet "long and slender body fish" and "tall, slender and handsome man or boy" etc.

Naming people with fish names is usually done according to several qualities, of which we can mention: a) the width of the belly of a freshwater featherfish, according to which an agile and sharp child is named: oystercatcher; b) the body size of a polar sea mammal, after which it is named after a fat, heavy, and clumsy human; c) the swimming speed of a saltwater fish, according to which a man with a fast and agile body is named; d) the elongated body shape of a freshwater predatory fish, according to which a man obese by mind is named, a foolish man; e) the quantity of the wings of an octopus, according to which a wicked and mischievous man is named, who tries to extend his harmful activity as wide and noiselessly as possible: octopus; f) the length and detail of the body + the way of walking of a fish that lives in the sea and in fresh waters, according to which a cunning man is named, who knows how to make a tail and escape from difficult situations: eel ; g) the length + detail of the body of a saltwater and freshwater fish, according to which a tall, slender and handsome man is named: mock; h) the abduction ability + the size and strength of the body + the strength and sharpness of the teeth of a predatory sea fish, according to which a predatory and ruthless man is named, who attacks others and exploits them savagely; one who gets rich by mercilessly exploiting others: the shark.

The lexical field of naming people with wildlife names can also be represented by the following Table 1:

From the data in the table above we can make at least two main observations:

firstly, the number of semantic components that semantics present in the first meanings of animal world names approaches the figure 800, while the number of semantic components as a function of semantics or semantic theme is more than 1/3 of them that will says that the names of this lexical field have great potentials for semantic development in the future as, according to the figures, there are almost 500

sema or semantic components unused so far in the process of resemanticizing the names that we have made the object of our analysis;

**Table. 1. Lexical field of naming people with animal world names**

Nr. of lexical microfields	semantic components of firts meaning	semantic components in the function of semantema meaning	figurative
1 names of people with pet names	280	60	75
2 names of people with names of wild animals	100	30	25
3 names of people with bird names	200	45	55
4 names of people with insect names	80	25	30
5 names of people with reptile names	80	20	25
6 names of people with fish names	40	15	15

secondly, the number of figurative meanings that animal names have acquired in the process of resemanticization exceeds the figure 200, but what is worth saying is that a good portion of these names have acquired two or more metaphorical meanings on the basis of a single semantic theme. Thus, e.g. the name pig, with six semantic components present in the first meaning, has acquired three figurative metaphorical meanings that characterize man according to physical and moral features simultaneously, on the basis of a single feature: the thickness of the body and neck, while this name has and five other ingredients or schemes that may become active over the years. This shows once again that the extent of reinterpretation of the names of wildlife in the future in the Albanian language will be greater and greater.

## CONCLUSIONS

Looking at the names of people with wildlife names as a whole, we can draw some more general conclusions:

1 The naming of people according to physical and moral features in the Albanian language is done with the names of the animal world, which are re-

semantized in the process of linguistic metaphorization and acquire figurative meanings that characterize people according to the physical appearance and moral features. The transition from the initial meaning or the initial historical meaning of these names to the figurative metaphorical meaning is made according to a prominent feature of the reality marked by them, a feature which takes figurative values in the new unit that is created. Such transitions or transformations in the Albanian language are a common phenomenon, a typical link, which can be said to be a model (cattle) of semantic movement in Albanian. In the names of the animal world this model comes out with six metaphorical semantic transformations, which are realized by passing:

a) from meanings related to pets to meanings related to humans: white-haired1 “white pet” - white-haired2 “girl or woman with very white skin.

b) from meanings related to wildlife names to meanings related to humans: gold1 "wild animal with large and heavy body" - gold2 "heavy and clumsy man, but strong; rude and uneducated man "

c) from meanings related to bird names to meanings related to man: pigeon1 "beautiful bird, usually with white feathers held as a symbol of tenderness," beauty and peace "- pigeon2" child, little boy, beautiful and loving ”

d) from meanings related to the names of insects to meanings related to humans: nut1 "invertebrate with poisonous thumb" - nut2 "evil man who gets on the necks of others and makes them bad"

e) from meanings related to reptile names to meanings related to humans: chameleon1 "reptile that changes skin color to match the color of the environment" - chameleon2 "swaying and multi-faceted man, who often changes attitude or behavior to protect its own interests ”

f) from meanings related to fish names to meanings related to man: octopus1 "fish with many legs, with a body gathered like a bag, with suction cups and two big eyes" - octopus2 "evil and mischievous man; a man who tries to quietly expand his evil activity and devour others ”

2 Semantic components or semantics that serve as semantic themes or semantics on the basis of which are obtained figurative meanings that characterize people according to external and moral qualities. of linguistic metaphorization. As

such we can mention: color (white, white, gray, gray, red, black, etc.); age; dimensions (length, size, smallness, thickness, detail, width); appearance; ability (rodent, poisonous, abducting, biting, to hunt, to adapt, to walk, to fly, to bite, etc.); unconscious; tenderness; wisdom; clumsiness laziness; dexterity; force; energy; speed, fear; cunning; savagery; greed or gluttony; beauty; parasitism; danceability; flexibility; the way he walks, the way he attacks the prey; the shape of his body or parts of any other. Only very few names of the animal world have developed figurative meanings characteristic of humans, having as semantic subject semantic components that express linguistically indicators of the function or use of the referent marked by them or indicators of the environment and history.

3 Some names of this lexical field are not included in the process of linguistic metaphorization to characterize people according to physical and moral features, the word comes, trout, unlike carp, is not metaphorized, because the language creator, apparently, does not find any salient features that can be easily figured and on the basis of which reinterpretation can be done; whereas salmon, since it does not live in the Albanian environment, ie even "limited" in ordinary Albanian discourse, has not managed to be included in the process of metaphorization to qualify people according to appearance or internal features, as is the case with mullet, eel, etc .; while some other names of the animal world that have undergone the process of linguistic metaphorization have already become symbols of human attributes, for example, it is known that the donkey is also a symbol of patience, but this feature is not taken into account in metaphorical developments in the Albanian language (usually we do not say "he has the patience of a donkey", but "he has the patience of a pig"), he remains a symbol charged with a "negative" metaphor, which characterizes a fat man with a stupid mind, that is, a symbol of stupidity;

4 It seems to us with great interest to point out or discover also the social perception, the "usus" of the names or, in other words, the social perception of the phenomenon of linguistic metaphorization or reinterpretation; For example, the viper is really a reality for a "negative" metaphor ("- She's a viper"), but when we sing to a beautiful girl "My viper dotted", in this case we have a meaningful social use "Positive" of the word, which, as is well known, starts as an individual use, but, in

time, passes into social use; likewise, the rabbit is known to be a symbol of fear, but we caress the child when we call him a rabbit; the name donkey is known as an insult, for "stupid, stupid in mind", but, jokingly petted by the father, he says to his son: "- Come here, father donkey"; the clearest cases are hawks, lions, pigeons, etc.

We brought in this article many cases that highlight that feature, quality or feature of an animal which becomes the motive of semantic metaphorization, serving as a semantem of figurative meaning in naming people according to them. But such motives for semantics or semantic themes are endless in all areas of life, in spiritual and non-spiritual, concrete and abstract, second or third, fourth, etc. of figurativeness. These motives based on semantic themes constitute the specificity of semantic derivation, of meaning formation for each lexical-semantic field of Albanian.

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## INFORMATION MODELS AND HUMAN HEALTH

**Abstract.** *This article investigates new information models and technologies created on the basis of informology, information approach and their impact on the preservation of health and longevity of Russians.*

**Keywords:** *information, information models, technologies, people and society, language of relations in society.*

Reactions to the phenomena of the surrounding world, new productive forces and industrial relations, world challenges and threats have accelerated nowadays. This led to the transition from mathematical abstract models to information models. In conditions of the information society together with human resources and information and computing power they should ensure scientific and technological progress, the transition to a single global information and cellular community. Mathematics played a major role in the development of the USSR, its industry and agriculture, engineering, aviation, metallurgy, chemistry, mining, construction, natural Sciences, Economics and management. Some time ago science provided progress based on the use of economic and mathematical methods and models. Today any effective activity at different levels of management of branches of the national economy, the entire state and society can be achieved on the basis of information theory.

The basis of informology is the logical and mathematical language of relations in the micro-and macrocosm of the Universe. Relations are considered to be a multi-sided, universal and unified primary basis of information for all phenomena, processes and events in nature and society. Multiple relationships as the primary basis of information can be interpreted in the form of logical links: cause-effect; base-cause-effect phenomenon; path-time; object-part of the object; movement-path-

speed-time; induction-deduction; form-antiform; particle-antiparticle; synthesis-analysis; symmetry-asymmetry, etc. Functional dependencies of objects, events and values are used to describe various effects and events in nature and society. The primary basis of the Universe is not matter and antimatter, but information, autocorrelation relations of relations, connections, dependencies, velocity fields, electromagnetic, thermal, spin-spin, and other information fields of near and far range. Scientists' substantiation of the world picture (system, cybernetic, biological, synergetic, fluid, electronic, physical, etc.) allowed us to expand the boundaries of research of many processes and phenomena in which information is the basis of a new unified picture of the world. The power of time extends to materialized objects and the space of the Universe, but the information world is not subject to the power of time (in particular localized annihilation processes, it is practically absent due to absolutely instantaneous autoregeneration and correlation relations). Time can only be conquered by information.

It is known [1-4] there are four rough forms of materialized information in the Universe: earth, water, air and fire, as well as subtle forms of non-materialized information – mind, instinct, intra - and interatomic and intermolecular relationships that together make up the elements of earth life. The organisms of humans, animals, insects, and plants are actually small universes themselves with corresponding processes of change, growth, death, and transformation. They themselves are home to thousands or millions of living beings, processes and technologies similar to those in the Universe. On earth, there are actually two forms of natural information - internal (invisible) and external (visible), so the material energy depends on the information.

Science has proven that life is originally from chemical compounds, although it is unknown where the chemicals and their compounds came from. In fact, chemical substances are generated by life, which is characterized by information power – the autoinformogenesis of a single autocorrelation information-cellular space. E.g.: women and men are approximately the same, but the body of women is able to produce milk, give birth to children, and the body of men is not, which depends on autocorrelation codes, processes and technologies controlled by autoinformogenesis.

Life is a source of information power, an infinite autocorrelation auto-

information genesis. The information and cellular society is a new and non-alternative information model of humanity that can ensure peace and preserve life on Earth. Information is materialized and dematerialized (material and spiritual). The claims of materialist philosophers that everything comes from matter and not from information are incorrect, because dematerialized or spiritual energy is the primary source. It can exist without material energy, but the latter one cannot exist without information energy. It is not true that consciousness arises from matter, because consciousness actually exists as a form of information, and matter can dematerialize depending on consciousness, and vice versa. Just as darkness is derived from light, so matter is derived from information. All material is discrete, transitory, temporary, and all information is permanent, continuous, and permanent. In the information world of the Universe, there are many forms of life, and some of them are on Earth. Life and matter come from information (life), life (information) gives birth to matter and life, living people give birth to living children. Life differs from death by automatic adjustment of information processes and technologies of the biological form.

A number of scientists deny the philosophy of the Universe, the worldview of religious circles, in turn, aggressively opposed to science, which is wrong on both sides. Scientists consider all evidence to be biased without relying on empirical knowledge, experiment, and deny the justifications, subjective reasoning, thinking, and feelings of mystics, clairvoyants, ufologists, astrologers, palmists, theologians, and telepaths. Memory (information) is genetically transmitted from generation to generation, and at any stage of their development manifests itself in the form of predictions, knowledge, discoveries that happened a long time ago, statements that planets that had been described thousands of years ago discovered only in our era, created phenomena that are known only now.

From the energy-biological point of view, information is both a natural substance within us, between us, around and outside of us, and an attribute artificially created by man. Natural information provides autocorrelation process of self-informatization of the Universe independent from the information-energy and biological potential of human, and artificial information is created and used as the basis of energy-biological informatization of the Universe, research and knowledge

of planets and galaxies, the possibilities of building information biospheres for their development.

The most widely studied two areas of information: a) natural (autoinformatization of the Universe) – independent from the human object of research and learning (autoinformatization of the Universe – the natural primordial endless autocorrelation functioning of luminous environments and objects in the Universe, providing autoinformation balance of space and its structures); b) artificial – the subject of transformations of objective data for its application in the fields of activity (a particle of natural informatization of the Universe, covering all spheres of human activity and beyond it with the help of spacecraft, optical devices, radio telescopes and telemetry equipment).

There is no sphere of natural phenomena or artificial technologies on Earth without processes of information relations and relationships within and between objects. The unified world information and cellular community is a new socio-political formation that replaces material civilization, progressively mastering the processes of informatization and cognition of the information model of the Universe and awareness of the unity of the laws of information in nature and society.

The information model of the Universe reflects the deep essence of the physical picture of the world, the universal concept and information reality of nature with a generalization of material, logical, hypothetical and other models of the Universe. Information controls all processes within us, between us and outside of us. It is a universal single autocorrelation source of the world around us. Information is the process (action) of relations, and informatization is the process of providing humanity with a variety of information resources, increasing labor productivity by reducing the cost - productivity ratio, increasing literacy and living standards of the population, and moving to a new information and cellular society.

The heuristic model of self-generation, self-development and self-decay of biogenic micro-and macro-worlds of organisms in the Universe has the following form:

The principles that precede and accompany the informatization of society include: a) *humanization* of the informatization process; b) consciousness that

determines existence and is far ahead of it; c) saving material and labor resources through the development of information; d) prevention of nuclear and environmental disasters and other threats to the survival of civilization; e) demilitarization of society.

The Apocalypse of the New Testament may be replaced by the universal teletraffic of information civilization. To realize and see God, whose functions are always performed by anthropocentrism-anti-anthropocentrism and the universal law of preserving infinite information, means the immortality (eternal life) of a person and information faith (religion) in the information world (Yuzvishin, 2000; Evreinov, 2021; Arsenyev, et. al., 2021; Arsenyev & Davydova, 2021).

Creating new methods and techniques of information thinking is one of the most important modern objectives. Improving human health and longevity, as a small universe, requires an analysis of the problems of digestion, diet, sleep, hygiene and the relationship of the human body with the environment (Yuzvishin, 2000). The teaching of the academician Pavlova I.P. on the first and second signal systems, unconditional and conditional reflexes is a consequence of information relations both within the body and its environment. The body's signal systems function inextricably united with the human information system, which consists of elementary information relations of dematerialized, hypothetical and elementary particles, atoms, molecules, organs, fields, their traces, etc. The logical connection of human systems is as follows: informational → nervous → first → second. In order to subjectively represent and then objectify the nervous, first and second systems, it is necessary to find an elementary phenomenon (ideal, dematerialized, absolutely or physically vacuum, soul, psychic, left, trace, etc.), which, simultaneously being considered a materialized phenomenon of the surrounding nature, represents, in fact, information relations that continuously occur in human and animal organisms, in the micro-and macro-structures of the Universe. If the second signal system is a signal (primary signals) of the first system, then the last one is a signal (disturbance, interference) from the human, animal or external information system. The cortex of the cerebral hemispheres in higher animals and humans is the accumulator (analyzer) of all information relations in the body, as well as the body itself with the environment. In

the brain, there are "reference cells" which the relations of cells, glands, secretions, organs and processes of the body are constantly and instantly compared with, followed by instantaneous development of a reaction (a positive or negative impulse transmitted to the musculoskeletal-connective-Executive system of the body). The nervous tissue serves as receivers of information processed in the cerebral cortex as an information and analytical center of the nervous system. There is a constant exchange of information between the environment and the body of any person, providing a two-way process of metabolism – assimilation-dissimilation. The exchange of information, substances and energy is a three-side unity of opposite and at the same time inseparable processes in the human body and nature as a consequence of the universal law of information unity.

The human information system consists of two parts: a) the primary (subjective, dematerialized) ideal system of information relations of elementary particles (electrons, atoms, molecules, cells, fields, and their traces) involved in the life of the human body and outside it; b) the secondary (objective) system of information relations between the environment and the human body, its functional organs, glands, and secretions in the body. The objective information system consists of the nervous tissue, spinal cord and brain that form the Central nervous system, which is connected to the peripheral nervous system by long processes of neurons (non-moats) with receptors (receivers of primary signals, interference, and excitations). The main receivers and analyzers of information represent the organs of vision, hearing, smell, taste, touch, muscle and connective tissue and the human vestibular apparatus. From these receivers, information is sent to the cortex of the brain, where the interaction, analysis, processing and standardization of the received signals take place.

Information and code-based treatment, or self-treatment, has become extremely relevant in recent years. According to medical experts and traditional healers, the development of 80% of diseases depends on psychomuscular disorders of the person. Therefore, information and code-based treatment, autogenic training, aerobics, yoga are important in preventing and eliminating human diseases. Treatment is a composition of special words in a certain combination (code). Repeating for 5-10

minutes information-code words, each person can achieve relaxation, emancipation and immune activity of their body, prophylactically affecting all organs and the body as auto-generators of frequency-oscillatory processes. Each human organ with its own structure, shape, size, and different frequency of self-oscillations is synchronized into a single self-oscillating information-frequency process of the entire body, functioning in a certain frequency range. On Earth, it is difficult to find people with the same frequencies, and people with a higher natural frequency can influence people with less auto-frequency. The impact of increased heat, magnetic, electric, sound, hypnotic and other frequencies of one person causes another to change the frequency of the organ, secretion, glands, which can lead to an improvement or deterioration of his or her condition. An increase in the frequency of a doctor or a patient can be caused by information-code-word effects on these people. It is known that each person lives almost all his life with his strictly fixed frequency in the limits of the frequency range, and any attempt by another to go beyond this frequency band due to any deviations, physical, mental or other influences in order to try to achieve something (Yuzvishin, 2000). However, due to the law of universal information balance, the organism still returns to its frequency band by drug or surgical intervention, and leaving it will lead to disability or death, which should be taken into account by radio device developers and medical professionals when using frequency treatment methods.

Hypodynamia, colds, infections, stress, poisoning, bruises lead to diseases of the body, accompanied by discomfort, changes in the temperature norm, the chemical composition of food, air, and water in maintaining its information balance (homeostasis). Frequent diseases cause increased changes in temperature, frequency of vibrations (radiation) of a certain organ and disrupt its information imbalance and homeostasis. Man, as a complex information process and object, is related to the law of constant symmetrization and desymmetrization in nature, isotropy and harmony of his environment. Information (geopathogenic, biopathogenic, techno-pathogenic) cells (zones) that negatively affect the entire human environment, natural flora and fauna are extremely dangerous and harmful to their health.

The frequency, temperature, electrical or magnetic radiation of all people is

different. Information-field characteristics of all organs of the body reflect a single information-cellular field of a person, his vital tone, character, behavior, views, likes and dislikes, compatibility and incompatibility with other people. The information and gene structure of the body has developed in such a way that exogenous processes and their objects affect it negatively, which sometimes a person does not realize and does not feel. The natural symmetry and harmony of natural processes has a beneficial effect on the state and health of people, while the disharmony and desymmetrization of natural phenomena and processes under the influence of natural or artificial forces affects them negatively. The resonance of internal and external information fields of people is the basis of harmony in human life. Fields of objects, things, and plants have different effects on people's information biofields, feeding them with health-improving energy and removing negative energy. Violation of the universal law of information symmetrization-desymmetrization by natural or artificial means negatively affects people's information fields. At the first meeting, people on the internal information (bioenergetic) level feel 33 compatibility or incompatibility, love or dislike. With information compatibility they fuel each other with positive energy that ensures the harmony of their desires and goals, and incompatibility causes discord and discomfort of relationships. People who are close in genetics and biology (brothers, sisters), have the same structures, codes, and frequencies to a certain sign of discrepancy. When generating the appropriate frequency and energy of thoughts of biological objects even at ultra-long distances, they are perceived, decoded by the body's supervirtual memory and comprehended by the brain.

Science has partially studied the hidden qualities of man, his internal information, code structure, electricity, magnetism, hydro - and heat dynamics of his organs, and their relevant interactions. The human brain, in fact, is an operational processing center for perception and analysis of internal and external information, and the entire organism is its virtual memory. Man's supervirtual memory is the informational field of the Earth, the entire biosphere and outer space. People who are endowed by nature with hidden information and extrasensory abilities can easily connect to the biocosmic field when it is not available to others. The information process of human and animal thinking is a correlation process of perception and

reflection of factors of internal and external symmetrization and asymmetry in billion cells, molecules and atoms of both the brain and the entire organism. Thoughts are the result of the autogeneration process of simultaneous entry and exit of huge flows of information and thought waves (thought quanta), and the thinking process is the spherical propagation of a large flow of information modulated by the generalization frequency of internal information flows of human organs. There are no devices created that can receive, record, decode, and print out the content of informational thought waves of any person or animal at any distance. But now only natural information receivers (humans, animals) can perceive waves similar to their own, and decode them in the brain, as an operational processor with a virtual memory of the organism in the supervirtual memory of the Universe. The brain is a generator of thought frequencies that synchronizes in-phase the wave processes of the heart, kidneys, liver, lungs, and other human organs and systems.

Thoughts are a huge force: from a dematerialized, ideal form of information they can turn into material things, objects, structures. Constantly generated thoughts in one direction with a specific goal can spread over long distances and to the deepest parts of the information fields of people and animals. As in the theory of automatic regulation, thoughts in a feedback loop can influence those who emit them and transform people ("people create themselves"). With the help of the information physiognomy, people's occupation, profession, thoughts, hobbies, illnesses, etc. can be determined by their appearance. Since ancient times, healers, doctors, psychics, fortune tellers used the appearance and behavior of a person for therapeutic purposes (determining internal diseases) or predictions. The face is an information and encyclopedic book. It is possible to talk to its owner without wasting speech energy, find out what he is thinking, whether he is healthy or not. Behaviors, facial expressions, emotions, eye expressions and other signs of appearance are determined by the corresponding thoughts that generate them, the diagnostic alphabet of which is the specified features and signs of a person. Face and demeanor is a mirror (photograph) of any person's thoughts and health.

Up to 95% of the information a person perceives visually, but hundreds of times faster than through hearing. The combination of informational mental-visual

images and models, a high level of interests allow even elderly people, despite the weakening of visual functions, to have a greater accuracy of information-mental diagnostics and depth of judgments. It is not a secret that sound speech often leads to great conflicts with extremely undesirable consequences, because a word is also an act. Information and biogenic processes are responsible for life on Earth. The code of life in the micro-and macro-worlds of biogenic organisms is represented by a fine information auto-tuning of many parameters of both the world information balance and many biogenic properties. When searching for extremums of functionals, it is important to choose the right class of functions with initial, boundary, and additional conditions.

The future information and noosphere society, its scientific and technical potential and information technologies will influence the further development of countries. With distributed information and cellular self-government, democracy can develop freely only on the basis of neoinfotechnologies, while the role of state structures is to distribute and implement these technologies in the activities of society.

The classical mechanics by I. Newton preserved the primacy in the system of physical knowledge, and informology preserved the deep primary information essence in micro-and macro-dimensional processes and phenomena of nature. Space and time are forms of information existence, energy, force, motion, mass-types (methods) of its qualitative and quantitative properties manifestation in real and artificial processes and phenomena. The concepts of classical physics in informationology are related to the fundamental properties of information-materialization and dematerialization, symmetrization and desymmetrization, proportionality and deproportionality. Knowledge of information codes of a person and the Universe, other universal laws (rhythmicity, periodicity and cyclicity of the Universe), processes of self-organization, self-development (metabolism), self-management and self-destruction (self-decay) are important in cognition of the surrounding nature. Information science in combination with other Sciences will help to develop the Russian state and society, culture and technology, and the entire national economy.

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## **DEVELOPMENT A TRAINING SYSTEM FOR TEACHING THE CALCULATING OF A FUNCTION'S DERIVATIVE**

**Abstract.** *The article proposes the training system, developed for improvement of teaching process the topics of higher mathematics, in particular, for teaching of calculation a function's derivative. Use of trainig system considerably increases quality of training processes of the higher mathematics and accordingly makes easier for the students learning of mentioned topic.*

**Keywords:** *computer training, derivative of a function.*

### **INTRODUCTION**

It is known that improving the teaching of higher mathematics at universities is a complex psychological and pedagogical process to improve which scientists and teachers from different countries are actively working. Many approaches have been developed to improve the teaching processes of higher mathematics at universities. One of them is the development of training systems [Samkharadze, et.al. 2019; Samkharadze, et.al. 2017].

One area of higher mathematics, where a training system can be used successfully is teaching of calculation of a function's derivative. Let's give some definitions. The limit of the difference quotient as  $\Delta x$  approaches zero, if it exists, should represent the slope of the tangent line to  $(x, f(x))$ . This limit is defined to be the derivative of the function  $f$  at  $x$ . The derivative of a function is denoted by the symbols  $f'(x)$  or  $y'$ :

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{f(x+\Delta x) - f(x)}{\Delta x} \quad (1)$$

The ratio on the interval  $[x, x + \Delta x]$  is called the rate of change of the function  $f(x)$ .

The expression  $f'(x)\Delta x$  is called the differential of the function  $y = f(x)$ . It is denoted with  $dy$  symbols:

$$dy = f'(x)\Delta x = f'(x)dx \quad (2)$$

According to the definition:

$$dx = x' \Delta x = \Delta x, \quad (3)$$

from which we will have:

$$f'(x) = \frac{dy}{dx}. \quad (4)$$

If in equation (1) the  $\Delta x$  tends from right to zero, then the corresponding limit is called the right derivative of the function  $f$  at point  $x$  and is denoted by the symbol  $f'_+(x)$ :

$$f'_+(x) = \lim_{\Delta x \rightarrow 0^+} \frac{f(x+\Delta x) - f(x)}{\Delta x}. \quad (5)$$

Similarly, if in equation (2) the  $\Delta x$  tends from left to zero, then the corresponding limit is called the left derivative of the function  $f$  at point  $x$  and is denoted by the symbol  $f'_-(x)$ :

$$f'_-(x) = \lim_{\Delta x \rightarrow 0^-} \frac{f(x+\Delta x) - f(x)}{\Delta x}. \quad (6)$$

The functions  $f'_+(x)$  and  $f'_-(x)$  are called one-sided derivatives at point  $x$ .

The function is called derivative at  $]a, b[$  interval if it is derivative at each point in this interval, and the function is called derivative at  $[a, b]$  segment if it is derivative at  $]a, b[$  interval and is derivative at point  $a$  from right, and at point  $b$  from left. It is easy to see that the function is derivative at the point  $x \in ]a, b[$  when it has one-sided derivatives equal to each other.

Now, let's give some rules for the derivation of functions. If  $f(x)$  and  $g(x)$  are derivative functions at any interval, then  $f(x) \pm g(x)$ ,  $f(x) \cdot g(x)$ ,  $\frac{f(x)}{g(x)}$  ( $g(x) \neq 0$ ), functions are also derivative at the same interval and following equations are valid:

$$\begin{aligned} [f(x) \pm g(x)]' &= f'(x) \pm g'(x), \\ [f(x) \cdot g(x)]' &= f'(x) \cdot g(x) + f(x) \cdot g'(x), \\ \left[ \frac{f(x)}{g(x)} \right]' &= \frac{f'(x) \cdot g(x) - f(x) \cdot g'(x)}{g^2(x)}, g(x) \neq 0. \end{aligned}$$

In particular, if  $C$  is constant, then we will have:

$$[Cf(x)]' = C'f(x) + Cf'(x) = Cf'(x).$$

Thus, a constant multiplier comes out of the derivation mark:

$$[Cf(x)]' = Cf'(x).$$

The algorithms for calculating the derivative of functions are implemented in the training system. The following rules for the derivatives of the most common basic functions, where  $a$  is a real number, are implemented in the training system:

$$(c)' = 0, \quad (x)' = 1, \quad (x^a)' = ax^{a-1}, \quad (x^2)' = 2x, \quad (\sqrt{x})' = \frac{1}{2\sqrt{x}} \quad (x > 0),$$

$$\left(\frac{1}{x}\right)' = -\frac{1}{x^2}, \quad (e^x)' = e^x, \quad (a^x)' = a^x \ln a, \quad (\ln x)' = \frac{1}{x}, \quad (\log_a x)' = \frac{1}{x \ln a},$$

$$(\sin x)' = \cos x, \quad (\cos x)' = -\sin x, \quad (\operatorname{tg} x)' = \frac{1}{\cos^2 x}, \quad (\operatorname{ctg} x)' = -\frac{1}{\sin^2 x}.$$

Tasks of this topic are divided into three levels according to their difficulty. There are four tasks at each level.

The first window of the developed training system is shown on Fig.1. At the first level, the student is given four tasks to solve. To move on to the next step, student must solve any three tasks. The number of tasks at each level and the number of solved tasks which are required to move to the next level, can be different and predetermined by the leading professor of the course. The computer uses a random number generator to generate tasks that appear on the screen.

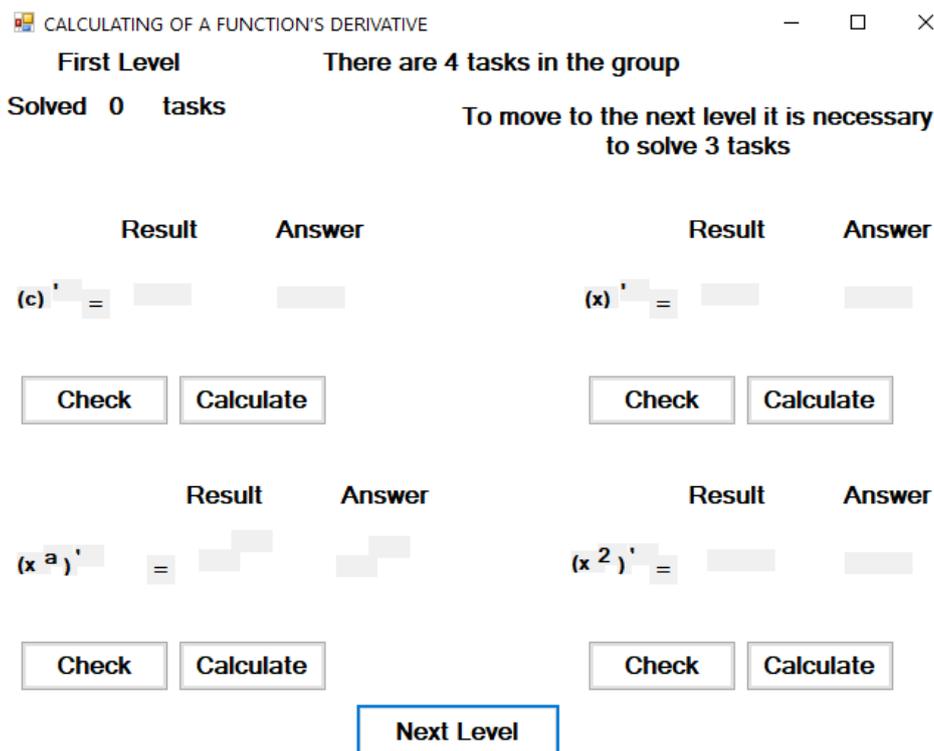


Fig. 1. The first window of the training system

The student chooses one of the tasks, solves it and enters the result in the field "answer" of this task. In order to check the correctness of this result, he clicks the "Check" button. If the answer is correct, the corresponding message and the number of correctly solved tasks will appear on the screen, and the student will start solving any other task. If the answer is incorrect, then a corresponding message will appear on the screen. In this case, the student can re-solve this task, or move on to solving another task and then return to solving this task again.

The system counts the number of correctly solved tasks, and as soon as it equals the predetermined number needed to move to the next level, the "next level" key is activated. Clicking on it opens the window of the corresponding next level, which will display the corresponding tasks of this level. The learning process ends when the student solves the required number of final level tasks. As a result, it will be considered that he has mastered the topic to be studied.

At each level of complexity, the student can change the data of any task and solve it again, if desired, can solve all the tasks, and so on. Below are the corresponding tasks for each level. The first level tasks are:

$$(c)' = 0, \quad (x)' = 1, \quad (x^\alpha)' = \alpha x^{\alpha-1}, \quad (x^2)' = 2x.$$

The second level tasks are:

$$\left(\frac{1}{x}\right)' = -\frac{1}{x^2}, \quad (e^x)' = e^x, \quad (a^x)' = a^x \ln a, \quad (\ln x)' = \frac{1}{x}.$$

The third level tasks are:

$$(\log_a x)' = \frac{1}{x \ln a}, \quad (\sin x)' = \cos x, \quad (\cos x)' = -\sin x, \quad (\operatorname{tg} x)' = \frac{1}{\cos^2 x}.$$

Such approach allows students at each level of learning as much as possible to reveal the intellectual opportunities and therefore will dramatically increase the degree of interest of students in this course. They, also can change the data of any task and solve it again. Using of training system considerably increases quality of training of calculation of a function's derivative and makes easier for the student learning this course. Such method of training can be successfully applied for effective training of different sections of the higher mathematics, such as, matrix calculation, integral calculus, mathematical logic, etc. The developed method also can be applied successfully for training in biology, chemistry, physics, etc.

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