COMPUTER LITERACY OF CITIZENS OF THE SLOVAK REPUBLIC IN THE CONTEXT OF INDUSTRY 4.0

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Abstract

Thanks to digital solutions, more flexible production, higher productivity and the development of new business models are possible today. However, the future of the industry offers even greater potential. Cutting-edge technologies will create new opportunities for both the discrete and manufacturing industries to meet individual customer requirements. Over the last decade, companies in various industries have digitized their operations and processes. Businesses are already using artificial intelligence to streamline workflows and supply chains. As a result, today's job seekers require specialized skills to help them stand out from the crowd. While some colleges, universities and training providers have adapted or expanded their curricula to meet this growing demand for digital know-how, many educators are trying to provide the basic skills that students need. Labor market responsive and lifelong learning remain key to success. In digital production, the demand for digital skills has been growing since 2015. It is important that Slovak education focuses on soft skills, especially social and technological ones, not on content. However, the ability to learn new skills "on the go" is and will remain the most sought-after skill of the people.

Keywords: computer literacy, industry 4.0, Slovak republic

1 Introduction

The world is constantly changing, and with it the increasing emphasis on the development of new technologies that should facilitate and at the same time optimize not only production but also everyday life. The beginning of the 21st century is associated with the expansion of the Internet, technology and their penetration into all areas of human activities. Constant innovation, optimization and efficiency itself are the key to gaining a competitive advantage in today's labor market. Industry 4.0 is considered to be a societal change affecting industry, technical standardization, research, education, the legal field, security, interconnection, and social systems. Digital skills thus represent an important competence for life and work, which has been multiplied mainly by the increase in digitization in everyday and working life. It is therefore natural to adapt to the change that is coming with Industry 4.0, because it is this that is causing the change in the employment system as we know it today. What is the level of these skills in the conditions of the Slovak Republic and what possibilities and challenges this issue brings will be the task of researching the following article.

2 Description of the approach, work methodology, materials for research, assumptions, experiments, etc.

Digital skills can be considered the complete foundation of almost all aspects of work and life as such. From filling in the official form to communication between people. It is therefore difficult to find a job or a life task that does not require at least a basic level of digital skills. Digital skills are the gateway to opportunity in the 21st century. According to Rose (2016), digital technologies are a major driver of growth, productivity, competitiveness and innovative capacity for the economy. However, for the labor market, they are a challenge for existing jobs, especially for those that involve routine tasks and opportunities to create new ones, which are mainly related to digital skills. According to Ghobakhloo (2020), the fourth industrial revolution, also known as Industry 4.0, is just considered to be the basis of digital transformation. It is transforming the way individuals basically live and work, which has a strong bearing on digital skills. Industry 4.0 enables the digitization of the manufacturing sector using built-in scanners in virtually all manufacturing components, products and devices. This analysis of related data in the ubiquitous system of combining digital data and physical objects has the ability to transform every industry in the world so that it develops much faster, more efficiently and with greater impact (Mrugalka, Wyrwicka, 2017). At the same time, Qin et al. (2016) add that Industry 4.0 supports production efficiency precisely through intelligent data collection, correct decision-making and decision-making without any doubt. Using the most advanced technologies, data collection and interpretation procedures will be simpler. This overall consistency represents Industry 4.0 as the most important aspect of artificial intelligent functions. Based on previous opinions, it can be stated that the development itself does not arise only in business, but it also has implications in the institutional, educational, training and social spheres. Therefore, the importance and essence of digital skills is taking on a much larger dimension than in previous

times. According to Karacay (2017), in today's global environment, the sustainability and competitive advantages of a company depend primarily on their ability to adapt to changing business requirements and thus also the requirements that are placed on people's abilities. Creating a future workforce involves not only attracting and developing new talent, but also retraining current employees. However, it is necessary to realize the difference between digital skills and digital navigation skills. Digital skills are the technical skills needed to use digital technologies, while digital navigation skills represent a wider set of skills needed to succeed in the digital world. This includes finding information, prioritizing information and evaluating the quality and reliability of the information system itself. These skills in digital navigation are not fundamentally different from the non-digital skills that were needed in the past and are still needed today. Digital navigation capabilities have also been referred to as "eternal skills" (Grand-Clement, 2017). Marsh (2018) says a recent European Commission study on digital skills in the workplace found that 88% of organizations take no action to address their employees' digital skills shortages. According to her, this finding is particularly worrying, as more than a third of respondents say that a lack of digital skills in their workforce affects performance, with the main negative effects being lost productivity and reduced customer numbers. The research found that the development of digital transformations in organizations around the world is hampered mainly by a lack of appropriate digital skills and insufficient staff training. According to Vosloo (2018), these are mainly shortcomings in the following spectra, which include digital skills and competences, which are further defined by UNESCO and the International Telecommunication Union - ITU:

- Basic functional digital skills that allow users to access and perform basic operations.
- General digital skills that involve using digital technologies in a meaningful and beneficial way, such as content creation and online collaboration.
- Higher-level skills that mean using digital technologies in an empowering and transformative way, for example for software development (Broadland Commission for Sustainable Development, 2017).

Another view of the issue is provided by Price and James (2018), who in their research approached 60 organizations around the world to find out how they structure and use their digital activity. They have revealed a number of challenges, many of which are related to digital skills and, in particular, their lack. Respondents were asked which digital skills they considered most valuable. Their answers were as follows:

- Technical leadership - the ability to lead an organization to make sound decisions about the implementation of digital technologies and the development of a stable scalable digital infrastructure.
- Content Management and Editing - This skill set reflects the content focus of most digital teams that have researched, and points out that digital teams have editorial ownership and manage content delivery to the platforms they support.
- Data Management and Analysis - These skills enable the digital team to understand user behavior, which can guide the design and development of digital experiences and inform decision-making and digital investment.

In contrast, 60% - data management and analysis, 56% - develop web applications / applications and 51% consider technical equipment to be under-represented in a number of digital skills. There are several solutions to this situation and issue, for example, the Finnish government has worked with industry and academia to create a six-week massive open online course (Mooc) called "Elements of AI", which it introduced in 2018. The second EU-funded initiative is the Sector Skills Alliance. These alliances consist of a consortium of public and private sector organizations from at least three EU countries. Their role is to identify labor market needs and to support the design and delivery of transnational VET content, as well as teaching and training methodologies at the local level (Everett, 2020). If countries, including Slovakia, want to succeed in the development of small and medium-sized enterprises in the context of the smart industry in the coming years, several changes will be needed. The small and medium-sized enterprises in Slovakia themselves will have to consistently approach the analysis of the current situation in their company, analyze in detail all the procedures and processes that should be subject to automation. So it is about digitization and the digital skills associated with it. Our goal is to find out what are the digital skills of the citizens of the Slovak Republic on the basis of available information and statistical data. Where we can see the biggest shortcomings and what steps are being taken by companies, the state to improve this situation. Our findings will allow us to shape the direction of the paper and its problems.

3 Description of achieved results

The Commission has presented its Digital Learning Action Plan for the next seven years. It outlined a bilateral strategic approach to promoting digital learning in the EU. It includes ensuring the highest quality infrastructure, connectivity and digital equipment for students, as well as supporting the acquisition of basic digital skills from an early age. The plan will include a wide range of initiatives, including recommendations for distance education in primary and secondary schools, the creation of guidelines for the use of artificial intelligence in teaching, and the introduction of the so-called European Certificate in Digital Skills. Education and training have had enormous difficulties due to COVID-19 and the rapid transition to distance and online education. The mass use of technology

thus revealed its gaps and weaknesses. As many as 95 percent of respondents to the public consultation on the Digital Learning Action Plan see the crisis as a turning point in the way technologies are used in education and training. In Slovakia alone, according to the Institute of Educational Policy at the Ministry of Education, up to 52,000 children did not learn at all during the closure of schools in the first wave of the pandemic and 128,000 learned only through worksheets and occasional phone calls, ie without the Internet, which represents almost a quarter of all primary and secondary school students. According to a public consultation, up to 60 percent of Europeans have never used distance and online education before the coronary crisis. Roughly the same number of respondents say that their digital skills have improved during the pandemic, but about half of the respondents say they would like to work even more on these skills. As school curricula are the sole responsibility of EU Member States, the European Commission can only recommend specific measures for the time being. As many as 40 percent of young Europeans think that topics such as critical thinking, the media and democracy are "not taught enough" in schools. Combating misinformation and harm on the Internet through education and training is crucial for the effective functioning of individuals in society. The executive therefore wants to develop common guidelines for teachers and educators to guide them in how to teach, but also to practice the fight against misinformation. The plan also emphasizes gender balance in various aspects of digital skills.

The European Executive has set out its vision for the creation of a European Learning Area by 2025. It would consist of a series of benchmarks within the EU education area, which would, inter alia, offer more opportunities to study abroad, ensure the recognition of official qualifications throughout Europe, promote the acquisition of foreign language teaching and provide every European with access to high-quality education. At the beginning of July, the Digital Skills Agenda set the EU's executive branch new and ambitious targets for skills upgrading and retraining by 2025. At the same time, it seeks to ensure that up to 70 percent of European adults have basic digital skills. This announcement follows the recent publication of the Digital Economy and Society Index by the Commission. The index found that a large part of the population still "lacks basic digital skills, although most of them want to have these skills." In addition, the recently published Innovation Scoreboard, also presented by the European Commission, found that it was the countries that co-created the right environment for innovation in terms of human resources that were also committed to supporting educational initiatives in universities (Euractiv, 2020). A dramatic transformation of the workforce is taking place right before our eyes. The Covid-19 pandemic has developed from a health crisis to an economic and social crisis. Some types of work have literally disappeared from the face of the earth, and entire industries have been severely damaged in a way we have never experienced before. The demand for labor is also changing. There is a growing hunger for cybersecurity experts, data analysts, and software and application developers. New jobs such as "contact tracers" (workers monitoring the network of contacts infected with Covid), "distance monitors" (workers monitoring health at a distance) and "temperature controllers" (workers who monitor body temperature) are rapidly emerging. Demand for other jobs, such as air transport, hospitality and the entertainment industry, will disappear at the same rate. A new categorization of work activities into "necessary" and "non-necessary" is emerging. Necessary positions (first-line workers), such as employees in grocery stores, drugstores and general merchandise, couriers, or medical staff, ie employees who did not stop working even during the crisis, became heroes.

Since March 2020, we have seen the largest change and regrouping of the workforce, as well as the most marked changes in the demand for labor skills, since the Second World War. Some of the skills that were in the course in 2019 are out of date today. These changes come really suddenly: even the skills that were most in demand at the beginning of the crisis are different from those that are in demand now and that will be of interest in the future. The crisis strengthens the interest in technical and personal skills that we have identified some time ago and predicted their need. The acute shortage of skilled workers mainly concerns technology. Demand for cybersecurity experts, software developers and data analysts is growing. The demand for general and personal skills (human or power skills) is also increasing. In a time of rapid change and general uncertainty, these, the so-called The soft skills of employees and leaders are more important than ever, such as communication, priority setting, adaptability, initiative, integrity, analytical thinking, relationship development, empathy, coaching and resilience.

What is the impact of the crisis on women and men? From a health point of view, the crisis is having a more serious impact on men, and the economic and social crisis will have a longer-term impact on women. Women are more likely to have a temporary break from work (12% vs. 10%) and are more concerned about returning to work. On the other hand, they value office work more because it is a way of separating work from privacy. Men want to return to work to succeed and advance their careers. In connection with returning to work, they feel more relief, satisfaction and security. Working from home is not always a win for women. One could easily get the impression that flexible working will be an effective and universal tool for balancing inequalities between men and women. This is not always the case. Men use work in the office more for networking, women for cooperation and to do the work. Working from home could reinforce fundamental inequalities by further reducing opportunities for personal networking. There is also a threat of a new form of "presentation". In most cases, some workers will be present at the workplace, some will work remotely. What happens when some team members work in the office or on a business trip and others work from home? Instead of unsubstantiated assumptions about productivity and performance, data needs to be collected and analyzed. Look at the impact of teleworking on different levels of workers. Do they bring the same career benefits to members, mid-career employees, or leaders? Actively combat any entrenched prejudices related to the maternal roles of mothers and fathers, so that these norms are not a major factor influencing the way

managers and colleagues perceive teleworking for men and women and do not affect their expectations. Above all, learn to evaluate productivity and reward people for their true contribution, not for how they present themselves externally (Manpower, 2020).

The EU Executive has developed a Digital Single Market Strategy, as well as a regulatory framework in line with the emerging digital era. Investments in the Digital Europe program are aimed at increasing the EU's competitiveness and developing and strengthening Europe's strategic digital capacities. Key digital capabilities include high-performance computing, artificial intelligence, cyber security and advanced digital skills. The Commission proposal focuses on five areas. The first is supercomputers, where the Commission has set aside € 2.7 billion to build and strengthen high-performance computing and data processing in Europe. The second is artificial intelligence. The sum of EUR 2.5 billion is intended to extend artificial intelligence to all European economic and social spheres. Cyber security and trust are the third areas on which the European Commission will focus. The fourth area of interest is therefore digital skills. The last fifth area is the widespread use of digital technologies. The Commission wants technology to be used in all economic and social spheres, for which it has set aside € 1.3 billion. This is to ensure the digital transformation of public administration and public services and their interoperability across the EU. The aim is to facilitate access to technology and know-how for all businesses, especially small and medium-sized enterprises. To this end, Digital Innovation Centers will be set up to serve as single points of contact for SMEs and public administrations, providing access to technological knowledge and experimental facilities, as well as providing advice on better assessing the digital transformation of projects (TASR, 2018).

4 Conclusion

Progressive digitalisation, together with the increasing flexibility of production processes, provides industrial companies around the world with new opportunities and opportunities - enabling them to meet increasingly differentiated customer needs and reduce time to market. Digitization also optimizes the use of resources such as energy, water and wastewater, while increasing environmental efficiency. The digital transformation paves the way for further innovation, new services and even completely new data-based business models. Digital business enables industrial companies of all sizes to implement current and future automation and digitization technologies. In this way, they can use the full potential of Industry 4.0 and prepare for the next level of their digital transformation journey. The digital enterprise enables companies from every industry to integrate and digitize their business processes. Companies can start digitizing at any step of their value chain for green and brown industrial plants and based on standardized and open interfaces. As many as 60 percent of Europeans have never used distance and online education, but digital skills have proven to be irreplaceable. The European Commission is presenting plans to support educating citizens in this area for the next seven years. The Commission has presented its Digital Learning Action Plan for the next seven years. It outlined a bilateral strategic approach to promoting digital learning in the EU. It includes ensuring the highest quality infrastructure, connectivity and digital equipment for students, and supporting the acquisition of basic digital skills from an early age. The plan includes a wide range of initiatives, including recommendations for distance education in primary and secondary schools, the development of guidelines for the use of artificial intelligence in teaching, and the introduction of a European Certificate in Digital Skills.

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CZECHOSLOVAKIA - APPLICATION OF DEMOCRACY IN 1990

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Abstract
The political change after November 17, 1989, was the beginning of new historical era for Czechoslovakia. A top priority of the new leaders was the re-creation of a democratic political system and the effort to re-create a market economy and to rejoin Europe. Czechoslovakia's newly re-created democratic political system proved unable to survive the continued conflict between Czechs and Slovaks that dominated public life during the first post-communist era. The milestones in the phasing can be seen in the dates on which fundamental changes in the legislative bodies had taken place, i.e. the dates of the reconstruction of the Federal Assembly, the Czech National Council, the Slovak National Council (end of January and beginning of February 1990) and the date of general election to the legislative bodies on June 8, 1990. This article will reflect several important political facts in Czechoslovakia, the institutional changes that occurred after the end of communist era and milestones emphasis on the development of the Slovakia. The methods used in this article were mainly analysis, synthesis, literature search and study of historical sources, which as a basis of research contributed to achieving the set goal.

Keywords: Constitution, Czechoslovakia, democracy, revolution, Slovak republic, state.

1 Introduction

The breakpoint in 1990 is a significant milestone in the history not only for Czechoslovakia, but also for democracy. A wide space was opened for changes in all areas of social and economic life of Czechs and Slovaks, respectively the "Czechoslovak community". Law and word have regained their meaning, political pluralism and democracy have become a daily reality. After 44 years, free elections (parliamentary and municipal) were held again. The dual model of public administration came into force and at the end of the year the competent law came into force. The first year of freedom was rich not only for illusions, but also for bizarreness and disappointments. At the same time, we can call this year as the year of determining the next direction of our company. For this and many other reasons, we will recall the events that took place in 1990 and that were recorded in our historical annals.

2 1990 - a year of changes

From november 1989, the inhabitants of Czechoslovakia did not expect only partial corrections of socialism. They wanted a fundamental change in the social system. They were not afraid to manifest and demand the changes offered by the changing international situation [1].

During this period, in 1990 (the so-called year of changes), there are historical events in our State that change the form of behavior and the application of rules. The period from november 1989 to the first free elections in June 1990 was a brief and unsuccessful attempt to liberalize the regime and the successful transition of the regime culminating in the clear victory of democratic political parties in the elections of 8 and 9 June 1990. In the context of changes, there is change in the view of self-government and in state administration. The most significant socio-political changes of this period are the restoration of territorial self-government of municipalities [2], [3] and a spontaneous effort to correct some insensitive decisions from previous years.

Significant characters of that period were the temporary government and the President. Opponents of the previous regime have taken key-leading positions in the State. The dissident Václav Havel became the President, the former reform-communist Alexander Dubček became the Chairman of the Federal Assembly. Their task was to lead the country to the first free elections and to promote the principles of a democratic system. However, the beginning of the transformation of our society, there was a different view, perception and the need to grasp socio-political issues. The first conflicts and disputes arose soon, which eroded the relations, ties and direction of the policies of "Czech-Slovak coexistence" [4].

The problem of the post-communist build-up of liberal democracy and the market economy was, for example, the issue in Czech and Slovak relations. Czech and Slovak relations began to escalate after unsuccessful attempts by President Václav Havel to rename the State. It resulted in the so-called Hyphen War. While the Hyphen war carried little policy significance, it pointed to the existence of strong mutual resentments among the political elites of the two republics, and set the tone for the negotiations over more substantive issues. [5]. This subsequently led to a process of independence and autonomy of both States (1.1.1993).

As Zajac states [6], "the struggle for the existence of Czechoslovakia began with a struggle for the name of the State."

A partial solution to the conflict between the Czech and Slovak political representations was Constitutional Act no. 81/1990 Coll. on the change of the name of the Czechoslovak Socialist Republic (ČSSR). However, this initiative has led to even greater divisions. The reason was the double form of the name of the State, with which the countries were to present themselves. The name Czech-Slovak Federal Republic (ČSFR) was valid for Slovakia, and the name without a hyphen was valid for the Czech Republic and abroad. That caused a great resentment in Slovakia. As Zemko states [7], "the point was that the name of the State presents the character of the State. Should it therefore be the unitary nature of the State or a State composed of two equal parts?" This problem was resolved after painful negotiations when the new name Czech and Slovak Federal Republic (CSFR) was adopted. This name was valid until the official division.

Zajac [6] also emphasizes that this period was not just a political duel. "It quickly turned the political struggle for sovereignty into an economic struggle for authority over state property. In the first case, the focus was on whether the owner of state property will be a joint State or republics itself. In the second case, who will control the economy. The Slovak leaders began advocating institutional reforms that would have placed the relations between the two constituent nations on more equal footing. [5] The Slovak government promoted greater competencies for republics. The Czech government preferred more power to the federal authorities. The struggle for the content of the so-called "competence law" thus represented one of the most serious disputes over the form and functioning of the Czech-Slovak federation in the years 1990 to 1992.

It was even worse with the Constitution. The proposal of a new form of the Constitution could not be approved at all. Controversies arose not only in terms of its qualitative but also quantitative values. The question, whether there should be one or three Constitutions (one federal and two for republics) was not answered at all.

The peak point of the events of november 1989 was the elections (8 and 9 June 1990), which had the character of open competition between several political entities. The organization of the first free and pluralist elections after more than forty years meant a lot to Czechoslovakia. The electoral rules followed the tradition of a proportional electoral system from the time of democratic inter-war Czechoslovakia [8]. On the other hand, these choices have been marked by agile societal discussions. In addition, society began to polarize significantly. However, the successful transition of the regime culminated in the clear victory of democratic political parties promoting the rule of law and a market economy.

3 Description of results

The elections in 1990 meant for the citizens of the Czech and Slovak Federal Republic, that they had the opportunity to vote in the real manner. Nevertheless the elections were held before, the difference was that citizens could vote freely and choose from several political parties. Therefore, the institute of free elections is one of the basic pillars of a democratic society.

The size and nature of the election was huge. Elections to the House of Peoples (SĽ) and the House of Nations (SN) of the Federal Assembly (FZ), the Czech National Council (ČNR) and the Slovak National Council (SNR) were held. Although the federal and republican parliaments began to take shape in part before the election, the result of the election could not be estimated in advance. The problem was that no one knew what public support they could expect and how the new politicians are perceived. At the same time, the key question which has not been answered, was, how are the communists, who have ruled so sovereignty so far, perceived by the public? If they get majority and won, it could be not only the first, but also the last free elections. Despite these unanswered questions and issues, the favorites won. The Public Against Violence (VPN) party won in Slovakia and the Civic Forum (OF) won in the Czech Republic. Zeman [6] aptly comments on the election result: "We have survived; it is time to think about what will happen next."

At the same time, these elections can be referred to as elections of trust. Therefore, they were to some extent considered a "mini-referendum". The citizens had the opportunity to decide about the regime of the newly created State and their representatives.

According to Gális [9], the biggest shortcoming of the elections was "the absence of a relevant federal party. Although the Communists formally formed one party, the Slovaks were mentally elsewhere. Although VPN and OF cooperated, they did not merge organizationally. The Slovak Democrats and the Czech People's Party have made an agreement that they will not act on the other bank of Moravia river."

Slovakia shuffled even more cards. This was aroused by nationalist passion and the question of a clear determination of the position in the joint State. Although there was no open talk of independence, everything was geared towards that.

Social and political pressure caused a record number of voters. Almost everyone went to the polls. The reason was the desire and determination to express what was absent in the previous governmental establishment.

At the same time, the elections started a two-year operation of democratically and freely elected institutions, i.e. the Federal Assembly (FZ) and national parliaments. FZ was composed of two equal chambers. The House of Peoples (SĽ) had 150 deputies elected throughout Czechoslovakia. The House of nations (UN) consisted of 150 members elected on a parity basis. Half of them were elected in the Czech Republic and half in the Slovak Republic. The Czech National Council (CNR) consisted of 200 deputies, the Slovak National Council (SNR) 150 deputies (Table 1).

Table 1*Winning political parties in the 1990 elections* [10]

Federal Assembly							
Czech republic				Slovak republic			
Political party	Votes		Number of chairs	Political party	Votes		Number of chairs
	number	%			number	%	
House of people							
Občanské fórum	3 851 172	53,15	68	Verejnosť proti násiliu (VPN)	1 104 125	32,54	19
Komunist. strana Československa	976 996	13,48	15	Kresťanskodem. hnutie (KDH)	644 008	18,98	11
Křesťanská a demokr. unie	629 359	8,69	9	Komunist. strana Slovenska (KSS)	468 411	13,81	8
Hnutí za samospr. dem. - Společnost pro Moravu a Slezsko	572 015	7,89	9	Slovenská národná strana (SNS)	372 025	10,96	6
-	-	-	-	Koalícia Spolužitie - Maďarské kresťanskodem. hnutie (ESWMK)	291 287	8,58	5
Overall			101	Overall			49
House of nations							
Občanské fórum	3 613 513	49,96	50	Verejnosť proti násiliu (VPN)	1 262 278	37,28	33
Komunist.strana Československa	997 919	13,80	12	Kresťanskodem. hnutie (KDH)	564 172	16,66	14
Hnutí za sam.dem.- Sp.Mor.a Sl.	658 477	9,10	7	Komunistická strana Slovenska (KSS)	454 740	13,43	12
Křesťanská a demokratická unie	633 053	8,75	6	Slovenská národná strana (SNS)	387 387	11,44	9
-	-	-	-	Koalícia Spolužitie - Maďarské kresťanskodem.hnutie (ESWMK)	287 426	8,49	7
Overall			75	Overall			75

Source:

As Szomolányi presents [11], “the elections in 1990 created the legitimacy of a new government elite. It was tasked with creating the institutional framework for the new regime and its economic system."

Among the important and decisive acts of this period, we also include the renewal of self-government (Act on Municipal Establishment). This can be described as a basic pillar of the later introduction of the dual model of public administration, which is still valid in a modified form.

4 Conclusion

The year 1990 was marked by euphoria. Emotions evoked negotiations about the new name of Czechoslovakia, arguments about the hyphen as well as the result of the elections. Expectations and disappointments alternated rapidly. The pressure and the need to assert themselves were therefore enormous on both sides. Society welcomed change and the influx of freedom. It believed in unity and brotherhood. The society did not know, that this period would last so short. Ideals began to fade. The harsh reality began to show more and more intensely. The era of joint Czechoslovakia began to fall slowly. However, it managed to build a solid foundation for the transition from autocracy to democracy, on which both republics stand to this day.

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BUSINESS ENVIRONMENT in SLOVAK CONDITIONS

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Abstract

It is indisputable that a quality business environment in the economy is a basic prerequisite for its long-term competitiveness and subsequent economic growth and development. Therefore, we can state that the business environment in its broadest sense reflects the quality of conditions and preconditions for the rational development of business activities. The level of quality of the business environment determines the conditions for long-term sustainable achievement of economic growth and increasing the competitiveness of the economy. A healthy business environment, which motivates people to do business, is one of the key tools of the state to ensure long-term economic growth. The business environment must allow for effective competition between entrepreneurs, which is a key driver of the economy. The aim of the presented paper is to descriptively characterize the business environment, evaluate the quality of the business environment through selected indices and then specify the obstacles and limits that prevent business entities in business activities and their further progress.

Keywords: *business environment, small and medium-sized enterprises, economic growth and development, barriers to business, quality of the business environment*

1 Introduction

Small and medium-sized enterprises are an important part of the Slovak economy. These enterprises are the driving force of the economy, create jobs, respond flexibly to market conditions and stimulate the growth of the living standard of the population. But small and medium-sized enterprises in Slovakia are currently exposed to many problems related to the business environment with its structure and quality. Despite these problems, small and medium-sized enterprises are a means to the growth and development of the Slovak economy. They have the ability to adapt quickly to market requirements. To adapt production to the changing requirements of customers and customers. This means that small and medium-sized enterprises are an essential element of modern economies. They therefore represent the basic business entities in a market economy with their typical features and characteristics. (Majdúchová, 2012) According to the author Felisová et al. (2004) the main prerequisite for the positive development of small and medium-sized enterprises is the creation of a good business environment and suitable conditions for entrepreneurship. Here we should ask ourselves the question: "What is a good or good business environment?" A good business environment is therefore an environment that creates equally favorable conditions for all involved, regardless of where they come from, what their legal form, size, etc. A good business environment must therefore enable effective competition between businesses, which is the basic engine of the economy. It should be noted that the individual elements of the business environment are significantly shaped by the state through economic policy. Therefore, the importance of the state in shaping the business environment is not negligible. This means that the state should create stable conditions for the implementation of business activities in the long term, i.e. gradually build a favorable, high-quality business environment. Public institutions should therefore serve to increase and simplify business conditions for these business activities and not to complicate the whole process. Therefore, the state should create such conditions for business in the whole territory of the Slovak Republic, which will support new investments, increasing productivity, innovation and the creation of new jobs, and at the same time remove all barriers to effective business. In order to be able to evaluate the conditions for doing business in small and medium-sized enterprises in the Slovak Republic and then point out the limits limiting their business activities, we must first focus on evaluating the quality of the business environment. indexes. Through selected indices, we can then evaluate the quality of the business environment. Indices have different constructions, use different data, different data sources and different variables. Several criteria are used to divide them, such as by species, objectivity of evaluators and the like. The index that we choose to evaluate the quality of the business environment can be, for example:

a) unique - the data are obtained by an unusual survey and follow only a pre-selected purpose,
b) composite - is derived from several existing surveys and indicators

Objective indices are those that are calculated from objectively measurable data. Subjective are those that are based on the subjective judgments of the respondents of the selected group. The construction of the index, the nature of

the data and the sources of the data are considered to be the three basic criteria for measuring the quality of the business environment. The individual indices also differ from each other in the subject of their measurement. The subject of measuring each index is to measure the quality of the business environment through the selected variable. The following indices can be used to measure the quality of the business environment:

- Corruption Perception Index (CPI)
- Global Competitiveness Index, assessed by the World Economic Forum
- Business Environment Index (IPP)
- Doing Business report, carried out by the World Bank
- Aggregate Governance Indicators (AGI)
- Opacity Index (OI)
- Capture Index (CI)
- Economic Freedom Index (EFI)
- Corporate Governance Risk Index (CGR)

When processing the paper, we worked with information obtained from basic information sources such as the database of the Statistical Office of the Slovak Republic, Eurostat and the Slovak Business Agency. An important source of information was also information and reports of important Slovak and European institutions, such as the Business Alliance of Slovakia. Slovak Business Agency, European Commission reports. Standard scientific research methods were used to process the paper. We have been monitoring the development of individual indicators over the last ten years. To evaluate the quality of business conditions for small and medium-sized enterprises in the Slovak Republic, we have selected the following indices: Corruption Perceptions Index, Global Competitiveness Index, Doing Business Report and Economic Freedom Index.

2 Evaluation of the quality of the business environment through selected indices

The quality of the business environment significantly affects the performance of the business sector. Therefore, the creation of a healthy business environment is an important prerequisite for the development of the business sector. Small and medium-sized enterprises, which play an important role in the Slovak economy, are more sensitive to the shortcomings of the business environment, but at the same time they have limited resources to overcome them. Small and medium-sized enterprises (the definition is given in Table 1) represent an important part of the economies in developed countries. In the conditions of the Slovak Republic, small and medium-sized enterprises represent more than 99% of the total number of all enterprises, while their share in value added is about 50% and the share of employment is on average around 60-70%.

Table 1 Definition SME

SME Definition				
Enterprise category	**Ceilings**			
	Staff Headcount (number of persons expressed in annual work units)	**Turnover**	**Or**	**Balance sheet total**
Medium-sized	< 250	≤ € 50 million		≤ € 43 million
Small	< 50	≤ € 10 million		≤ € 10 million
Micro	< 10	≤ € 2 million		≤ € 2 million

Source: http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en

For this reason, it is necessary to systematically monitor and evaluate the state and development of the small and medium-sized enterprise sector and to take measures for its further development. Table no. 2 shows us a change in the total number of small and medium-sized enterprises in the last ten years, where we can see how the ratio of the number of small and medium-sized enterprises - legal entities has changed to the detriment of small and medium-sized enterprises - natural persons. During the observed ten-year period, the number of small and medium-sized enterprises in the Slovak Republic increased by 7.7%.

Table 2 The state of small and medium enterprises in the Slovak Republic

	2010	*2019*	*absolute increase*	*Index 2019/1996*	*in %*
Total number of SMEs	552 725	595 371	42 646	1,077	7,7%
SMEs legal entities	142 417	246 353	103 936	1,729	72,9%
FO entrepreneurs	**410** 308	349 018	-61 290	0,850	-15%

Source: SBA, based on data from the Statistical Office of the Slovak Republic

Corruption Perceptions Index

The Corruption Perceptions Index serves as a reminder that abuse of power or bribery continues to be a problem in many countries around the world. The level of perception of corruption classifies countries and territories according to how corrupt its public sector is. Transparency International rates public sector corruption on a scale from 0 (high levels of corruption) to 100 (the so-called "clean country"), where 0 means that the country is perceived as very corrupt and 100 means that it is perceived as very clean. From the following table no. In the world rankings, countries such as Denmark appeared at the top of the list, finishing in first place, followed immediately by New Zealand, Singapore and Sweden. These countries are considered to have the lowest levels of corruption. The placement of the Slovak Republic on the tail either of the V4 countries or its placement among the last EU countries creates pressure on the government not to take the problem of corruption lightly and considers it an important factor in creating a successful and high-quality business environment. Entrepreneurs in the Slovak Republic perceive the problem of corruption as very serious. Corruption is the third most serious barrier to business in Slovakia. The problem of the high level of corruption in the Slovak Republic does not lie in insufficient legislation, because from a formal point of view, Slovakia has anti-corruption laws and control mechanisms at the level of European standards, but lags far behind in their practical application.

Table 3 Corruption Perceptions Index

year	**2010**	**2011**	**2012***	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
rank	62	66	62	61	54	50	54	54	57	59
score CPI	4,3	4.0	46	47	50	51	51	50	50	50

*Source: own processing based on http://www.transparency.org (*Transparency International has revised the methodology used to compile the index in order to compare scores from one year to the next.)*

Global Competitiveness Index

The Global Competitiveness Index is the most comprehensive assessment of national competitiveness and is analyzed and evaluated annually by the World Economic Forum. The World Economic Forum assesses competitiveness on the basis of available statistics and a global survey of managers' views. Table 4 shows the development of the value of the index over the last ten years as well as the ranking of the Slovak Republic in the ranking of the World Economic Forum. The global competition index takes values from 0 - very low competitiveness to 100 - maximum competitiveness. During the period under review, the Slovak Republic ranked worst in 78th among the evaluated countries in the world in 2013. This meant the worst historical placement for Slovakia since its accession to the European Union as well as since its inclusion in this prestigious international comparison (see Table 4).

Table 4 Global Competitiveness Index

year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
ranking score	60	69	71	78	75	67	65	59	41	42 (66,8)
change	-13	-9	-2	-7	+3	+8	+2	+6	+18	-1

Source: own processing http://www3.weforum.org

In its last report for 2019, the World Economic Forum also identified what, based on the analysis, it considers to be the biggest competitive disadvantages of the Slovak economy and barriers to the development of economic activities. Detailed data can be found in the following table 5.

Table 5 The biggest competitive disadvantages of Slovakia 2019

The biggest competitive disadvantages of Slovakia	**ranking**
Labour tax rate	138
Distortive effect of taxes and subsidies on competition	137
Burden of government regulation	135
Ease of hiring foreign labour	133
Efficiency of legal framework in challenging regulations	132
Efficiency of legal framework in settling disputes	130
Ease of finding skilled employees	127
Government long-term vision	125
Diversity of workforce	120

Source: own processing http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf

The improvement of the position of the Slovak economy in the ranking of the World Economic Forum is constantly hindered by the persistent problems of the business environment in the Slovak Republic. This is the case, for example, with low innovation capacity, where we lag behind other countries mainly in terms of workforce diversity, cooperation between research entities, building business clusters and the maturity of shopping behavior of consumers who continue to prefer price to quality in their purchases. products and services. We also lag behind in the efficiency of the goods market, where the problem is mainly the complicated tax and customs system, special tax regimes and subsidies that harm the competitive environment. Another problem of the business environment based on the report of the World Economic Forum is the labor market with its insufficient flexibility of employment relations, low mobility of workers and high barriers to the employment of foreigners. The most lagging area is the quality of public institutions, where high regulatory burdens, low law enforcement, insufficient independence of the judiciary and police, but also the unclear long-term economic vision of the government are most damaging to competitiveness and the deterioration of the business environment. Among the most significant competitive advantages of the Slovak Republic, the World Economic Forum cites macroeconomic stability, high openness of the Slovak Republic to the entry of foreign capital, low risk of terrorism, the spread of the Internet, the Slovak banking system and energy infrastructure.

The Doing Business report

The Doing Business report published by the World Bank is another well-known and respected indicator monitoring the state of the business environment. The advantage of Doing Business over other indices measuring the quality of the business environment is that Doing Business measures regulation that affects the business activities of ordinary companies as well as the conditions for starting and closing a business, but does not examine broader factors affecting business such as human capital, infrastructure, economic policy. In terms of the methodology used, Doing Business is based on the opinions of experts. Doing Business obtains data on items related to specific components of the business environment. The closer the country is to a lower number, i.e. to the first place, the better the business environment.

Table 6 Areas of the business environment of the Slovak Republic that are part of the DB Report and their ranking in the overall ranking

	Areas of business environment in the Slovak Republic	**2020**	**2019**	**2018**	**2017**	**2016**	**2015**	**2014**	**2013**	**2012**	**2011**
1	Starting a business	118	127	83	68	68	77	108	80	76	74
2	Obtaining a building permit	146	143	91	103	84	110	53	50	50	50
3	Access to electricity	54	47	57	53	48	100	65	66	102	94
4	Ownership registration	8	9	7	7	5	11	11	9	10	8
5	Availability of credit resources	48	44	55	44	42	36	42	40	24	21
6	Investor protection	88	95	89	87	88	100	115	113	111	108
7	Tax obligations of companies	55	48	49	56	73	100	102	100	130	126
8	Cross - border trade	1	4	1	1	1	71	108	111	95	91
9	Enforceability of contracts	46	47	84	82	63	55	65	65	71	74
10	Termination of business	46	42	42	35	33	31	38	38	35	33
	The quality of the business environment - ranking	45	42	39	33	29	37	49	46	48	43

Source: own processing based on http://www.doingbusiness.org/reports

Economic Freedom Index

The International Heritage Foundation's index on the quality of the business environment is the Economic Freedom Index (EFI). The EFI rating scale is on a scale from 0 to 100. If a country scores 80-100, it is considered economically free, if 70-79.9 is considered predominantly free, the range 60-69.9 expresses a slight freedom, the score 50-59.9 indicates a mostly non-free country and below 50 points the country is considered repressed. The 10 freedoms trade policy, tax and levy burden, government intervention in the economy, monetary policy, monetary stability, capital flow and foreign investment, banking and financial sector, wages and prices, property rights, trade regulations, black economy are evaluated.

Table 7 Evaluation of the Slovak Republic according to the EFI index in the years 2010 - 2019

year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total evaluation of the SR	69.7	69,5	67	68,7	66,4	67,2	66,6	65,7	65,3	65,0
Verbal evaluation of the SR	mild economic freedom	mild economic freedom	mild economic freedom	mild economic freedom	mild economic freedom	mild economic freedom	mild economic freedom	mild economic freedom	mild economic freedom	mild economic freedom

Source: own processing based on http://www.heritage.org/index/explore?view=by-region-county-year

The Slovak Republic achieved the highest rating according to the EFI index in 2008, when it was assessed as a predominantly free country. This was the best rating in the entire history of measuring this indicator. In recent years, the Slovak Republic is assessed as a slightly free country, with the worst result in the period under review in 2014, while the worst rate in 2014 was the level of corruption, law enforcement and freedom of work).

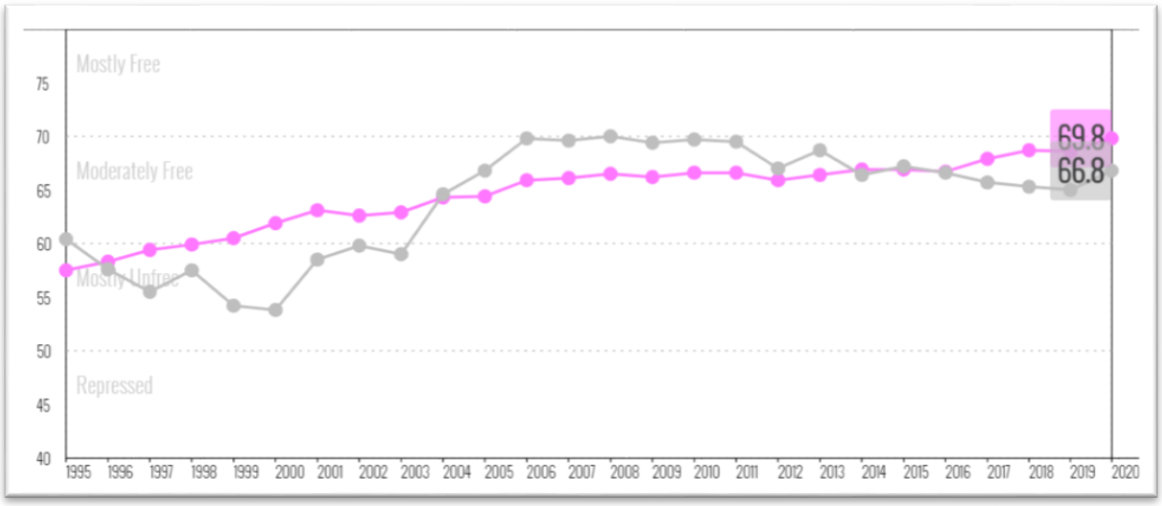

Fig. 1 OVERALL SCORE - Evaluation of the Slovak Republic according to the EFI index in the years 1995 - 2020 Source: Index of Economic Freedom (heritage.org)

3. **Conclusion**

Due to the processes of globalization, the development of the business environment of the Slovak Republic is largely influenced by the development of the world economy, therefore great emphasis must be placed on the quality of the business environment, which affects the competitiveness and performance of the economy and also motivates entities to perform business activities. However, it can be said that the Slovak Republic is still a relatively inefficient economy and that is why it is even more important for our entrepreneurs to do business in a favorable business environment. Support and development of business is therefore defined as one of the priorities of economic development of the Slovak Republic. However, the main prerequisite in the process of developing business activities is the creation of a suitable or in other words quality business environment.

Table 8 Weaknesses and strengths of the business environment in the Slovak Republic

Weaknesses of the business environment of the Slovak Republic	Strengths of the business environment in the Slovak Republic
corruption, bureaucracy, high level of clienteles law enforcement and the functioning of the judiciary clarity, applicability and consistency of legislation skilled workforce, insufficient support for innovation	the position of the Slovak Republic in the middle of the European area openness of the economy, banking system, relatively cheap labor,

Source: own processing

Based on the synthesis of knowledge from a more detailed analysis of individual indicators selected by us (Corruption Perception Index, Global Competitiveness Index, Doing Business Report), we gained some insight into the strengths and weaknesses of the Slovak business environment, see. Table 7. From the above analyzes we can conclude that the quality of the business environment in the Slovak Republic has not significantly improved in recent years and the business environment has long faced problems that negatively affect the economic activities of small and medium enterprises and therefore more systematic solutions are needed by the state. improving business conditions in the Slovak Republic. The main priorities in the business environment should be the following:

- law enforcement,
- support for innovation activities and cooperation between the business sector and research,
- legislation, its quality, clarity, stability,
- public institutions as a partner and not a burden,
- availability of skilled labor,
- quality physical infrastructure and services in network industries.

A functioning market and a healthy business environment are key prerequisites for economic freedom and voluntary economic activities, and thus for a free and prosperous society. The business environment must allow for effective competition between entrepreneurs, because economic operators work best and create value in an environment with clear, transparent and predictable rules that apply equally to everyone. Therefore, the government should create such a business environment throughout the Slovak Republic, which would create suitable conditions for new investments, increasing productivity, innovation and the creation of new jobs. In terms of macroeconomic instruments that have an impact on public finances, the government should especially prefer instruments that will have a positive effect on business activities such as. reducing the tax and levy burden on all business entities (not selectively, but systematically), but at the same time will not endanger the stability of public finances.

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RESEARCH AND DEVELOPMENT EXPENDITURE AND THEIR IMPORTANCE FOR INNOVATION DEVELOPMENT

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Abstract

In an era of increasing globalization and digitization, innovation is becoming an increasingly important factor in determining the success of business. They provide companies with higher growth, increase efficiency, competitiveness and enable companies to create new markets. Especially in the current dynamically developing period, the need for innovation is even higher. This fact was also demonstrated by the current pandemic, during which companies were forced to react quickly and flexibly to changes in the market. Despite the fact that in Slovakia there is already support for innovative companies and efforts to create an innovation-friendly environment, the innovation performance of the Slovak Republic still lags behind other EU countries. The need to introduce innovations is necessary for Slovak small and medium-sized enterprises from the point of view of adaptation. And innovation would not arise without adequate research and development.

In the article, we will focus on the area of research and development and subsequently on the innovative activity of companies. We will evaluate the development of expenditures on research and development in the Slovak Republic in the period 2010-2019, describe human resources in research and development and assess the innovative activity of companies.

Keywords: research, development, innovation, employees, innovation activity, innovation performance

1 Introduction

The ability of the economy to adapt to current as well as expected technological changes is determined by many factors. One of the main ones we can consider its level of innovation. By the country's innovation level we understand a set of several factors: educated workforce, quality research and development, funding intensity, the share of intensely demanding industries in the structure of the economy, employment and the level of intellectual property production. Investment in research and development and innovation is essential for the long-term economic development and prosperity of EU countries. They boost economic growth, resource efficiency, job creation and labor productivity. The ambiguity and variability of the concept of innovation is also related to the innovation activity itself. Innovation can be the result of several years of innovation activity of the company, it can be the result of constant small, almost invisible changes in the product or process. It can also be the result of chance or a one-time idea. The purchase of machinery, equipment or licenses, training or changes in marketing can also be considered an innovation. All these activities can be performed externally, by purchase, or even internally in-house. However, the basic feature of the company's innovative activity is a high degree of uncertainty associated with innovation. [3] Innovation would not arise without adequate research and development. The relationship between R&D and innovation is very complex. Research, development and innovation are basic preconditions for growing the well-being of the population, maintaining a stable pace of economic growth and long-term competitiveness of economies.

Act no. 172/2005 Coll. on the organization and state support of research and development states that research "is a systematic creative activity carried out in the field of science and technology for the needs of society and for the development of knowledge" and "development is a systematic creative activity in the field of science and technology using or based on practical experience in creating or improving new materials, products, equipment, systems, methods and processes. " [5]

Edquist (2011) emphasizes that R&D activities bring new knowledge, while R&D activities bring advanced products and processes. [2] Innovation determines a new way to improve, restore and change something. [4] It is also about the use of knowledge for the generation and practical application of a new idea that brings benefits. We can also understand innovation as a process of securing new, better capabilities or increased usefulness. The innovative environment connects the three inner parts of the regions - universities, financial institutions and geographical relations with the market. Close collaboration between leading companies, universities and research centers creates more efficient and innovative solutions. Innovation activities are the result of research and

development and are the driving force of the country. Innovation changes the existing state of the economy, acts as a basic factor in the society-wide production process moving to a new or newer stage of development. The importance of innovation needs to be emphasized, in particular in terms of its impact on guiding real economic policy towards new metas in society. Public investment in research and development plays an important role in the country's innovation. Countries spending more on public R&D spending tend to become more efficient and have a stronger knowledge base. The development of science, research and innovation of internationally comparable quality is important for the sustainability of economic development and long-term competitiveness.

2 Expenditures on research and development in the Slovak Republic

Slovakia is a country with a competitive technical background and a long tradition of industrial research and development. It has active research and development staff participating in top domestic and international projects, has an available engineering and scientific base, has a research and development network consisting of industrial research and development organizations, research institutes at technical and natural sciences, research institutes of the Slovak Academy Of Science and foreign research and development centers. This research and development base is also well connected with other interested institutions such as industry associations, clusters, agencies to support research, development and innovation, business innovation centers and incubators, science and technology parks, but also software development companies.
Although Slovakia can still be considered an industrial and especially an automotive power, the main focus is increasingly on investment projects with higher added value and on activities with a significant degree of scientific and research potential. [10]

Table 1 *Expenditure on research and development in the Slovak Republic in thousand. Euro* [8]

Year	*Expenditure on research and development*			*R&D expenditure per capita* (Eur)	*Share of R&D expenditure from GDP (in %)*
	Together	Capital	Common		
2010	416 369	63 073	353 296	77,2	0,62
2011	468 439	94 799	373 641	86,9	0,66
2012	585 225	109 337	475 889	108,3	0,80
2013	610 876	97 300	513 576	112,9	0,82
2014	669 632	115 698	553 934	123,6	0,88
2015	927 272	374 186	553 086	171,0	1,18
2016	640 835	45 814	595 021	117,9	0,79
2017	748 955	72 776	676 179	137,6	0,88
2018	750 947	53 918	697 029	138,0	0,84
2019	776 590	36 117	740 472	142,50	0,83

Expenditures on science and research in Slovakia are constantly growing from 2010 to 2015, with a significant share during the entire analyzed period being current expenditures. The percentage share of R&D expenditure in GDP reached its maximum in 2015, namely 1.18% of GDP. The increase in the percentage of total R&D expenditures in 2015 was caused solely by capital expenditures, with significant drawing from the Structural Funds. In 2016, expenditures on research and development amounted to 640.8 mil. EUR, which represented 0.79% of HPD. In the following years, R&D spending increased again. Since 2018, the share of R&D expenditure in GDP has remained above 0.8%. In recent years, current expenditures have again been several times higher than capital expenditures. The maximum values from 2015 have not yet been exceeded. Slovakia is one of the countries in the EU with the lowest level of expenditure on research and development.

In Table 2 we see the evaluated structure of expenditures on research and development. In 2017, almost half of the expenditure was from state resources. Slovakia recorded a relatively positive development in the intensity of public expenditure on research and development. This fact can be attributed to drawing from the EU Structural Funds and the Cohesion Fund. However, the sustainability of public funding for research and development in the coming years is questionable. In the European context, the Slovak economy remains only a modest innovator with a relatively significant lag behind in a large part of the factors of innovative development. Since 2016, business resources have accounted for the largest share of funds spent on science and research. The interest of the business sector in the field of research and development is supported by the state through subsidies in the form of incentives for research and development. Foreign sources invested the most in research and development in 2015, when they were the main source of investment in research and development. Over the next two years, their share fell sharply.

Table 2 *Structure of R&D expenditures (in %)* [8]

Indicator		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
By sectors	Business enterprise sector	42,09	37,18	41,35	46,26	36,84	27,95	50,36	54,12	54,08	54,83
	State (government) sector	29,96	27,66	24,52	20,48	28,34	27,86	21,44	20,81	21,22	19,95
	State (government) sector	27,64	34,95	34,03	33,10	34,42	43,79	27,71	24,67	24,28	25,19
	Private non-profit sector	0,31	0,21	0,10	0,15	0,41	0,40	0,49	0,41	0,42	0,03
By source of funds	Business enterprise	35,06	33,85	37,71	40,19	32,21	25,06	46,22	35,50	48,85	46,76
	State (government)	49,57	49,75	41,57	38,90	41,38	31,94	40,99	49,03	38,01	40,45
	Other domestic	0,70	2,24	2,07	2,94	2,72	3,57	2,08	1,72	1,91	2,06
	Abroad	14,67	14,16	18,65	17,97	23,68	39,43	10,71	13,74	11,23	10,73
By field of science	Natural sciences	19,92	20,72	20,48	17,71	17,77	15,94	16,27	19,56	19,86	20,22
	Technological sciences	53,59	47,68	46,92	51,01	48,77	48,02	55,77	58,14	58,77	58,17
	Medical and pharmac. sciences	7,10	7,96	8,46	8,95	9,98	7,48	6,65	5,10	4,82	5,21
	Agricultural sciences	8,20	7,57	6,74	3,18	6,94	7,97	6,29	5,23	4,81	4,66
	Social sciences	6,99	8,46	7,44	7,50	10,34	17,14	9,91	7,21	6,51	6,08
	Humanities	4,21	7,62	9,96	11,65	6,21	3,45	5,12	4,77	5,22	5,66
By activity	Basic research	46,27	48,87	47,34	44,09	45,10	42,78	40,39	37,22	40,11	39,93
	Applied research	23,67	24,63	23,46	23,83	28,42	30,26	23,67	22,82	24,07	23,40
	Development	30,05	26,50	29,20	32,08	26,48	26,95	35,94	39,96	35,81	36,67

More than half of the expenditure is directed to technical sciences, less than 20% support natural sciences. Until 2016, the largest share of expenditures was spent on basic research. In 2017, a larger share went to the area of development. More than 20% is directed to applied research.

3 Research and development personnel

An important factor in research and development is human resources, which increase technological progress, scientific knowledge, improve the quality of life, and contribute to European competitiveness and the prosperity of European citizens. The lack of qualified employees is a common barrier, especially in small and medium-sized enterprises. On the one hand, it is related to the demography and educational structure of graduates. But the shortage of skilled workers often has regional dependence. In those locations where there are plenty of job opportunities, such employees are usually concentrated who bring innovative ideas to the company. Small businesses, even if they acquire such employees, may have problems with the evaluation and career growth of quality and innovative employees.

Table 3 *Research and development personnel* [8]

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
R&D personnel - total	28128	28596	28880	27823	28825	28752	33252	33467	35770	36309

The number of employees in the field of research and development in Slovakia increases slightly during the analyzed period, while it is obvious that the largest share is made up of researchers.

Table 4 *R&D employees by fields of science* [9]

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Natural sciences	5 046	4 873	5 178	4 896	5 048	4 730	4 712	4 889	5 863	6 172
Technological sciences	9 807	10 166	10 081	9 790	10 042	10 669	10 850	11 838	12 366	12 773
Medical and pharmaceutical sciences	3 590	3 544	3 641	3 280	3 259	3 292	3 402	2 974	2 889	3 019
Agricultural sciences	1 888	1 856	1 723	1 125	1 599	1 842	1 801	1 752	1 742	1 672
Social sciences	4 802	4 896	4 814	5 175	4 836	4 612	4 867	4 906	4 823	4 584
Humanities	2995	3 261	3 443	3 557	4 041	3 607	4 039	3 425	3 582	3 569

The field of research and development is highly dependent on human potential and knowledge, more than any other field. In the field of research and development, it is necessary to support the development of intangible capital - people and their ideas, knowledge, and to link it to real tangible outputs and research results. The number of R&D employees available to the national economy thus becomes the main measure of the country's research and development potential.

Table 5 *Structure of R&D employees (in %)* [8]

Indicator		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
R&D employees by occupation	Researchers	85,50	86,41	86,80	87,84	87,01	84,85	83,41	82,79	82,35	81,57
	Technicians and equivalent staff	10,10	9,38	9,53	8,72	8,93	9,89	10,42	11,78	11,87	12,67
	Supporting staff	4,40	4,21	3,66	3,44	4,06	5,26	6,16	5,43	5,78	5,75
R&D employees by qualification	Graduates from universities and higher qualified people	89,19	90,13	90,44	91,86	91,12	89,03	89,65	89,35	88,96	88,97
	Bachelor degree	2,51	2,15	1,24	0,96	1,29	1,73	1,54	1,36	1,88	2,13
	Master degree	40,18	40,99	40,82	41,23	39,87	38,82	40,08	39,88	40,72	41,72
	Doctoral degree (Ph.D., Dr., Professor, Associate prof.)	46,51	46,99	48,38	49,67	49,96	48,48	48,02	48,11	46,36	45,12
	Short-cycle tertiary education	1,13	1,27	0,98	0,82	1,25	0,87	1,72	1,38	1,80	1,74
	Secondary education	9,23	8,22	8,22	6,96	7,41	9,63	8,28	8,95	8,97	9,03
	Basic education	0,44	0,37	0,35	0,36	0,22	0,47	0,35	0,32	0,27	0,26

As many as almost 90% of R&D employees are employees with a university degree of the 2nd and 3rd degree. They are the R&D staff, researchers and innovation creators. In relation to individual scientific disciplines, the largest share has long been represented by employees in the field of technical sciences, followed by employees in the field of natural sciences.

4 Inovačná aktivita podnikov

Every enterprise that wants to be competitive in today's globalized market needs to innovate. The share of enterprises with innovation activity from all enterprises operating in Slovakia is 30%, while the share of their expenditures on innovations increased compared to previous years and in 2018 it represents more than 2% of total revenues.

Table 6 *Enterprises with innovation activity* [8]

		2018	2016	2014	2012	2010
Share of enterprises with innovation activity	of enterprises in industry and selected services	30,5	30,7	31,8	34,0	35,6
	small enterprises (10-49 employees)	25,8	24,6	28,5	29,8	29,3
	medium enterprises (50-249 employees)	39,1	42,7	37,9	40,0	43,6
	large enterprises (250 and more employees)	61,1	60,1	54,7	62,1	65,1
Share of innovation expenditure	in total turnover in %	2,3	1,6	1,3	1,8	1,2
Structure of innovation expenditure in %	Intramural R&D	23,4	22,4	21,8	12,9	17,1
	Extramural R&D	14,1	7,8	10,6	20,8	7,7
	Acquisition of machinery, equipment, software and buildings	42,5	63,6	41,4	62,8	71,6
	Acquisition of other external knowledge	-	3,2	16,6	1,8	3,6
	Market introduction and other preparations	-	-	-	-	-
	Expenditures on other innovation activities	-	3,1	9,6	1,6	-
	Expenditures on own personnel working on innovation	9,2	.	.	.	.
	Expenditures on services and materials for innovation	10,8	.	.	.	.

The analysis of the structure of expenditures on innovation activities of enterprises shows that the majority of expenditures were spent on the procurement of machinery, equipment, software and buildings (more than 60%),

22% of expenditures on innovation are directed to internal research and development. If we look at the breakdown of companies by size, of the total number of enterprises in Slovakia, up to 99% are small and medium-sized enterprises. But as far as innovation activity is concerned, of the small enterprises, only 24% are engaged in innovation activities, of the medium-sized enterprises it is already more - 42%. Large enterprises have the smallest representation among enterprises in Slovakia, but up to 60% of them invest in innovative activities. This confirms the fact that R&D is a costly activity and there is a significant relationship between the size of the enterprise and the intensity of R&D expenditure. [1] Business R&D spending appears to be too low to significantly increase innovation performance. Overall, R&D is one of the smallest in the EU and focuses on medium- to high-tech manufacturing in areas dominated by multinational companies. [10]

Table 7 *Share of the innovative enterprises cooperating in innovations with be specified type of partner* [8]

Kind of partners at co-operation	2018	2016	2014	2012	2010
Other enterprises within the enterprise group	13,4	14,5	14,5	13,1	15,2
Suppliers of materials, components or software	23,6	23,4	25,2	17,6	25,5
Clients or customers	23,2	20,2	18,3	19,4	21,7
Competitors and other firms from the same industry	8,0	6,0	4,3	7,1	17,6
Consultants, commercial labs or private R&D institute	11,7	15,1	9,7	7,3	11,9
Universities and other higher education institutions	10,3	8,7	8,1	7,4	10,8
Government or public research institutes	3,2	2,8	3,8	3,1	7,1
Other enterprises	6,8	.	.	.	.
Non-profit organisations	3,0	.	.	.	.

Enterprises with innovation activity cooperate in innovation mainly with suppliers of equipment, materials, components and software and with customers (more than 23% of companies). Another important type of innovation partner are companies within the group of companies, consultants and scientific research institutions. In 2018, the share of companies using cooperation with universities and higher education institutions increased. This is closely linked to the fact that most R&D staff are university-educated staff and confirms the importance of human resources in effective R&D and the subsequent creation of innovations.

5 Conclusion

Slovakia is highly dependent on EU funding for research and development. In order to increase productivity and maintain the convergence process in Slovakia, permanent investments in research and development, digital and transport infrastructure and energy efficiency are needed. Effective spending policies in support of R&D by the state and multinational companies have a positive effect on the growth of innovation performance of countries and their regions. They stimulate the growth of the business environment, with the aim of increasing investment in research and development, but also other drivers of innovation who invest in this area and are active in it. Innovation helps any entity to reach a higher level, both qualitatively and quantitatively, and thus helps it to maintain and develop its competitiveness.

Slovakia is one of the countries with a low share of R&D funding in GDP. During the entire analyzed period, R&D expenditure was less than 0.9% of GDP, with the exception of 2015, when Slovakia reached its maximum and the share of R&D expenditure reached 1.18% of GDP. Over the last three years, the share of R&D expenditure in GDP has stabilized at more than 0.8%. As part of the Europe 2020 Strategy, Slovakia has set a goal of putting one percent of GDP on science and research. This goal can be achieved if the business sector is more involved in research and development.

An important factor in the implementation of research and development is human resources and their level of education. Most R&D employees who are the creators of innovation are employees with a university degree. It is universities and other higher education institutions that are important partners in companies with innovative activity. Universities provide companies with a basis for research and development, which is then transformed into an economy in the form of innovation.

Increasing expenditures in the field of research and development in Slovakia should also be helped by the Government-approved Economic Policy Strategy with a view to 2030, the aim of which is to gradually move closer to the knowledge economies within the EU. One of the recommendations speaks of a gradual increase in R&D expenditure by 2030 so that the level of the top five EU countries is reached in terms of the share of R&D expenditure in GDP. One of the main support instruments is to be various tax breaks. The tax advantage stimulates companies to spend on domestic research and development. In the last year, the amount of the possible deduction of R&D expenditure, which is an effective tool for financing innovation, has been increased. It is an indirect support for research and development, which is provided to the company through a tax relief from expenses

incurred for development and research activities. At present, mainly companies that hire young R&D workers and companies that increase funding for their research activities are supported.

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CONTEXT BETWEEN HUMAN CAPITAL DEVELOPMENT AND ECONOMIC GROWTH

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Abstract

The knowledge economy raises the need to pay increased attention to the development of human resources and the subsequent impact of this fact on the development of many economic indicators. Although the prevailing view is that the higher quality of human resources is also reflected in the pace of economic growth, it may be extended with opposing ones who reject this claim. The main goal of this paper is to theoretically define the interaction between increasing the level of human capital and economic growth and to explain why looking for connections between these two variables is a difficult process. As economic growth is closely linked to the development of several other socio-economic indicators, we have also pointed to another area that is influenced by the level of human capital development. In order to achieve the goal, we have studied several theoretical publications dealing with the issue. In working with theoretical sources, we used mainly general scientific methods such as analysis, synthesis, deduction or induction.

Keywords: economic growth, human capital, unemployment, education

Introduction

Recently, the study between the development of human capital and economic growth has received increasing attention among developed countries. In the past, this relationship has been explored mainly in developing countries. And although these tendencies persist to this day, several other facts need to be mentioned. Achieving a favorable rate of economic growth is one of the basic goals of all countries. While in the past natural wealth was considered to be the main source of growth, developments in many countries around the world have shown that, despite its limited quantity, sustainable growth can be achieved. Examples are Japan or the so-called asian tigers. These countries have experienced favorable economic growth rates in a relatively short period of time, mainly due to the rapid implementation of innovation and technological progress. On the contrary, countries like Iraq or Iran have not been able to use the vast reserves of natural resources (oil) to achieve growth. Introduction of innovations, resp. however, technological progress does not take place on its own, but high-quality human resources are behind it. Developments from the recent past also confirm this assumption - technological development has already progressed since World War II, especially in those countries that have invested heavily in science, research and education. These trends in the world therefore rightly raise the need to focus more on the issue of human resources and the possibilities for their development. Today, the knowledge economy, together with the technological revolution, is leading to changes in labor markets. Jobs with unskilled or low-skilled workers are disappearing and the demand for highly-skilled workers with great creativity, able to process a lot of information, is growing. Thus, attention has been focused more and more within countries around the world on improving the quality of education systems, as formal education is generally considered to be the most important prerequisite for human resource development.

1 Economic growth

The performance of the economy and economic growth of each country is influenced by the activities and interrelationships of the four sectors (households, companies, the state and abroad). Economic growth can be characterized as an increase in the amount of products and services that are produced in the economy. Achieving

economic growth is an important goal for any country's government, as it is associated with rising real average incomes and rising living standards. It can be measured using several macroeconomic aggregates. The basic and most comprehensive indicator is gross domestic product (GDP), which best captures the processes taking place in the economy. However, when it comes to economic growth, it is important to realize that it is not just the growth of measured real GDP, but rather the growth of potential GDP that the economy would achieve if it used all the factors of production effectively. A distinction must be made between real and potential GDP because measured GDP may exceed potential output in the short term or, conversely, may fall below its level. In addition to GDP, economic performance and growth can also be expressed by alternative indicators such as gross national product (GNP), Nett Economic Welfare (NEW) or the Human Developmen Index (HDI). In connection with the development of human capital, the HDI seems to be the most important, as it also takes into account the level of health and education in individual countries and the education system influences the level of human capital. When calculating the HDI, the educational level is assessed according to two criteria: the average number of years of adult schooling (25 years) and the expected length of schooling of children are determined, while their average is calculated.

2 Human capital

Human resources and their qualifications, which we refer to as human capital, are beginning to gain in importance in the period of the formation of a new, so-called knowledge economy. The first signs of increased interest in this area can be seen as early as the 50s and 60s. years of the 20th century, when, under the influence of the development of science and technology, the demand for educated labor began to increase. Human capital is beginning to be understood as the knowledge and skills of man, which allow him to create new knowledge, respectively. added value. Different authors interpret this term differently. However, they agree that human capital is a qualitative characteristic of the individual. It is most often based on the definition that "human capital is the ability, skill and corresponding motivation to apply those abilities and skills" (Becker, 1993). This means that it is not enough for an individual to have these abilities, but he must also be able to use them adequately, resp. have created conditions for their activity in which it can use them. As early as the 1960s, Becker pointed out the effects of education on earnings, career choices, employment and unemployment, and the fact that, in addition to education, human capital has an impact on the individual's influence on the individual. In addition to G. S. Becker, T. W. Schultz, J. Mincer, M. Friedman and S. Rosen were pioneers in the field of human capital. Schultz explains how human capital affects productivity and the rate of return on investment in education, although it is difficult to measure. According to him, the rate of return on these investments is in most cases higher than the rate of investment in "inhuman" capital (Shultz, 1971). It was based on the finding that the gradual increase in real earnings of workers is mainly due to additional skills of workers and only to a lesser extent due to the so-called. overall productivity factors.

Human capital and the assessment of its quality are receiving increasing attention throughout the world. The Organization for Economic Co-operation and Development (OECD) is one of the most important institutions dealing with its evaluation. Each year, it publishes a report on human capital development called Educiation at a Glance. It includes information on the structure, funding and performance of education systems in OECD countries and other partner economies. In 2019, Education at a Glance focused mainly on tertiary (higher) education, as the demand on the labor market for graduates with this type of education remains strong, despite the fact that they are increasing. The World Bank has databases that address the issue of human capital development. It monitors how much money each country spends on education (the share of government expenditure on education in GDP), and keeps statistics on school enrollment at each level of the education system. In this context, however, it also points out that a high enrollment ratio may not reflect a successful education system. Following this, it also keeps statistics on student progress, ie. what proportion of students moves from one year to another, resp. from a lower level of the education system to a higher level. The Summary Innovation Index, compiled annually by the European Commission, can also be an important source of data on assessing the level of human capital. This index measures several areas, one of which is the area of human resources, which provides information on the state of the population with tertiary education, doctoral graduates or lifelong learning. In addition to these institutions, of course, there are many others that deal with this issue.

2.1 The importance of education in the development of human capital

The development of human resources occurs in the process of education. Economic theory presented by the Chicago school characterizes the process of education as a process of investing in human abilities (Šrédl, 2010). This means that each individual is free to decide on their education by comparing the costs of education and the benefits (or benefits) from it. Thus, the money he uses for the educational process is not perceived as a cost of consumption, but as an investment. Such an investment does not only include explicit (direct) costs e.g. for study aids, but especially the cost of the opportunity sacrificed (eg the lost salary that an individual would receive if he entered the labor market after high school and did not continue his studies at university). These costs can be referred to as individual costs. Today, however, a significant part of the cost of an individual's education is borne by the state. By not entering the labor market, the state loses income in the form of unpaid income tax, insurance, ... On the other hand, the state secures an individual with a higher level of human capital in the future, which will significantly contribute to economic growth. However, there is often a problem here - the economic efficiency of education is difficult to measure. In general, the benefits of education are compared with the costs associated with obtaining the relevant education, with an emphasis on maximizing benefits and minimizing costs. While the amount of costs of education can be determined quite accurately, quantifying the benefits of education is problematic, e.g. simply because the effect of education never acts alone, but is linked to other factors of socio-economic development. This may lead to a situation where the effect of the education of an excellent graduate of a surplus field will be less than the effect of the education of an average (even possibly below average) graduate of a shortage field.

Most economists now agree that the quality of human capital is the most important element of economic growth. However, there is no one-sided relationship between the two categories - just as the level of human resources affects economic growth, so growth affects the level of human development (eg income growth can positively affect education levels by investing when an individual has sufficient resources). more into their education). The interrelationships between these categories are usually mutually reinforcing, ie countries generally achieve high economic growth and a high level of human development, or, conversely, low growth and a low level of human development. In the short term, it is possible to notice different levels of these variables in some countries, but if a country has a higher growth rate with a lower level of human capital development, it will usually reach a low value in a short time. On the other hand, if a country achieves a low rate of economic growth with a higher level of human capital development, it is likely that economic growth will increase in the future.

2.2 Contradictory views on the importance of education

However, there are also opinions that the impact of education on the level of human capital is constantly decreasing. Randall Collins is a proponent of the idea that the knowledge that students acquire during their longer and more expensive studies has little to do with labor market requirements. According to him, apart from ensuring basic literacy, no other contribution of education to economic development or to increase labor productivity can be demonstrated (Keller, Tvrdý, 2010). Although the results of research and analysis indicate the opposite, Collins is convinced that his grasp of the issue is correct. He argues that in companies it is usually true that employees with the greatest knowledge are not usually the best paid and usually do not hold top positions within the company. According to him, acquaintances, belonging to privileged classes or political instruments play a role here. He also argues that most professional experience can be gained by a worker directly in practical life and does not require unnecessarily long studies. In this context, he criticizes academic titles as an operational curtain of G. Becker's functionalist, technocratic theory of human capital (Collins, 1979). He recognizes higher education in only a few professions, such as at doctors, lawyers, architects. However, he also emphasizes the need for practice. While this view can be accepted in part, we believe that without insufficient training, employees may not be able to handle the tasks assigned, they may be less willing to participate in further training that requires constantly changing conditions and rapid introduction of innovations, after losing their jobs. they may have a bigger problem finding a job again and so on. Collins also deviates from the thesis of the interaction between economic growth and increasing the level of human capital. He argues that even the high level of education achieved does not bring anything to the economy, but on the contrary, the rapid economic development in recent decades has created sufficient funds to invest in education, and therefore the two categories are now mistakenly linked. The increase in the number of university graduates is a consequence and not the cause of the economic growth of any country. Collins's theory deviates absolutely from many other economists who disagree with it, and to which we agree for the reasons stated above. However, other authors with similar views as Collins can be found. E.g. even according to Wolf, economic growth took place in developed countries before the level of education increased (Wolf, 2002).

At the same time, developments show that as growth has taken place, the number of professions has begun to increase, which has created a greater need to study in order to be able to find a job. Economic growth leads to the promotion of education, regardless of whether higher education leads to growth. However, Wolf admits that educated people earn more, it is easier for them to get a job, they often have higher intelligence, achieving higher education is an indicator of perseverance and motivation, which leads employers to look for such people. At the same time, however, it points to the limited needs of individual economies, which are not able to provide all graduates with adequate jobs. Many times they end up in jobs for which they are retrained, e.g. as vendors or waiters, which will in no way lead to increased growth. However, if we look at their prospects for the future, we cannot say with certainty how much they will remain in their current job and whether they will not hold the position for which their education system has prepared them in a relatively short time, leading us to be completely unaware of with Wolf's opinion.

2.3 Expressing the level of human capital

As mentioned earlier, most economists believe that the impact of education on human capital is crucial. In order to demonstrate this impact, a link needs to be found between human capital development and economic growth. The problem arises here: in order to do this, it is necessary to measure the level of human capital. However, it is very demanding because human capital is a qualitative property of man and in order to be able to work with it in relation to economic indicators, it is necessary to express it quantitatively (Mazouch, 2011). However, it is not possible to assess the amount of knowledge, skills and innate abilities, so it is mostly based on the assumption that human capital is the result of education (the length of education plays an important role here). E.g. according to Denison (in: Ivanová et al., 2009) it is based on a two-thirds assumption - two thirds of the difference in earnings between individuals with higher and lower levels of education can be attributed to formal education, only the remaining one third is innate abilities and dispositions. Even on this basis, one of the easiest ways to express human capital is to measure knowledge. However, knowledge is only a part of human capital (it does not include, among other things, qualities, abilities, experience or potential). In addition, their level may change over time. It would therefore not be objective to measure human capital in this way. Therefore, the level of human capital is in some cases assessed on the basis of a survey of the level of education. The highest formal education achieved is determined. However, there is also a problem here - the same levels of education can differ significantly and do not include the degree of human capital depreciation. In addition, other alternative indicators of education can be used, such as e.g. educational potential of the company, average length of education, average length of education, etc. In order to determine the extent to which economic growth depends on the educational indicators of the population, it is necessary e.g. use correlation analysis to determine the interdependence between GDP per capita and these indicators.

3 The impact of human capital on selected areas

The development of human capital affects the functioning of several areas. One of them is the labor market, in which each individual moves, while having a certain productivity, which he offers on it, and for which he then receives a certain appreciation (eg wage). It is assumed that an individual with a higher level of human capital is more productive and higher labor productivity contributes to higher economic growth. In general, higher productivity will subsequently be rewarded with a higher income than the less productive individual will average. The government of each country is interested in this productivity through taxes, resp. wages, it is therefore in the interest of each country that as many individuals as possible be highly productive. It follows from the above that another area that affects the level of human capital development is the level of GDP. When examining their interdependence, it is recommended to replace the absolute value of GDP development, e.g. growth rate and the level of human capital also the level of growth, e.g. the value of the number of years by which the average length of education in society has increased (Mazouch, 2011). This makes it easier to identify how much GDP has increased in the event of an increase in the level of human capital. However, it must not be forgotten that economic growth is also affected by other factors and that GDP growth is not only the result of human capital development and also of the fact that the impact of the increase in human capital on the economy will be delayed. At the same time, we find recommendations in the professional literature that it is better to examine the dependence between GDP growth and human capital development at the level of smaller regions than at the level of the national economy. Lewin and Raut (1997) point out that exports are considered to be the driving force behind economic growth. According to them, human capital does not affect the development of GDP directly, but by acting on one of its most important components - exports. It is export that is the area where new technologies are widely used

and, as we mentioned earlier, human resources are behind the development of new technologies. The level of human capital development is also linked to the risk of unemployment. In general, individuals who have a higher level of human capital are more likely to apply in the labor market. Although unemployment is significantly affected by the economic cycle and increases during the recession, even in this unfavorable period, the unemployment rate is lower for people with a higher level of human capital. This is due to the fact that even in times of economic difficulties, companies try to keep key employees who often hold demanding positions, which would be difficult to replace. Although it can be stated that an individual with higher educational attainment has a lower probability of becoming unemployed, it should also be pointed out that if this situation occurs, such an individual loses more. Unemployment in such a case will not only mean a loss of income and related problems, but also a loss of specific human capital that the individual has created through continuing vocational training and work in a specific job (Bethmann, 2013). As this type of capital is so specific that it can only be used within one organization and one job, even if such an individual can be re-employed quickly, this continues to be a loss for him. Many studies even state that the loss of human capital is the largest component of the cost of job loss. There are increasing opinions that the pressure on an individual to re-employ should not be so enormous. It is more appropriate for human capital to be transferred to an area that is at least similar and will continue to be used at least in part. It is therefore recommended to look for an adequate job for longer than to work in a completely different area, as there is a socio-economic decline in an individual's life due to the loss of the opportunity to use their potential in the form of specific human capital. In practice, however, such an approach can be encountered relatively rarely, simply because an individual who does not work for the state represents an increased cost of social security.

Conclusion

Although there are no clear links between capital development and economic growth, the hypotheses that their interdependence is high are confirmed worldwide. E.g. Japan, which is characterized by a shortage of natural resources, is achieving a long-term favorable rate of economic growth. Studies, but also the experience of other Asian countries, show that this is due to education, investment in human capital and increasing levels of labor productivity in these countries. On the contrary, for developing countries, where education systems are generally of lower quality and do not reflect new trends in the development of the world economy, it is often difficult to achieve constant rates of economic growth. In 2020, however, a new question came to the fore: can the Covid-19 pandemic affect the interrelationship of the variables studied? There are two assumptions. On the one hand, the pandemic has accelerated the pace of the introduction of gradual electronicisation and digitization, which has increased the demands on human resources and their ability to work with information and communication technologies. On this basis, it can be assumed that the level of human resources development has increased and, over time, this fact should also be reflected in the pace of economic development. On the other hand, the functioning of education systems was significantly affected. Although it is possible to function relatively well in the online environment in this area as well, the opinion persists that online teaching in the long run leads to a decrease in the knowledge of pupils and students and this failure will be difficult to catch up in the coming time. Not to mention that today no one knows how long this situation will persist and as long as education is carried out mainly in a distance form. However, as we know that the impact of the level of human capital development in the economic development of the country is manifested only with a certain delay, it is currently not possible to objectively assess these assumptions. However, we assume that in the coming years it would be important to address this issue and relevantly evaluate its impact on the economy of a country.

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