

The Digital Economy in the Context of Digital Transformation and Their Impact on the Electronification of Accounting Processes in the Slovak Republic

Iveta Košovská¹, Marcela Hallová¹, Ivana Váryová¹, Edita Šilerová², Klára Hennyeyová¹, Petr Cihelka²

¹ Faculty of Economics and Management, Slovak University of Agriculture in Nitra, Slovakia

² Faculty of Economics and Management, Czech University of Life Sciences, Prague, Czech Republic

Abstract

As a result of the explosive growth of scientific knowledge and the rapid development of ICT, the world economy is undergoing crucial global changes, which are the most significant since the industrial revolution. Digitization represents the most important element of the fourth industrial revolution, enabling the connection of technology and people. The digital economy is related to the rapid onset and penetration of information and communication technologies into all areas of human activity, which also requires new perspectives on the factors affecting the development and success of the economy. We digitize information and data, digitize the processes and systems that make up the functioning of the company, and digitally transform the company and its strategy. The main task of article is to determine the digital economy in the context of digital transformation and their impact on the electronification of accounting processes in the Slovak Republic. The article defines the progress and level of development of Europe's digital competitiveness in individual EU member states using the Digital Economy and Society Index (DESI). The position of Slovakia and the EU is compared for the period from 2018 to 2022. Slovakia needs to create conditions for the gradual digital transformation of all sectors of the economy. Digitization is also coming to the accounting. The article also describes how the approved amendment to the Act on Accounting as of January 1, 2022 creates space for streamlining the processing and archiving of accounting records. The current change in the amendment to the Act on Accounting thus offers completely new opportunities for working with corporate accounting in relation to internal processes in the company, but also in relation to financial administration or tax authorities. All entities, this also applies to agricultural entities keeping the double entry accounting, are obliged to follow the Act No. 431/2002 Coll. on Accounting as amended.

Keywords

Digitization, digital economy, digital transformation, electronification of processes, accounting, agriculture, agricultural accounting entities.

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Introduction

We are increasingly confronted with the opinions that we are living in a period of global information society development. The industry is increasingly information based and dependent on the network connectivity with the internet playing the pivotal role (Šimek et al., 2017). Currently we are facing the period of so called fourth industrial revolution, which is determined as well as a digital revolution. It is combined with the society where the technological progress changes significantly the way we live, work and mutually communicate (Čierny, 2017).

Digitalization presents the driving power of the fourth industrial revolution and the largest transformation of country economies and societies where its pace and power are changing the status. It enables the connection of technologies and human beings (Schwab, 2016). Technological innovation and high-quality economic development are inevitable requirements of sustainable development, and the digital economy has gradually become a new engine to enhance technological innovation and the high-quality development of economy (Ding et al., 2022; Imran et al., 2022).

The digital economy represents a novel economic

form based on digital technology, with digital data and digital platforms as its two basic features. Digital data make enterprise business traceable, controllable, and traceable (Jorgenson et al., 2007). In the context of the development of the digital economy, digitalization is conducive to enterprise development (Peng et al., 2009; Suchman, 1995). Digital economy can be characterized as all economic processes, transactions, interactions, and activities base on the digital technologies. Several studies are focused on the fact that technologies are able to change the world quickly, not only in economic but as well as social area. The digitalization of economy brings a huge number of benefits and represents an increase in efficiency, as digital technologies stimulate innovation, create new job opportunities and affect economic growth (Unold, 2003; Gestrin and Staudt, 2018).

The business environment is influenced by modern technologies that enable to automate production processes, to introduce robotization, which partially or completely replace human work or enable the implementation of intelligent solutions that collect data and evaluate them. In the case of business entities, we talk about the implementation of digital technologies in company processes (production, technological, process or operational) as well as digital transformation (Slovak Business Agency, 2019). The digital transformation is defined as the change of work procedures, roles and products or services because of the adoption and implementation of digital technologies by a business or its operating environment (Bloomberg, 2018). The digital transformation is a deep change and accelerates the business activities, process, competences, models in order to fully utilize changes and opportunities in digital technologies and their impact on the company (Bican and Brem, 2020).

Digitization represents the most important element of the fourth industrial revolution and touches any information handled by an individual. The expansion of digital capacities leads to the fact that slowly every aspect of our lives is captured in digital form and shared through digital networks. The result is a global exchange of information in real time between many devices connected to a digital network (Slovak Business Agency, 2019). Data is a fundamental aspect of digitization and the use of data is essential for improving production processes. The need to integrate data and information regarding the processes of creating value chains in the areas of individual IT systems within individual companies as well as across

companies in processes relates to this (IA MPSVR SR, 2017).

Digital transformation is a highly current, an important and often discussed topic, which is currently receiving a lot of attention. Due to the impact of the Covid-19 coronavirus, companies were suddenly forced to digitally transform, digitize their products and operate online. The crisis during the COVID-19 pandemic has shown that an adequate level of digital skills is essential for the whole society, as it enables citizens to access services and information (Bednarčíková, 2020; Kouřilová et al., 2021). The potential of digitalization, digital transformation and digital technologies is important for environmental, economic and social sustainability in businesses and can be applied in various industries (Bednarčíková and Repiská, 2021). In addition to office work, digitization also affects agriculture. The consequence of digitization is precision in agriculture. This term can be simply explained as precision agriculture.

The scientific and technical progress associated with the use of information technologies affects all areas of social and economic life, including the automation of business processes. Manually provided transactions in business accounting entities are being gradually replaced by automated systems. The COVID-19 pandemic has accelerated the automation of business processes, including accounting, because the accountants' work has shifted into online environment and the communication with clients, or with financial authorities has to adapt to this change (Blahušiaková, 2022). The transformation of society into a digital society was also manifested in the territory of the Slovak Republic (Lovciová, 2022).

In 2020, a new strategy was planned for Slovakia - Strategy for the Digital Transformation of Slovakia 2030. This strategy is a framework supra-departmental government strategy that defines the policy and specific priorities of Slovakia in the context of the already ongoing digital transformation of the economy and society under the influence of innovative technologies and global trends of the digital age. The strategy puts primary emphasis on current innovative technologies such as Artificial Intelligence, the Internet of Things, 5G technology, big data and analytical data processing, blockchain and High-Performance Computing which will become a new engine of economic growth and strengthening of competitiveness (MIRRI SR, 2019).

The technologies described above, like all technologies, are being improved and find new applications. By combining them, applications are created that are more capable than the mere sum of the capabilities of their parts, synergistic effects and emergent phenomena are created. Legal, accounting and auditing services, as well as services to industry, are typical knowledge-based services. Many of the routine activities occurring in them can be affected by the onset of these new technologies, we can assume a growing share of artificial intelligence, which is already used by e.g. expert systems (Dvořáková et al., 2020). One of the strategic plans for how the government of the Slovak Republic can contribute to the start of rapid and sustainable economic growth after the effects of the COVID-19 pandemic in Slovakia is the Recovery and Resilience Plan of the Slovak Republic. The role of the Green Economy within the Slovak Recovery and Resilience Plan is to support environmental sustainability, while the transformation of society into a digital society and "digitization" itself is considered a significant green innovation in a sustainable business environment with a positive impact on environmental protection. Digitization is considered a key area, because its successful implementation in society has a significant impact on Slovak legislation in the field of accounting. Its impact is manifested in changes to existing legislation and in the adoption of new Slovak legislation into which provisions regulating digitization in various production or administrative processes are composed and incorporated (Lovciová, 2022). Agriculture with its production and non-production tasks has a lot of specifics. Therefore it is essential to adapt the accounting and recognition of agricultural production to these specifics and risks arising from agricultural activities.

Act no. 456/2021 Coll., amending Act No. 431/2002 Coll. on Accounting, as amended, effective from January 1, 2022 has the crucial impact on the digitization in the accounting. The act responds to developments in society and the rising trend of digitization of any processes in an accounting entity recorded in its bookkeeping. Based on the reactions of the current rising trend of digitization, the Act on Accounting has supplemented and clarified the conditions that an accounting entity is obliged to comply with when processing electronic accounting records. Specifically, the wording of the provisions of the Act on Accounting was changed

in the provisions of § 31 Accounting record, § 32 Provability of accounting record, § 33 Transfer of accounting record (Transformation of accounting record from 1 January 2022) and the provision regarding the archiving of documentation, i.e. §35 Archiving and protection of accounting documentation (Blahušíaková, 2022; Lovciová, 2022).

Materials and methods

As a result of the explosive growth of scientific knowledge and the rapid development of ICT, the world economy is undergoing excessive global changes. At the global and regional level, the topic of digitization, digital transformation, cyber security, etc. is increasingly coming to the fore. The expansion of digital capabilities means that almost every aspect of our lives is captured digitally and shared through digital networks. The result is a global exchange of information in real time between many devices connected to a digital network. The digital economy is also related to the rapid onset and penetration of information and communication technologies into all areas of human activity. It also requires new perspectives on the factors influencing the development and success of the economy.

The main task of article is to determine the digital economy in the context of digital transformation and their impact on the electronification of accounting processes in the Slovak Republic. The article defines the progress and level of development of Europe's digital competitiveness in individual EU member states using the Digital Economy and Society Index (DESI). This index helps the EU member states identify areas that require priority investments and measures. The article also describes how the approved amendment to the Act on Accounting as of January 1, 2022 creates space for streamlining the processing and archiving of accounting records.

It does not provide specific technical solutions applicable to the accounting practice, but it defines the principles of circulation of documents up to their archiving, including the verifiability of accounting records and their transformation from paper to the electronic form. The amendment to the Act on Accounting also introduces the cancellation of the signature record of the person responsible for the accounting case as a mandatory element of accounting documents, provided that electronic data exchange or the internal

control system of accounting records is used, as well as the cancellation of the signature record of the person responsible for its bookkeeping. In addition to the mentioned signature records, it is no longer necessary to indicate the determination of the accounts on which the accounting case was recorded in the double-entry bookkeeping system on the accounting documents after the amendment to the Act on Accounting came into force. The abolition of these hitherto mandatory requirements of accounting documents no longer hinders the development of modern trends in the field of electronic accounting.

Information from professional literature and available electronic resources consisting of various magazines and scientific publications from the databases Web of Science, Scopus, Researchgate and other data from the websites of the European Commission and the World Economic Forum were used as the source for the processing of the article. The basic methodical approach of processing is presented by standard methods of scientific work such as selection, analysis, comparison, deduction and synthesis in a theoretical as well as in a practical level.

DESI Index (The Digital Economy and Society Index)

The DESI index is a composite index that summarizes Europe's digital performance indicators and monitors developments in the digital competitiveness of the EU member states. It includes all member countries of the European Union, and in 2020 data is still available for Great Britain, even though it has left the EU.

DESI consisted of five basic dimensions until 2020:

- Connectivity.
- Human capital.
- Use of internet.
- Integration of digital technology.
- Digital public services.

The resulting DESI value for a country is calculated as follows:

$$\text{DESI} = \text{Connectivity} * 0,25^* + \text{Human capital} * 0,25^* + \text{Use of internet} * 0,15 + \text{Integration of digital technology} * 0,20^* + \text{Digital public services} * 0,15^*$$

(* the value of the scales determined by experts)

In 2018, there was a slight change

in the methodology of the DESI index. By using the MIN-MAX method, the data were recalculated in order to use a rating scale from 0 to 100 (0 - the lowest score, 100 - the highest score). Furthermore, from the point of view of comparability, it was necessary to normalize the data and apply the current system of weights for individual dimensions in the case of both indexes. A semi-log model was used to determine the growth rate for comparison of methodology changes with current data. This model belongs to the growth models and is used by default to calculate the growth rate of various variables.

A more interesting view of the ranking of countries is provided by dividing countries into groups. Group analysis according to pre-selected variables sorts the statistical units into groups in such a way that there is the greatest possible similarity within the groups and the greatest possible difference between the groups. The groups were defined as follows:

- rapidly developing countries,
- average developing countries,
- catching up countries,
- lagging countries.

Ward's clustering method was also used to confirm the classification of countries into groups. The principle of this method is the minimization of the heterogeneity of clusters according to the criterion of the minimum increment of the intragroup sum of squares of deviations of objects from the centroid of the cluster. In each step, for all pairs of deviations, the increment of the sum of squares of the deviations resulting from their merging is calculated. Then those clusters corresponding to the minimum value of this increment are joined. Ward's method tends to remove small clusters, that is, it forms clusters of approximately the same size (Kaufman and Rousseeuw, 2005). The most frequently used approach is the heuristic approach, which represents the determination of the number of clusters based on the subjective opinion of the solver. In 2021 and 2022, the structure of the index dimensions changed (Figure 1).

The resulting value from 2021 is recalculated as follows:

$$\text{DESI} = \text{Human_capital} * 0,25 + \text{Connectivity} * 0,25 + \text{Integration_of_Digital_Technology} * 0,25 + \text{Digital_Public_Services} * 0,25$$



Source: European commission, own processing

Figure 1: Current dimensions of the DESI index.

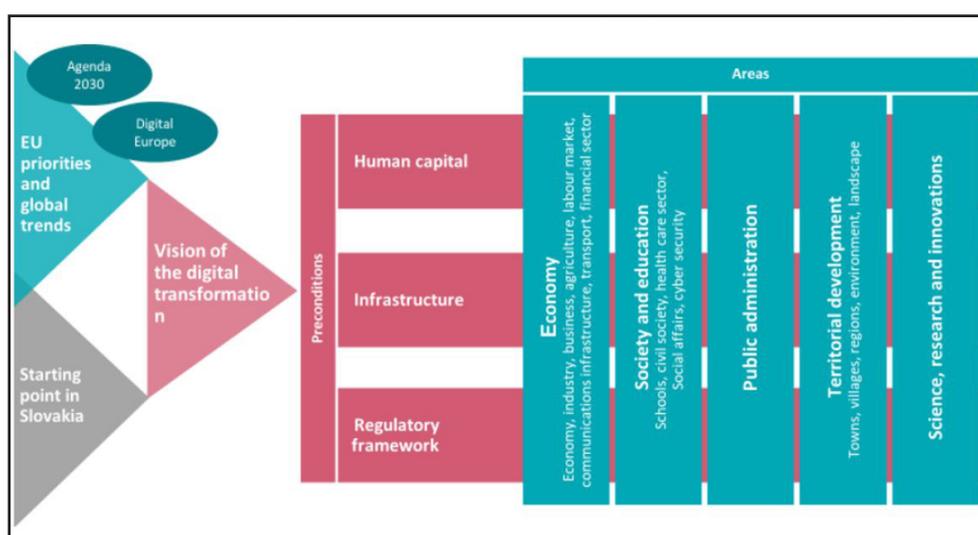
Results and discussion

In 2020, a new strategy was planned for Slovakia - Strategy for the digital transformation of Slovakia 2030. The strategy follows on from the creation of the new EU multi-annual financial framework for the years 2021-2027, including cohesion policy instruments, as well as directly managed programs (including the Digital Europe and the Connecting of Europe - digital part), where special attention is paid to the need to develop the digital economy. In addition to the above, it also directly reflects the conceptual materials and recommendations of international organizations, especially the Organization for Economic Cooperation and Development and the United Nations, which consider the process of digital transformation to be key to achieving sustainable and inclusive growth. Figure 2 shows the main objectives of the strategy.

For the given strategy, the initial state of Slovakia was evaluated, the basic prerequisites for implementation were identified, and the areas in which we absolutely need to multiply our potential through digital transformation were identified. The final goal of the process of building an information society and digital transformation will be the creation of conditions for the satisfied life of every person in the digital age in the context of respecting and building digital humanism.

Slovakia needs to create conditions for the gradual digital transformation of all sectors of the economy. This primarily includes the transformation of the current industry into Industry 4.0, by which we denote the current trend of digitization and the related automation of production and data exchange in production processes. Industry 4.0 will become the engine of the country's economic growth. The goal will be to use the technological

potential and increase private and public investments in new technologies. It will therefore be necessary for the state to help businesses prepare for such a transformation. First of all, this preparation will be ensured by the state providing companies with knowledge and the means to access technologies, as well as incentives and initiatives to solve specific problems, which will be used for example by digital innovation hubs. Due to the gradual introduction of automated technologies, most industries will experience a growing shift in skills. When working with new technologies, workers must be able to take on complex, less automated tasks, such as being able to solve problems, create their own solutions and approaches, and have critical thinking skills. Likewise, cognitive skills, social skills, communication skills, organization, technological expertise, as well as creativity are categories whose importance will constantly grow and will be the most sought after on the labor market, to which the Slovak market will have to adapt effectively. Slovakia will also create the prerequisites for the emergence of a dynamic data economy. The legislative environment will be set up in a way to enable the application of new business models, built on platforms and AI in practice. There will also be sufficient demand within the economy for innovative solutions to create innovation. Slovak companies will thus employ a growing number of data analysts.



Source: 2030 Digital Transformation Strategy for Slovakia

Figure 2: Vision of the digital transformation.

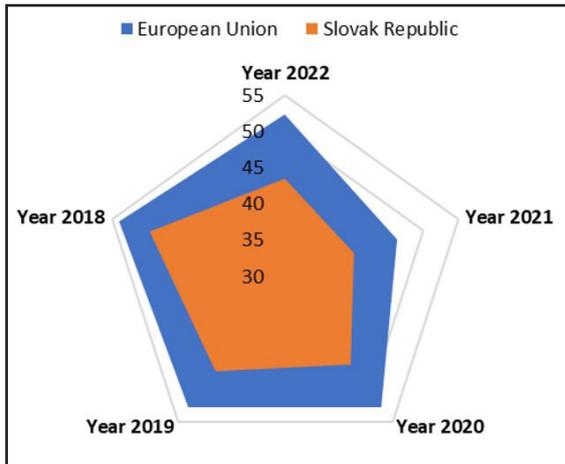
Digital Economy and Society Index

The European Commission monitors the digital competitiveness of member states according to the Digital Economy and Society Index (DESI) in the reports it has been issuing since 2015. These reports include profiles of individual countries as well as thematic chapters. DESI country reports are a combination of quantitative data obtained using DESI indicators in four areas within the index and an overview of country policies and best practices. The thematic chapters contain a Europe-wide analysis of broadband, digital skills, internet use, business digitalisation, digital public services, the ICT sector, and its R&D expenditure, as well as the use of Horizon 2020 funds in Member States. Slovakia ranked 23rd among the 27 EU member states in the European Commission's Digital Economy and Society Index (DESI) for 2022. Slovakia is just below the EU average or around it in terms of indicators in human capital. 55% of Slovaks have basic digital skills, which is slightly above the EU average of 54%. The share of experts in the field of information and communication technologies (ICT) from the total number of employees is 4.2%, which is just below the EU average (4.3%). Sixteen percent of ICT experts are women, the EU average is 19%. Slovakia's e-commerce score has decreased: 13% of small and medium-sized enterprises (SMEs) sell online, compared to 17% in 2020. In 2020, 16% of Slovak businesses used electronic invoices, compared to 32% in the EU. Although Slovakia has made some progress in all

areas over the past year, especially in the indicators of core internet coverage and connectivity rollout, the improvements have not been sufficient to keep Slovakia in step with the EU average.

The Digital Economy and Society Index (DESI) is an online tool to measure EU member states' progress towards a digital economy and society. DESI currently combines 33 indicators (pillars) and uses a system of criteria weights to classify each country based on its digital performance. It collects a set of indicators that are in the various digital agendas of countries in Europe. The indicators are not immutable, as evidenced by the modification of the index over the years. The index is currently divided into four main dimensions, which in turn consist of pillars. The DESI score ranges from 0 to 1 or from 0 to 100, with the higher the score, the better the country's performance.

If we look at the comparison of the position of Slovakia and the EU for the period from 2018 to 2022, Slovakia significantly lagged the EU values in each year. The comparison is shown in Figure 3. The best value of the DESI index was achieved by Slovakia in 2018. On the contrary, the worst value was measured in the first year of measurement, that is, in 2022.



Source: European commission, own processing

Figure 3: Comparison of DESI values of the EU and Slovakia.

A more interesting view of the data is provided by the division of countries into groups according to what score they achieved and how much they increased from previous periods compared to the European average. Groups are defined as follows:

Rapidly developing countries – countries that score above the EU average and their scores are growing faster than the EU score in the last year. These are countries that are performing well and are developing at a pace that allows them to move away from the EU average.

Average developing countries – countries whose score is above the EU average but whose score

is growing more slowly than the EU score in the last year. These countries are doing well, but their development is currently very slow compared to the progress of the EU.

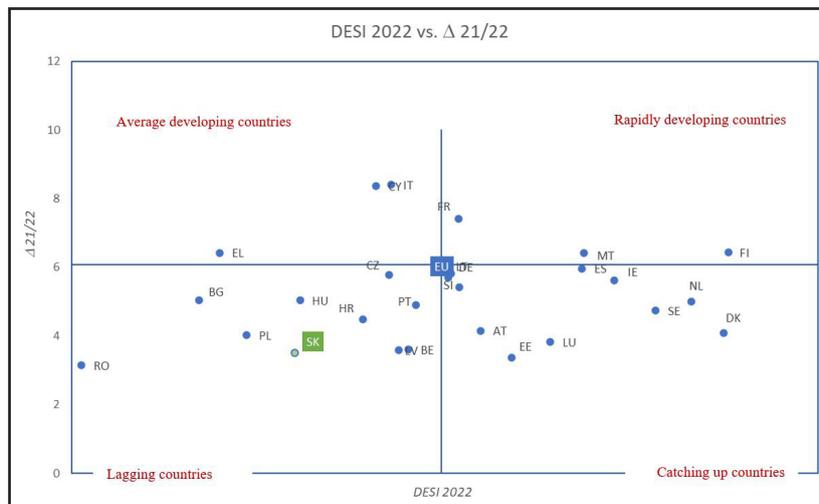
Catching up countries – countries whose score is below the EU average but whose score is growing faster than the EU score in the last year. These countries are developing faster than the EU as a whole and are therefore catching up with the EU average.

Lagging countries – countries whose score is below the EU average but whose development in the last year was slower than the EU score. These countries are less developed than the EU average and show anemic growth, distancing themselves from the rest of the EU.

Slovakia is included in the category of lagging countries, i.e. the results of the index are below the EU average and the country is also developing more slowly than the EU average. Figure 4 shows the classification of EU countries into clusters.

Integration of digital technologies in the business environment

The Integration of digital technologies dimension is mainly focused on businesses. It consists of 11 pillars listed in Table 1. There has also been a change in the pillars in this dimension compared to previous years. The pillars of radio frequency identification (RFID) and electronic invoices were taken away. The pillars of big data, artificial intelligence and ICT for environmental sustainability were added. Table 1 shows the pillars and their values for the years 2018 to 2022.



Source: European commission, own processing

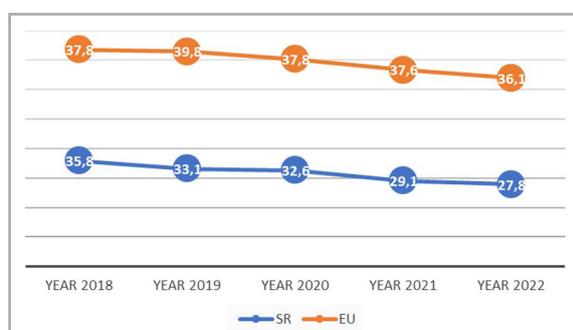
Figure 4: Classification of countries into groups.

List of pillars	Year 2018	Year 2019	Year 2020	Year 2021	Year 2022	EU 2022
SMEs with at least a basic level of digital intensity	NA	NA	NA	NA	43 %	55 %
Electronic information sharing	31 %	31 %	31 %	31 %	31 %	38 %
Social media	17 %	17 %	18 %	18 %	21 %	29 %
Big data	11 %	9 %	9 %	6 %	6 %	14 %
Cloud	15 %	13 %	NA	NA	31 %	34 %
AI	NA	NA	NA	NA	5 %	8 %
ICT for environmental sustainability	NA	NA	NA	76 %	76 %	66 %
List of pillars	Year 2018	Year 2019	Year 2020	Year 2021	Year 2022	EU 2022
e-Invoices	NA	NA	15 %	16 %	16 %	32 %
SMEs selling online	15 %	13 %	11 %	17 %	13 %	18 %
e-Commerce turnover	12 %	11 %	11 %	11 %	18 %	12 %
Selling online cross-border	8 %	8 %	7 %	7 %	7 %	9 %

Source: European commission, own processing

Table 1: Pillars of the third dimension Integration of digital technology.

Electronic sharing of information in Slovakia remained at the level of approximately 31% during the entire monitored period, which is below the EU average. Since 2017, a new pillar has been added to this dimension, namely Big Data. Slovakia is below the European average for this pillar. In the case of the use of cloud solutions, we are below the EU average, these values should increase soon mainly due to the pressure of Microsoft (the largest supplier of software solutions for businesses in Slovakia) to move to the cloud space and use products of the 365 series. Internet sales by small and by medium-sized enterprises decreased slightly compared to 2021, which further deepened the distance from the European average. The values in the pillars of e-commerce turnover and cross-border sales via the Internet are approximately at the same level as the EU, in the case of e-commerce turnover in 2022, it significantly exceeds the EU. Figure 5 shows the graphic development of the Integration of digital technology dimension.



Source: European commission, own processing

Figure 5: Integration of digital technology during years.

The digitization of enterprises is defined for Slovakia within the action plan of intelligent industry, which was adopted in 2018. The aim of this plan is support for industrial enterprises, service, and trade enterprises, regardless of their size, aimed at creating better conditions for the implementation of digitalization, innovative solutions and increasing competitiveness.

Slovakia signed the declaration of the European partnership for blockchain technology, as well as the declaration on cooperation on artificial intelligence. At the same time, it cooperates with other EU countries within the joint venture for European high-performance computing (EuroHPC). Overall, it can be concluded that Slovakia is intensifying its efforts to support the integration of technologies in businesses and is also closely connected with relevant European initiatives.

Electronization of processes is fully established in the administration of companies. In business relations, paper documents are gradually being replaced by electronic versions. Following the need to connect economic operations, financial resources are spent on process automation, data extraction, e.g., OCR (Object Character Recognition) technologies, approval of electronic documents, data export to accounting, etc. There is a need as well as an opportunity to find any data from documents entered in the system.

An important milestone in the electronization of processes was the adoption of Act No. 305/2013 Coll. on the electronic form of the performance of the powers of public authorities

and on the amendment and addition of certain laws, as amended, for communication with public administration entities. Every entrepreneur is obliged to have software equipment for electronic communication with public administration bodies, whether it is filing tax returns or other notifications. According to surveys, the electronization of processes is commonly introduced in large companies. However, small companies, typical in the Slovak business environment, have a high proportion of paper documents that require manual processing. There is still a high proportion of paper archiving of accounting documentation in the external accounting, sometimes perhaps for reasons of legal certainty. In this area, progressive accounting software sets the direction for creating electronic documents and extracting data from paper documents. In any case, it is more flexible to deal with the conversion to electronic documents at the moment of initial processing and not at the moment of archiving the accounting documentation.

Amendment to Act No. 431/2002 Coll. on Accounting, as amended, defines electronic and paper accounting records, establishes requirements for their processing in the accounting and archiving of accounting documentation. The creation of electronic accounting records and their processing in accounting was also possible pursuant to the Act on Accounting effective before its amendment. From the aspect of computerized accounting, the amendment to the Accounting Act modifies:

- provability of electronic accounting records and their archiving,
- verifiability of paper accounting records and their transformation into electronic form.

It provides solutions for accounting purposes, which in many cases are also acceptable for other legal requirements. Special regulations may expressly require the document to be in paper form. For example, according to the current Labour Code (§ 38, article 1), it is not considered that the labour law agenda could be kept electronically. In other cases, the law requires an electronic document, e.g. e-invoice according to Act No. 215/2019 Coll. on guaranteed electronic invoicing and the central economic system and on the addition of certain laws or electronic documents when communicating with the Financial Administration, health insurance companies or the Social Insurance Agency. However, the amendment to the Act on Accounting does not

establish technical parameters, it does not establish specific requirements for software programs, but it talks about the principles and methods that must be followed in the accounting. The accounting entity (this also applies to agricultural entities) has the obligation to prove that these accounting principles and methods are followed through program manuals and internal regulations for established processes.

Pursuant to the Accounting Act, the accounting is kept as a set of accounting records. An accounting record is a data that is a carrier of information that relates to the subject of accounting or the method of accounting. Accounting records include invoices, delivery notes, orders, decisions of general meetings, court decisions, payrolls, treasury documents, bank statements, warehouse records, VAT records, tax returns and several other records that form the basis for accounting. Currently, the accounting is practically conducted electronically, therefore the basic accounting records also include program documentation, the program manual of a software product for accounting, which can be elaborated in an internal accounting record. An internal regulation on the circulation of documents and the verification of documents is also included among the important underlying accounting records. Following the electronization of the process, a record is created expressing the provability of extracted data, access to cloud storage, and all that.

The amendment to the Act on Accounting defines the paper and electronic forms of accounting records. Paper accounting record is a record made on paper and a printed accounting record made using software. For accounting purposes, a documentary accounting record is considered to be one that is sent and received as a document or created in this way for the internal purposes of an accounting entity. Subsequently, it is possible to transform the paper accounting record into electronic form according to § 33 of the amendment to the Act on Accounting, while this electronic accounting record is archived as a part of the electronic accounting documentation. Electronic accounting record means:

1. Accounting record received or made available in an electronic format. The electronic format itself is determined by the creator of the accounting record or determined based on an agreement with the receiver of the accounting record.
2. Scanned document according to §33 of the amendment to the Act on Accounting

sent electronically. For the receiver of the accounting record, the accounting record that is sent as an attachment to the electronic mail is also considered to be the primary electronic accounting record.

3. An accounting record made in an electronic format for the internal purposes of an accounting entity.

The basic requirement of both the already effective Act on Accounting and the approved amendment is the provability of accounting records. An accounting record is considered to be provable if: the content of the accounting record directly proves the fact, the content proves the fact indirectly through the content of other provable accounting records, when recording and processing these facts, it meets the requirements of the credibility of the origin, the integrity of the content and the readability of the accounting record, from the moment the accounting record is made or from the moment the accounting record is received or made available until the end of the accounting documentation retention period. The accounting entity has the opportunity to ensure the credibility of the origin and integrity of the content of the accounting record:

1. Signature record of the responsible person; The accounting unit is obliged to adjust the details of the authorization, obligations and responsibilities of the persons in an accounting entity to whom the attachment of the signature record applies, in such a way that it is possible to determine independently the responsibility of individual persons for the content of the accounting record to which the signature records were attached.
2. Electronic data exchange, which means the exchange of structured messages between computers or computer applications, in which the processing of various electronic formats of accounting records takes place, which go through the process of verification, coordination, approval and settlement without the possibility of human intervention in the content of the accounting.
3. The internal control system of accounting records which means the determination of persons responsible for controlling of processing accounting records, while the control is sufficient to prove

the fact that is recorded in the accounting record. The control method determined by the accounting entity is a part of the accounting record for bookkeeping and accounting record processing.

The amendment to the Act on Accounting clarifies what is meant by the term signature record. It can be a handwritten signature, a qualified electronic signature or a similar provable signature record replacing a handwritten signature in an electronic form, which enables clear, provable identification of the person who made the signature record. A qualified electronic signature is defined by the eIDAS regulation as an improved electronic signature created according to specific security standards. In the eIDAS Regulation, electronic signature means data in an electronic form that is connected or logically associated with other data in an electronic form and that the signer uses for signing. In principle, it can be anything that identifies the signer in an electronic environment.

Such a signature guarantees:

- The document integrity, i.e., that the document signed with a qualified electronic signature does not change during its transfer from the sender to the recipient,
- at the same time, it enables the identification of the signed person, as it is created using a qualified certificate and a private key issued by the NSA (National Security Authority) or other qualified confidential service providers, using a qualified device (e.g. reader and eID).

A personal access code, access name and password or an encryption key, which can be used to clearly and demonstrably identify the responsible person who used it, can also be considered as a similar verifiable signature record replacing a handwritten signature. The accounting entity is obliged to create a system for creating similar verifiable signature records in an electronic form, which ensures that they cannot be obtained, changed or otherwise misused by anyone other than the responsible person, and which are attached or logically associated with accounting records in an electronic form in order to ensure the origin and integrity of these data. The technical solution in practice always depends on specific software equipment, such as accounting software used by an accounting entity, software for document administration or archiving, etc.

A common part between accounting entities and within an accounting entity is the use of electronic data interchange (Electronic Data Interchange). It is an integrated data exchange that prevents manual and paper transactions. It can be used, for example, for the exchange of orders, for invoicing processes, where the electronic transfer of invoices allows quick review and processing of documents. Currently, accounting programs already use e.g. cloud services. It allows to log in to own accounting program via the website, and e.g. create invoices. Among the advantages is the use of several computers at the same time. Another advantage is easy data sharing. Online software solutions through smartphones and mini programs synchronize and send data to cloud storage.

The amendment to the Act on Accounting itself had a crucial impact on the electronic storage and protection of accounting documentation. In order to ensure more consistent accounting records during their storage, an accounting entity is obliged to follow the specified method of storage of accounting documentation. Due to the fact that accounting documentation is already stored electronically, electronic storage of accounting documentation means the storage of accounting documentation on a data carrier. The form of the data carrier can be chosen by an accounting entity arbitrarily, it is up to its decision. It can be a USB key, external disk, memory card, storage, etc. When storing accounting documentation, an accounting entity is also obliged to ensure compliance with the requirements of accounting records in an electronic form, if it only stores accounting records, the form of which is the result of the transformation of the accounting record (§ 35 article 5 of the Act on Accounting).

Conclusion

The coronavirus pandemic has fully demonstrated the importance of the existence of a digital economy. It is obvious that this segment will undergo rapid development in the upcoming years and the entire economy will undergo a digital transformation. Digital transformation stands for ongoing changes to business models, business processes and operations as well as customer interaction in connection with new information and communication technologies. The involvement of small and medium-sized enterprises will be crucial in the upcoming process of digital transformation. The EU must work on much closer

cooperation with such companies.

Slovakia needs to create conditions for the gradual digital transformation of all sectors of the economy, this also applies to agricultural. The Digital Economy and Society Index (DESI) is an online tool to measure EU member states' progress towards a digital economy and society. DESI currently combines 33 indicators (pillars) and uses a system of criteria weights to classify each country based on its digital performance. Slovakia is included in the category of lagging countries, i.e. the results of the index are below the EU average and the country is also developing more slowly than the EU average. In 2022, Slovakia ranked the 23rd position among the 27 EU member states in the evaluation of the DESI. The rate of use of advanced digital technologies in enterprises lags behind the EU average. Electronic sharing of information in Slovakia remained at the level of approximately 31% during the entire monitored period, which is below the EU average.

Digitization is also coming to the accounting. The Slovak Republic also responded to the growing share of electronic accounting records, and the amendment to the Act on Accounting (§31 to §33) from 1 January 2022 specified the definition of an electronic accounting record. The current change in the amendment to the Act on Accounting thus offers completely new opportunities for working with corporate accounting in relation to internal processes in the company, but also in relation to financial administration or tax authorities. For several years, we have been working on solutions that can ensure the complex management of accounting documents from their entry into the company (this also applies to agricultural entities) to the final archiving with the possibility to search for any document. Electronic accounting can save companies. The accounting entity (agricultural entities) has the obligation to prove that these accounting principles and methods are followed through program manuals and internal regulations for established processes. Accounting can be paperless. Physical documents do not have to be archived, companies do not have to worry about them not being destroyed, lost or damaged. Digitization of accounting also eliminates the frequent problem of finding documents. For example, an invoice can be searched in the electronic system by supplier, amount, date of issue or other attributes. It will no longer be a problem to find out whether

the given invoice is approved, rejected or waiting for signature. The digital archive is also related to this. The amendment to the Act on Accounting thus opens the possibility for companies to move to a higher digital level and be more competitive.

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Corresponding authors

Ing. Iveta Košovská, Ph.D.

Faculty of Economics and Management, Slovak University of Agriculture in Nitra

Tr. A. Hlinku 2, 949 76 Nitra, Slovak Republic

Phone: +421 37 641 4116, E-mail: iveta.kosovska@uniag.sk

References

- [1] Bednarčíková, D. (2020) "Digitalizácia v bankovom sektore", *Ekonomika, financie a manažment podniku XIV: zborník vedeckých statí pri príležitosti Týždňa vedy a techniky*, pp. 40-51. ISBN 978-80-225-4763-5. (In Slovak).
- [2] Bednarčíková, D. and Repiská, R. (2021) "Digital Transformation in the Context of the European Union and the Use of Digital Technologies as a Tool for Business Sustainability", *Current Problems of the Corporate Sector 2021: 18th International Scientific Conference*, pp. 1-11. DOI 10.1051/shsconf/202111501001.
- [3] Bican, P. M. and Brem, A. (2020) "Digital Business Model, Digital Transformation, Digital Entrepreneurship: Is There A Sustainable "Digital"?", *Sustainability*, Vol. 12, No. 13. ISSN 2071-1050. DOI 10.3390/su12135239.
- [4] Blahušiaková, M. (2022) "Automatizácia a digitalizácia účtovníctva v Slovenskej republike – komparatívna analýza", *Ekonomika a informatika: vedecký časopis FHI EU v Bratislave a SSHI*, Vol. 20, No. 1, pp. 5-16. ISSN 1339-987X. (In Slovak).
- [5] Bloomberg, J. (2018) "Digitization, Digitalization, and Digital Transformation: Confuse Them At Your Peril" [Online]. Available: <https://www.forbes.com/sites/jasonbloomberg/2018/04/29/digitization-digitalization-and-digital-transformation-confuse-them-at-your-peril/?sh=423d66852f2c> [Accessed: Oct. 26, 2022].
- [6] Čierny, M. (2017) "História vzniku pojmu INDUSTRY 4.0 a základné informácie" [Online]. Available: <https://www.ipaslovakia.sk/clanok/kvalita-a-industry-4-0> [Accessed: Oct. 28, 2022]. (In Slovak).
- [7] Ding, C., Liu, C., Zheng, C. and Li, F. (2022) "Digital Economy, Technological Innovation and High-Quality Economic Development: Based on Spatial Effect and Mediation Effect", *Sustainability*, Vol. 14, No. 1. ISSN 2071-1050. DOI 10.3390/su14010216.
- [8] Dvořáková, L., Vacek, J., Černá, M., Hejduková, P., Hinke, J., Taušl Procházková, P., Vallišová, L., Horák, J., Caha, Z. and Machová, V. (2020) "Metodika adaptace malých a středních podniků v sektoru služeb na implementaci principů, postupů, metod a nástrojů Společnosti 4.0", University of West Bohemia in Pilsen, 85 p. ISBN 978-80-261-0953-2. DOI 10.24132/ZCU.2020.09532. (In Czech).
- [9] Gestrn, M. and Staudt, J. (2018) "The digital economy, multinational enterprises and international investment policy", OECD, 24 April 2018. [Online]. Available: <https://www.oecd.org/investment/investment-policy/The-digital-economy-multinational-enterprises-and-international-investment-policy.pdf> [Accessed: Oct. 27, 2022].

- [10] Imran, M., Liu, X., Wang, R., Saud, S., Zhao, Y. and Khan, M. J. (2022) "The Influence of Digital Economy and Society Index on Sustainable Development Indicators: The Case of European Union", *Sustainability*, Vol. 14, No. 18. ISSN 2071-1050. DOI 10.3390/su141811130.
- [11] Implementačná agentúra Ministerstva práce, sociálnych vecí a rodiny Slovenskej republiky (2017) "Analýza dopadov digitálnej transformácie na podnikateľov, v súkromnom a verejnom sektore". IA MPSVR SR, 2017. [Online]. Available: https://www.ia.gov.sk/data/files/NP_CSD_II/Analyzy/RUZ/RUZ_Analyza_Analyza_dopadov_digitalnej_transformacie_na_podnikatelov__v_sukromnom_a_verejnom_sektore.pdf [Accessed: Oct. 24, 2022]. (In Slovak).
- [12] Jorgenson, D. W., Ho, M. S., Samuels, J. D. and Stiroh, K. J. (2007) "Industry Origins of the American Productivity Resurgence", *Economic System Research*, Vol. 19, No. 3, pp. 229-252. ISSN 09535314. DOI 10.1080/09535310701571885.
- [13] Kaufman, L. and Rousseeuw, P. J. (2005) "Finding Groups in Data. An Introduction to Cluster Analysis", Wiley – Interscience, 1st ed., 342 p. ISBN 978-0-471-73578-6. DOI 10.1002/9780470316801.
- [14] Kouřilová, J., Kubíková, M. and Pělucha, M. (2021) "Digitalizace jako předpoklad regionální konkurenceschopnosti? Analýza disparit na příkladu ČR", *22nd International Colloquium on Regional Sciences Masaryk University, Collection of papers*, pp. 75-83. ISBN 978-80-210-9896-1. DOI 10.5817/CZ.MUNI.P210-9896-2021-9. (In Czech).
- [15] Lovciová, K. (2022) "Digitalizácia – významný začiatok éry transformácie účtovníctva v zmysle trvalo udržateľného rozvoja", *Ekonomika a informatika: vedecký časopis FHI EU v Bratislave a SSHI*, Vol. 20, No. 1, pp. 24-33. ISSN 1339-987X. (In Slovak).
- [16] Ministerstvo investícií, regionálneho rozvoja a informatizácie Slovenskej republiky. (2019) "Stratégia digitálnej transformácie Slovenska 2030", MIRRI SR, 2019. [Online]. Available: <https://www.mirri.gov.sk/wp-content/uploads/2019/06/Strategia-digitalnej-transformacie-Slovenska-2030.pdf> [Accessed: Oct. 24, 2022]. (In Slovak).
- [17] Peng, M. W., Sun, S. L., Pinkham, B. and Chen, H. (2009) "The Institution-Based View as a Third Leg for a Strategy Tripod", *Academy of Management Perspectives*, Vol. 23, No. 3, pp. 63-81. ISSN 1558-9080. DOI 10.5465/amp.2009.43479264.
- [18] Schwab, K. (2016) "The World Economic Forum: The Fourth Industrial Revolution: what it means, how to respond". [Online]. Available: <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/> [Accessed: Oct. 27, 2022].
- [19] Slovak Business Agency. (2019) "Analýza potrieb MSP v kontexte agendy inteligentného priemyslu a špecificky vo vzťahu k potrebe ľudských zdrojov do roku 2020/2030", Slovak Business Agency, February 2019. [Online]. Available: http://www.sbagency.sk/sites/default/files/analyza_potrieb_msp_v_kontexte_agendy_inteligentneho_priemyslu.pdf [Accessed: Oct. 26, 2022]. (In Slovak).
- [20] Suchman, M. C. (1995) "Managing Legitimacy: Strategic and Institutional Approaches", *The Academy of Management Review*, Vol. 20, No. 3, pp. 571 – 610. DOI: <https://doi.org/10.2307/258788>.
- [21] Šimek, P., Vaněk, J., Stočes, M., Jarolímek, J. and Pavlík, J. (2017) "Mobile accessibility expense analysis of the agrarian WWW portal", *Agricultural Economics – Zemědělská ekonomika*, Vol. 63, No. 5, pp. 197-203. ISSN 0139-570X. DOI 10.17221/313/2015-AGRICECON.
- [22] Unold, J. (2003) "Basic Aspects of the Digital Economy", *Acta Universitatis Lodzianensis*, No. 167, pp. 41-49. E-ISSN 2450-6990.