Digitalization in the Human Capital Management

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Abstract: Countries of the EU are trying to create a single digital market. Therefore, this article aims to evaluate the current situation in the field of readiness of economic entities in Slovakia for challenges in the field of human capital management (HCM) when implementing digital technologies in their processes and to propose recommendations regarding the implementation of digital technologies. We used basic scientific methods and calculated Cronbach’s alpha, descriptive statistics, and the chi-square test to detect dependencies between variables. This article processes data from a questionnaire survey completed by managers or owners of economic entities in Slovakia. In 2020, we received answers from 905 respondents, and in 2021, our sample consisted of 561 respondents. We found that among the most used is digitalization in the field of GDPR and not the use of a personnel information system (HRIS). The assumptions that the size of the entity and the prevailing ownership influence the use of digital technologies were also confirmed. The article’s originality lies in the topicality of the examined issue and the extensive questionnaire survey spanning two years. It follows from the findings from previous articles, which pointed to the extremely low values of Slovakia within the DESI index.

Keywords: Industry 4.0; digitalization; digital transformation; human capital management; human capital

1. Introduction

The current era is influenced by using modern digital technologies, which are meant to make people’s personal and work lives easier. Technologies bring positives such as speeding up and facilitating work and business processes, reducing the risk of accidents at the workplace, or increasing the competitiveness of economic entities on the market and increasing the quality of services and products provided. On the other hand, it is possible to register risks that consist of higher initial costs for purchasing modern digital technology and the need to employ highly qualified personnel, which will lead to retraining or layoffs.

Digital technologies can be used in various economic spheres and business processes [1]. Personnel processes are no exception, e.g., those processes in the company that concern people—employees. It is possible to digitalize all activities, from the acquisition and selection of employees, through the remuneration of employees to their release or reassignment to another job [2].

Due to the changes brought about by digital technologies, it will be necessary to pay more attention to people and their HC, e.g., their knowledge, skills, and competencies. Economic entities should avoid mass layoffs and preferably, if possible, invest in the education of their employees. For this reason, this article aims to find out the current situation in the field of readiness of economic entities in Slovakia for challenges in the field of HCM when implementing digital technologies in their processes and to propose recommendations regarding the implementation of digital technologies.

This article was inspired by several previous surveys in other countries and business areas that focused on digitalization in various fields, such as small and medium-sized industrial enterprises in Austria [3], agriculture in Azerbaijan [4], processes in the food...
industry in the European Union [5], waste management in Germany [6], education in Russia [7], small and medium enterprises in Ukraine [8], use of HRIS in Europe [9].

We see the further direction of the article in the framework of the investigation of relationships, factors, opportunities, and threats of the connection of HCM with digitalization in economic entities in Slovakia. It would contribute to the expansion of knowledge in the field of HCM and digitalization. Moreover, it would follow on from studies such as digitalization and development of HC in countries [10], HC during digital transformation in Ukraine [11], the impact of digitalization on HC in Russia [12], use of HC in the digital economy in Russia [13].

2. Theoretical Backgrounds

2.1. Digitalization as an Industry 4.0 Element

The fourth industrial revolution is built on several pillars (Figure 1), such as digitalization, the Internet of Things, additive manufacturing, Big Data analysis, autonomous robots, simulations, horizontal and vertical system integrations, additive manufacturing (3D printing), cloud systems, augmented reality, cyber data protection, sensors, artificial intelligence, or Business Intelligence [14–26].

![Figure 1. Development of industrial revolutions (Source: own processing according to [27–29).](image)

Digitalization is one of the pillars and tools of the fourth industrial revolution, which is very important for entities operating in various business areas and several spheres of the national economy. It is about the possibility of optimizing several business parameters, such as performance, efficiency, or competitiveness [30,31]. If economic entities want to be competitive, managers must respond effectively and quickly to changes brought about by the advent of digital technologies [32–36]. The term digitalization is also associated with the term digital transformation [37]. According to Lachvajderová et al. (2021), digital transformation represents a process in which modern technologies are used given the rapidly changing environment while expanding the innovative potential of the entity.

A distinction is made between the terms “digitization” and “digitalization”. The term digitization means digitalization in the process of converting human-readable analog signals into digital form and finally into binary numbers that digital technologies can understand. The second term, digitalization, represents the introduction of digital technologies into the enterprise and various socio-technical phenomena and processes related to this introduction and use [38–42].

This technology also has the elements that characterize it. According to Porter and Heppelmann (2014) [43], Pfeiffer and Jarke (2017) [44], and Friedrich et al. (2013) [45], these are sensors, devices forming an intelligent system, and finally, the integrating connectivity from devices to a digitalized platform. Digitalization brings changes in the business environment at the process, organizational, business domain, and company levels [37].

Economic entities can use the digitalization of analog data, e.g., the personnel information system (HRIS), which transfers analog data into digital form. HRIS is an information
A system that collects, analyses, and stores information about employees [46]. It captures the entire life cycle of an employee in an economic entity [47]. HRIS is also positively evaluated by employees when they have the necessary knowledge and skills to use it [48]. Large companies use HRIS the most, but nowadays, information systems for smaller companies are available [49].

The digitalization of biometric data consists of using modern digital technologies to collect, process, and store the physical characteristics of a person, such as a face, eyes, voice, and fingerprints to verify the identity or identify a person [50]. Economic entities use this type of digitalization for access rights for their employees [51–53].

The use of digital platforms, including social networks, significantly affects not only the social and cultural life of people but also brings companies new opportunities for recruiting employees. It is a connection between the intrinsic world and the virtual one, with their gradual overlap, thanks to modern technologies in the field of virtual and augmented reality [50,54,55].

Big data analytics are used to analyze employee motivation. It represents the collection of a large amount of diverse data characterized by its large volume (volume), the speed of generating new data (velocity), and, finally, the diversity of the type of data (variety), which must be further processed [56–59].

As part of digitalization, predictive analytics is also used in the process of managing the employee’s work performance. It is an extensive set of different Business Intelligence (BI) technologies, thanks to which it examines the relationships between large volumes of data and uses them to predict events [60].

Social networks (Facebook, Instagram, LinkedIn) are a platform where people can exchange text messages, send pictures and videos, and make phone calls and video calls. Currently, social networks are used in the search and selection of employees [61].

The European Parliament issued Regulation 2016/679 in April 2016, which concerns the protection of personal data and the free movement of data of this type (General Data Protection Regulation, GDPR) [62]. In particular, the COVID-19 disease and the resulting measures and regulations contributed to digitalization in the field of GDPR in economic entities—activities were gradually transferred from paper to digital [63].

Digitalization took place in several waves. The first wave of digitalization represented the replacement of office paper with computers, which also led to higher automation of business processes. In the second wave, there was a boom on the Internet, through which communication began not only in companies but also between them (the emergence of electronic commerce). The third wave consists of using smart technologies (SMAC—social, mobile, analytics, cloud computing), constant increase in computing power, higher storage capacity, or in the bandwidth of communication [39,64].

Markovitch and Willmott (2014) [65], Baršić et al. (2019) [9], Akoyo and Muathe (2017) [66], and De Silva and Da Silva Lima (2017) [67] state that the use of ICT makes HCM processes more efficient and supports the fulfillment of the company’s business strategy. They see HRIS as linking complex HCM processes with ICT. A summary of the benefits of HRIS for companies was given by Beckers and Bsat (2002) [68] and Kovach et al. (2002) [69], who consider the pluses to be the increase in competitiveness caused by the improvement of HCM processes, the implementation of more diverse processes in the field of HCM, the transfer of HCM from a transactional perception to a strategic one, the involvement of employees in HCM processes and, finally, the reengineering of the entire HCM. It also has a positive effect on various fields in the company [37,70–74].

The reason why it is necessary to pay attention to digitalization is also confirmed by the results of the digital economy and society index (DESI). In 2022, the Slovak Republic received a score of 43.40 points (23rd out of 27 places), while the average of the European Union was 52.30 points. Only four countries were ranked behind Slovakia—Poland, Greece, Bulgaria, and Romania [75].
2.2. Human Capital Management

Human capital management (HCM) represents a set of activities for managing the human capital (HC) of an organization. It encompasses planning, recruitment and selection, placement, development, and training, maintaining employee satisfaction, engagement, and collaborative activities to manage individual and organizational competencies [76–83]. The mentioned idea is also complemented by the European Partnership for Public Strategies (2022) [84] and Kianto et al. (2017) [85], who argue that HCM aims to manage people in such a way as to ensure greater efficiency and productivity in the enterprise. It is not only related to the development of HC but also its maximum use in the company; therefore, the emphasis should be placed on the education of employees.

In the context of digitalization and HCM, we talk about the mutual interaction of employees with modern digital technologies. Some say that digitalization is necessary if an economic entity wants to improve its processes, increase competitiveness, and increase work productivity and employee motivation. The introduction of elements, such as automation, digitalization, or robotization will cause employees to work much more efficiently than when the company did not use such elements [4,86,87]. Managers in companies should motivate employees to take a proactive approach to education [83,88–93].

The irreplaceability and great importance of HC have also been confirmed in the context of digital progress, which is related to the introduction of digital technologies in enterprises, and HC plays a relevant role. People are becoming the principal part of the enterprise, not only because of their work but also because of their knowledge, skills, and competencies, also within digital technologies [94–96].

In the field of employment and working with people, digitalization will cause a change in the habits of workers, but also a change in work. Employees may be afraid of new technologies and their impact on their jobs. In addition, to avoid possible discrimination, it is necessary to still innovate the recruitment process. The number of HR personnel who recruit new employees for companies will decrease, as their work will be able to be performed by modern technologies. Digitalization will also cause the disappearance of some jobs, especially in administration and production [97–100].

The DESI Index examines the link between digitalization and HC. Within the “Human capital” dimension, Slovakia’s most significant drop is within the indicator, which tells what percentage of companies provide their employees with vocational training in the field of ICT. In 2021 and 2022, only 16% of businesses did so, while the EU average was 20% [75].

3. Materials and Methods

The article aims to find out the current situation in the field of readiness of economic entities in Slovakia for challenges in the field of HCM when implementing digital technologies in their processes and to propose recommendations regarding the implementation of digital technologies.

In addition to standard scientific methods, such as analysis, synthesis, induction, and deduction, we used other scientific methods in the article. Among these methods, we included a content analysis of professional and scientific literature, or comparison, which we used when comparing the opinions of individual authors. As part of statistics, we calculated Cronbach’s alpha for the reliability findings of the questionnaire survey. We also used descriptive statistics and the chi-square test to detect dependencies between variables. Finally, the modeling method was also used, namely in the graphical processing of the questionnaire results.

The questionnaire consisted of an identification part, where we investigated four types of basic information about the economic entity:

- Headquarters—one of the eight regions in Slovakia where the economic entity is located. This is the geographical division of Slovakia.
- Size—the criterion was the number of employees. Whereas in Slovakia, a business with up to 9 employees is considered a microeconomic entity. An economic entity with 10 to 49 employees is considered small. If the entity has between 50 and 249 em-
ployees, it is in the category of a medium economic entity, and finally, with more than 250 employees, it is a large economic entity.

- Business area—includes three basic groups within which an economic entity can operate on the market. It concerns production, services, and others (for example, agriculture, mining, and wood processing industry).
- The predominant type of ownership—was monitored whether the economic entity is owned by a domestic owner (a person with a permanent residence in Slovakia) or a foreign one (a person who does not have a permanent residence in Slovakia).

The core of the questionnaire was divided into eight areas, namely values, digital tools, and technologies within HCM, competencies of management and executive employees, HCM concept, motivational factors, forms of digitization in personnel processes, and manifestations of digitization towards customers.

Within the framework of values, 11 basic values were identified by which an economic entity can be guided in its existence. These values included: meaningfulness of work, commitment, passion, cooperation, recognition, open communication, support, autonomy, emphasis on health, trust, and commitment as a manifestation of responsibility.

With modern tools within the HCM concept, we found out what the managers and owners of economic entities in Slovakia put the most emphasis on, what they apply, and what they consider very important for the future functioning of the economic entity. We included, e.g., employee autonomy in the performance of work, elements of work–life balance, brand building, gamification, virtualization, the possibility of choosing a reward, the form of feedback, or the benefit of employee education.

Managers had the opportunity to determine which of the offered 15 competencies they consider important and which of them they possess. We focused on competencies such as critical thinking, self-study ability, creativity, analytical thinking, strategic thinking, project management knowledge, quality management skills, technological and IT skills, time management, customer orientation, employee orientation, teamwork, communication skills, intercultural sensitivity, and the ability to self-motivate.

Executive workers could be characterized by managers and owners of economic entities using the suggested 9 competencies—professional qualification, soft skills, technological and IT skills, ability to self-study, critical thinking, creativity, analytical skills, ability to independently solve a problem, and personal commitment.

Motivational factors were divided into 5 groups—career, work, social, financial, and relational. Each of the groups contained a certain type and form of reward that employees in the company can receive. We have included, e.g., among the individual rewards, self-realization, the possibility of career advancement, financial evaluation, the atmosphere at the workplace, prestige, or recognition.

As part of the HCM concept, 17 questions were used to determine whether the economic entity has such a concept in place, or whether it considers employees as wealth. It was also monitored whether, according to managers and owners of economic entities, the HCM concept has a positive effect on the entity’s performance and competitiveness.

When digitizing customers, it was monitored whether the company limits paper documentation or whether it uses big data analysis for marketing purposes. In addition, the importance of GDPR was also observed, because businesses that operate in the online environment meet sensitive personal data of their customers.

The last part consisted of forms of digitization in the personnel area, where the questions were focused on HRIS, access rights in the economic entity, internal communication, the method of management and analysis of employee motivation and work performance, but also on GDPR and the use of social networks in the recruitment of employees.

The questions from the questionnaire were formulated based on summarized knowledge from previous surveys but also based on long-term research in the field of HCM, which the authors of the article are engaged in.

The questionnaire was filled out by managers or owners of economic entities during the years 2020 and 2021. The questionnaire was anonymous and was sent to economic
entities electronically by email. First, subjects that cooperate with the university were approached. However, to ensure that the questionnaire will be filled out by subjects all over Slovakia, it was also sent to subjects outside the Zilina Region.

Within the identification part, the option of one answer was used. In the core of the questionnaire, a Likert scale from 1 to 5 was used, while its interpretation depended on the answer, which could relate to reality when 1—we do not apply, 2—we do not apply yet, but we are considering applying 3—I do not know, 4—we apply partially and 5—we apply completely. The interpretation in the column regarding the degree of importance for the subject’s future was as follows: 1—unimportant, 2—rather unimportant, 3—do not know, 4—rather important, and 5—important.

For the evaluation of the questions from the questionnaire, we chose the criterion by which we determined that we consider as “important” and “we apply” those answers where the respondents marked the answer 4 or 5 on the Likert scale. On the contrary, “unimportant” and “we do not apply” are considered within the Likert scale answers 1 to 3.

For this article, some questions were selected from the questionnaire, which is related to the examined issue of digitalization in the context of HC. In the article, we tested the following hypotheses:

**Hypotheses 1 (H1):** We assume that the digitalization of analog data is used the most within personnel processes (HCM process).

**Hypotheses 2a (H2a):** There is a statistically significant difference between the actual use of analog data digitalization towards employees and the prevailing ownership of the economic entity.

**Hypotheses 2b (H2b):** There is a statistically significant difference between the actual use of analog data digitalization towards employees and the size of the economic entity.

### 4. Results

This article processes data from a questionnaire survey from 2020 and 2021, which was filled out by managers or owners of economic entities in Slovakia without specific criteria. We set a confidence level of 95% and a significance level of $\alpha = 5\% (0.05)$. In 2020, we received responses from 905 respondents, which represents a 3.26% error rate with a preserved confidence interval and a 78% return rate of relevant responses. One year later, our sample set consisted of 561 respondents, which represents a 4.14% error rate and a 92.27% return of relevant answers [101].

During the research, two perspectives on the investigated issue were applied. In both years, the actual application of digital technologies in personnel processes was monitored, as well as the degree of importance assigned to these technologies by managers or business owners in the future.

To verify the reliability and consistency of the questionnaire, it was possible to calculate Cronbach’s alpha ($\alpha$) since the entire core of the questionnaire consists of answers in the form of a Likert scale. We found that Cronbach’s alpha is 0.98 ($\alpha > 0.70$), which means that the created and processed questionnaire is reliable, consistent, and suitable for investigating the issue of readiness of economic subjects for the introduction of digital technologies and their impact on HC.

#### 4.1. H1: We Assume That the Digitalization of Analogue Data Is Used the Most within Personnel Processes (HCM Process)

In both years, the questionnaire survey examined eight types of use of digitalization in personnel processes, namely digitalization of analog data, digitalization of biometric data, digital interaction platforms (networking), big data analytics, rapid analytics, predictive analytics, digitalization in the field of GDPR and finally the use social networks.

In 2020, economic entities mainly applied GDPR digitalization (782), digital interaction platforms (543), analog data digitalization (526), and rapid analytics (476). We compared the most common forms of digitalization that economic entities apply to the size of the economic entity and the prevailing ownership (Table 1). Respondents again determined
the same four elements for the importance of digital technologies. The change occurred in their order—GDPR digitalization (772), analog data digitalization (587), digital interaction platforms (576), and finally, fast analytics (540).

Table 1. Ways of using digitalization towards employees.

<table>
<thead>
<tr>
<th>Year</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reality/Degree of Importance</td>
<td>Reality</td>
<td>Degree of Importance</td>
</tr>
<tr>
<td>Answers Ways of Digitalization</td>
<td>Do Not Apply</td>
<td>Apply</td>
</tr>
<tr>
<td>Digitalization of Analog Data</td>
<td>379</td>
<td>526</td>
</tr>
<tr>
<td>Digitalization of Biometric Data</td>
<td>528</td>
<td>377</td>
</tr>
<tr>
<td>Digital Interaction Platforms (Networking)</td>
<td>362</td>
<td>543</td>
</tr>
<tr>
<td>Big Data Analytics</td>
<td>582</td>
<td>323</td>
</tr>
<tr>
<td>Fast Analytics</td>
<td>429</td>
<td>476</td>
</tr>
<tr>
<td>Predictive Analytics</td>
<td>534</td>
<td>371</td>
</tr>
<tr>
<td>Digitalization of GDPR Using Social Networks</td>
<td>123</td>
<td>782</td>
</tr>
<tr>
<td>493</td>
<td>412</td>
<td>465</td>
</tr>
</tbody>
</table>

Source: own processing.

Based on the highest number of respondents who apply (the Apply column) it was found that among the top four technologies were digitalization in the field of GDPR, digital interaction, digitalization of analog data, and fast analytics. To find out the basic statistical functions, descriptive statistics were performed (Table 2).

Table 2. Descriptive statistics of the four most used digital technologies in 2020.

<table>
<thead>
<tr>
<th>Functions of Descriptive Statistics</th>
<th>GDPR</th>
<th>Digital Interaction</th>
<th>Analogue Data</th>
<th>Fast Analytics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case number (n)</td>
<td>905</td>
<td>905</td>
<td>905</td>
<td>905</td>
</tr>
<tr>
<td>Mean</td>
<td>4.43</td>
<td>3.62</td>
<td>3.57</td>
<td>3.41</td>
</tr>
<tr>
<td>95% Confidence Interval—upper</td>
<td>4.49</td>
<td>3.70</td>
<td>3.65</td>
<td>3.49</td>
</tr>
<tr>
<td>95% Confidence Interval—lower</td>
<td>4.36</td>
<td>3.53</td>
<td>3.48</td>
<td>3.33</td>
</tr>
<tr>
<td>Median</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Mode</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Std Dev</td>
<td>0.98</td>
<td>1.32</td>
<td>1.30</td>
<td>1.28</td>
</tr>
<tr>
<td>Variance</td>
<td>0.96</td>
<td>1.74</td>
<td>1.70</td>
<td>1.65</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>3.34</td>
<td>−0.67</td>
<td>−0.65</td>
<td>−0.79</td>
</tr>
<tr>
<td>Skewness</td>
<td>−1.95</td>
<td>−0.67</td>
<td>−0.63</td>
<td>−0.47</td>
</tr>
<tr>
<td>Range</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Min</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Max</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Sum</td>
<td>4008.00</td>
<td>3273.00</td>
<td>3227.00</td>
<td>3085.00</td>
</tr>
</tbody>
</table>

Source: own processing.

The frequency indicates the total number of respondents who answered the given question. In all cases, there were 905 respondents. The sum of the answer values is not significant in this case.
Two measures of central tendency were examined, namely the arithmetic mean and the mode. In 2020, as many as 782 respondents said that they apply digital technologies in the field of GDPR (average of 4.43), and in the case of rapid analytics there were only 476 respondents (average of 3.41). The mode (most often indicated in the answer) was in three cases at the value of 5, and in the last case, it was taking on the value of 4.

The median, minimum, and maximum values, skewness, and kurtosis were calculated within the quantiles. In all four cases, the median value is 3 (respondents answered on a Likert scale from 1 to 5). Values above the median represent those respondents who apply the given technology in their economic entity. Respondents could mark 1 (we do not apply at all) as the minimum value and 5 (we apply completely) as the maximum value. The spiciness coefficient takes on values around zero. If its value is greater than zero, we say that it is a spiked distribution of data in the analyzed set that is close to the mean. In our case, however, it acquires values lower than zero in three cases, e.g., the data distribution is flatter and there are several extreme values in the file. Only in the digitalization of the GDPR are its values positive, so it is a pointed distribution of values. The coefficient of skewness tells whether higher or lower values prevail in the analyzed set. In our case, this coefficient acquires negative values, it is lower than zero, so it is a right-skewed distribution, which indicates that there are higher values in the analyzed set. The variability of the analyzed set was investigated using variance and standard deviation. Within the analyzed set, these are values in the interval 0.98–1.32.

The graphic processing (Figure 2) shows two categories (We apply—answers 4 and 5; We do not apply—answers 1 to 3) of the most used digital technologies about majority ownership (domestic owner, foreign owner) confirms that GDPR digitalization was considered the most applied area within digitalization in 2020.

![Figure 2](image_url)  
**Figure 2.** The most common ways of digitalizing personnel processes with regard to the ownership of the economic entity 2020 (Source: own processing).

In 2021 (Table 3, Figure 3), respondents’ preferences changed slightly. Economic entities most applied GDPR digitalization (465), digital interaction platforms (372), digitalization analog data (362), and use of social networks (332).

Similar values were recorded in all descriptive statistics functions. Changes did not occur even within the coefficient of spiciness and skewness. When the kurtosis coefficient takes on positive and negative values. With positive values (GDPR digitalization), we are talking about a pointed distribution of data in the analyzed file, which is close to the average. The remaining three most frequently used methods of digitalization acquire negative values, e.g., the data distribution is flatter, and there are several extreme values in the file. The coefficient of skewness tells us that a right-skewed distribution prevails in our data set, which indicates that there are higher values in the analyzed set.
Therefore, we reject Hypothesis 1. The use of analog data was only in third place in 2020.

Interestingly, most economic entities are digitalizing precisely in GDPR, while it is a relatively complicated area. The personal data processed in the entities mainly concern employees (e.g., employment relationships), customers, and suppliers (e.g., contracts, invoices, cookie files on websites/e-shops). The form of digitalization can consist of changing personal data directly in the system based on a request from the person concerned. However,
in economic entities in Slovakia within the framework of labor relations, the possibility of digitalization is made impossible by Act No. 311/2001 Labour Code. According to this law, it is not possible to conclude an employment relationship electronically. The employment contract must be in written form, with the handwritten signature of both parties—the employer and the employee. The same conditions (paper, written form of documents) also apply when informing about working conditions and terms of employment, upon the termination of employment, when changing the employment contract, when adding to the contract, when temporarily reassigning an employee, when changing the employee’s data, or when performing other gainful activity [102]. In such cases, the employer can create the documents electronically through the system but must still print them.

Considering this, individual countries must focus on simplifying administrative processes that are uniform for all economic entities in the country and that are regulated by law or other regulations and measures. The remaining three most frequently used types of digitalization are mainly affected by the COVID situation because, at the time of collecting answers from respondents, there was a disease of COVID-19 in Slovakia, which affected communication in the company (digital interaction platforms), the course of individual processes and those of personnel (digitalization of analog data), which finally led to the fact that the company had to evaluate individual data much faster and more efficiently (fast analytics).

4.2. H2a: There Is a Statistically Significant Difference between the Actual Use of Analogue Data Digitalization towards Employees and the Prevailing Ownership of the Economic Entity

Even though through Hypothesis 1 we found that the use of analog data is not among the most frequently applied methods of digitalization in personnel processes in Slovak economic entities, we focused Hypotheses 2a and 2b on the use of analog data, e.g., the personnel information system (HRIS), which has great potential to streamline activities within the framework of HCM implementation, thereby increasing the competitiveness and performance of businesses.

Two questions were verified from the questionnaire. The first was: “What is the predominant ownership in your economic entity?” and the second was: “How is the digitalization of analog data currently used in your economic entity?”.

Economic entities did not attach importance to analog data because either they did not know that they were talking about HRIS, or they take the use of HRIS in an economic entity as a matter, of course, these days. However, we were interested in whether there is a dependency between the digitalization of analog data and the type of business ownership. In the 2020 questionnaire, we first investigated the value of the Kolmogorov–Smirnov Test and the Levene Test for questions related to majority ownership and the use of analog data. The mentioned two tests are a prerequisite for the use of parametric statistical tests, such as one-factor analysis of variance (ANOVA).

We found that the value for the Kolmogorov–Smirnov Test is 0.000. Since the test takes on a value lower than the established significance level $\alpha = 0.05$, we can claim that the data obtained in the analyzed two questions do not have a normal distribution. The same values are obtained by the Levene test, the value of which was also 0.000, which is less than $\alpha = 0.05$. Based on the stated results, it is not possible to use parametric tests for the statistical evaluation of these questions. Therefore, statistical significance and dependence were tested by the chi-square test of independence ($\chi^2$). In 2021, the values of both tests were the same, so even in 2021 the data could not be analyzed using parametric tests (Table 4).
Table 4. Chi-square Test—Analogue Data and Prevailing Property 2020 and 2021.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degrees of Freedom (df)</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Chi-square Test</td>
<td>60.472</td>
<td>21.579</td>
</tr>
<tr>
<td>Chi-square Tab.</td>
<td>9.49</td>
<td>9.49</td>
</tr>
<tr>
<td>p-value</td>
<td>$2.30863 \times 10^{-12}$</td>
<td>0.0002</td>
</tr>
<tr>
<td>Significance Level ($\alpha$)</td>
<td>0.05</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Source: own processing.

In 2020, the calculated value of the chi-square test is much higher (60.472) than the table value (9.49) at the significance level $\alpha = 0.05$ and df $= 4$. The statistical significance was also confirmed through the lower p-value ($2.31 \times 10^{-12}$) than the established level of significance $\alpha$ (0.05). The chi-square test in 2021 acquired a value of 21.579, which is a value higher than the chi-square test tab. Moreover, the determined level of significance $\alpha$ has a higher value than the calculated p-value (0.0002). Based on the statistical results (Table 4), it can be concluded that Hypothesis 2a was confirmed in 2020 and 2021, and thus in both years, there is a dependence between the digitalization of analog data and the prevailing ownership of the economic entity.

Although the Kolmogorov–Smirnov test and the Levene test did not allow the use of parametric tests, we tried to calculate the ANOVA test. We found that the p-value is $5.24 \times 10^{-15}$, which is lower than the established level of $\alpha = 0.05$. Likewise, the value of $F_{\text{crit}}$ (3.85178) is lower than the value of $F$ (63.32178), which means that Hypothesis 2a would be confirmed by ANOVA. Thus, there would be a difference in the use of analog data for majority ownership. Hypothesis 2a would also be confirmed in 2021 when $\alpha = 0.05$, p-value $= 5.81 \times 10^{-212}$, $F_{\text{crit}} = 3.00461$, and $F = 816.71039$.

The assumption that economic entities in Slovakia, which are owned by a foreign entity, digitalize their processes much more has been confirmed. It is probably also because the foreign entity is the owner of a mostly medium or large economic entity, and at the same time the given owner has at his disposal a larger amount of funds that he can use to purchase digital technologies that will enable him to gain a competitive advantage on the market.

4.3. H2b: There Is a Statistically Significant Difference between the Actual Use of Analogue Data Digitalization towards Employees and the Size of the Economic Entity

With Hypothesis 2b, we follow up on the previous hypothesis, which examined the majority ownership of economic entities. With this hypothesis, we assume that the size of the economic entity has a significant impact on whether the economic entity digitalizes the HCM process.

We verified two questions. The first was: “What is the number of employees in your economic entity?”. Four answers: 1 to 9 (micro entity), 10 to 49 (small entity), 50 to 249 (medium-sized entity), and 250 and more (large entity). The second question was: “How is the digitalization of analog data currently used in your economic entity?”.

For Hypothesis 2b (2020, 2021) we again calculated the value for the Kolmogorov–Smirnov test and for the Levene test. Again, we found that the value for both tests was 0.000, which is less than the established significance level of $\alpha = 0.05$. It follows that the data obtained in the two analyzed questions do not have a normal distribution. Based on the above results, statistical significance, and dependence were tested using the chi-square test ($\chi^2$) (Table 5).
Table 5. Chi-square Test—Analogue Data and Subject Size 2020 and 2021.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degrees of Freedom (df)</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Chi-square Test</td>
<td>101.770</td>
<td>51.217</td>
</tr>
<tr>
<td>Chi-square Tab.</td>
<td>21.0</td>
<td>21.0</td>
</tr>
<tr>
<td>p-value</td>
<td>$2.50 \times 10^{-16}$</td>
<td>0.000001</td>
</tr>
<tr>
<td>Significance Level ($\alpha$)</td>
<td>0.05</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Source: own processing.

A chi-square test showed that in 2020 the calculated value of the chi-square test (101.770) was several times higher than the value of the tabular chi-square test (21.0) at the significance level of $\alpha = 0.05$ and df = 12. Compared to the calculated $p$-value ($2.50 \times 10^{-16}$), our determined $\alpha$ (0.05) also acquired a higher value. Both results confirm the acceptance of Hypothesis 2b. We confirmed Hypothesis 2b also in 2021 when the calculated chi-square test takes on a value of 51.217, which is a value higher than the table’s chi-square (21.0). The change did not occur even at the $p$-value, which is lower (0.000001) than the determined $\alpha$ level (0.05).

Despite the violation of the assumptions of normality of data distribution and agreement of variances, we tried to calculate ANOVA, which showed that the $p$-value $2.29 \times 10^{-18} < \alpha = 0.05$. Likewise, the value of $F$ crit (2.61478) < $F$ (29.78535) means that Hypothesis 2b has been confirmed, and there is a difference in the use of analog data due to the size of the economic entity. Hypothesis 2b would also be confirmed in 2021 when $\alpha = 0.05$, $p$-value $= 1.72 \times 10^{-188}$, $F$ crit = 2.38305, and $F = 397.41713$.

With this hypothesis, we have confirmed the assumption that economic entities that have a larger number of employees, e.g., are classified in the medium or large size category, implement digital technologies in processes more in Slovakia.

Through the survey, we found that economic entities in Slovakia in the years 2020 to 2021 consider digitalization within the GDPR to be the most important type of digitalization for the present, and the given type of digitalization also has the highest degree of importance for the future of economic entities in both years. When comparing the actual application and the degree of importance the remaining places changed, and HRIS appeared in second place, rather than digital interaction platforms. For this reason, we consider it very important to focus on the issue of connecting HCM with digital technologies in further research and thus focus on HRIS, or eHRM, which represents the electronic HCM. The importance of GDPR is also related to the often-mentioned cyber security, which is an important issue when a company decides to implement digital technologies, but also when it has already implemented them. However, an expert in the field of cyber security points out that even if the company has fulfilled all the points stipulated by the law on the protection of personal data of the given country, it is not possible to claim that the data of the company is 100% safe [103]. For this reason, it places particular emphasis on data backup and encryption, even when using the most modern digital technologies. Businesses in Slovakia that violate GDPR rules face fines of up to 20,000 euros, or 4% of the company’s global annual turnover for the previous accounting period. The amount of the fine can thus be liquidated for most businesses in Slovakia. For that reason, the importance of the issue we are investigating is even higher.

5. Discussion and Conclusions

The importance of the introduction and use of digital technologies was also supported by the COVID-19 disease when economic entities were forced to start using these technologies and thus change the way of performing many activities [104,105]. A survey in 10 countries of the European Union showed that eastern countries (e.g., Slovakia) lag behind western countries (e.g., Germany) in the field of digitization. The improvement occurred with the arrival of the COVID-19 disease when countries were forced to move to the online world [106]. The wrong values of one of the eastern countries—Ukraine—were also
confirmed by the survey of Rodchenko et al. (2021). A survey by Ivanova et al. (2020) [107], which focuses on Russia, also points to problems with skilled labor and its departure to the West among developed countries. Technologies have been used in various ways, and HCM is no exception. A study by Scafarto et al. (2023) [108] confirms that digitization has a major impact on human capital, and it is thanks to it that the knowledge and skills of the company’s employees will be expanded and deepened. All this will have a positive effect on the company’s performance.

The introduction of digital technologies contributes to increasing the competitiveness, performance, and value of enterprises, but also gross domestic product [104,109–111]. In the paper, we state that digitization requires investing in employee training our opinion is also confirmed by Sun et al. (2023) [112], who claim that it is the use of digital technologies that supports a higher level of education for people in the country. In addition to positive changes, digitization also brings negatives and threats to businesses. Managers see threats mainly in the insufficient qualification of their employees, but the question of the trustworthiness of digital technologies also arises here because managers fear the loss or misuse of their data [113]. This is also why the field of GDPR, and cyber security is becoming more and more relevant and important. Digitization has also affected several HCM processes, such as hiring employees, training, and development, managing their performance, and analyzing the obtained data, which is also confirmed by the survey by Markova et al. (2022). In addition, Markova et al. (2022) stated in their survey that companies in Slovakia use digitization mainly in production and research and development. The field of personnel management is only in third place. An interesting fact is that employees are afraid of digital technologies mainly because of their lack of command of foreign languages, but also because of their too narrow specialization—employees in Slovakia learn in a certain field and mostly apply themselves in that field, they do not expand their knowledge and skills in other areas. For this reason, education has been highlighted as the most important form of investment in human capital [104,114].

Most economic entities use the online space to publish a job vacancy announcement, but also specific social networks on which they look for their employees, and finally, these are also systems used to track applicants, which filter out applicants and unqualified ones immediately excluded from the recruitment process. The online environment is also used for webinars and training that employees must complete, but in this case from the comfort of their office or home if they are unable to work or have a home office. Economic entities also use information systems to manage the performance of employees. Such a system helps identify critical areas in which it is necessary to deepen the knowledge and skills of employees. What technologies will be implemented in personnel processes also depends on the knowledge of managers, because up to 75% did not have sufficient knowledge of Industry 4.0 and its technologies, which hindered the development of their companies and thus stagnated not only companies but also the entire country [115].

To support the digitalization of economic entities, the Ministry of Investments, Regional Development, and Informatization of the Slovak Republic adopted the so-called digital transformation action plan, which they created and planned for the period from 2023 to 2026. The mentioned plan follows from the Action Plan for the Digital Transformation of Slovakia in the period 2019–2022 and the Strategy for the Digital Transformation of Slovakia 2030. It is also in line with the European document, the so-called Digital compass. Between 2010 and 2019, there were changes in education in Slovakia due to the onset of the fourth industrial revolution. At that time, the number of university graduates began to increase, from 15.1% to 23.1% [10]. Bolek et al. (2021) [116] state that in most cases (almost 70% of them) managers in Slovakia have a second-level university education. It can be an opportunity for the successful implementation of digital technologies in HCM processes in enterprises. This is because it is assumed that if a manager has a higher education, they understand digital technologies and can weigh their benefits and threats.

Based on previous studies, the document confirms the results obtained by us, namely that there is a dependence between the use of digital technologies (analog data, information
systems), the size of the economic entity, and the prevailing ownership. In our survey, we found that the larger the company (or more foreign ownership it has), the more likely it is to use cutting-edge digital technologies. This is mainly because a larger business is likely to have more funds at its disposal or will have more opportunities to obtain them. In the case of a foreign owner, it is about his knowledge and skills, which he acquired through practice in other countries, which are at a higher level than Slovakia within the DESI index. That is why the Action Plan focuses mainly on supporting small and medium-sized enterprises. A relevant part of the Action Plan is the development of knowledge and skills of managers and experts from economic entities which are focused on the ICT area [117].

When comparing the actual application and the degree of importance the remaining places changed, and HRIS appeared in second place, rather than digital interaction platforms. For this reason, we consider it very important to focus on the issue of HRIS, or eHRM, which represents the electronic HCM, in further research.

Based on the obtained results, we proposed several managerial implications. Economic entities in Slovakia that want to implement digital technologies in their processes should implement several activities:

- Informing managers—as pointed out by the 2021 survey of the Industr4UM cluster and the company Trexima, which was carried out in Slovakia, up to 70% of managers do not see the point in digitalizing processes [118]. Therefore, the managers of economic subjects must learn about Industry 4.0 and digitalization to understand what the implementation of digital technologies can bring them.
- Analyzing data and identifying processes—this analysis also provides managers with an overview of areas and parts of processes that need to be improved, made more efficient, or accelerated. With this information, managers can track progress and monitor KPIs.
- Analyzing the financial situation—the economic entity must be allocated funds not only for the purchase of digital technology but also for its management and possible updates or troubleshooting.
- Provision of training and courses—the introduction of digital technologies increases the need to have highly qualified personnel. Therefore, managers of economic entities must try to develop the knowledge and skills of their employees so that they are ready to work with digital technologies.
- Designation of an IT team—this team will provide technical and technological support to employees in the economic entity if they make a mistake or some technical error occurs that the employees will not be able to eliminate by themselves.
- Ensuring cyber security—most economic entities use the cloud to store data and entire databases. Since the data is stored online, it is important to ensure that it is not lost or stolen.

The successful implementation of the proposed measures can help companies simpler and more effectively introduce digital technologies to work with people, thereby increasing the efficiency of the use of their HC, the competitiveness of companies, their performance, and the creation of their value in the market. We found that in Slovakia, digital technologies in HCM are implemented by statistically significantly large companies. Given that SMEs are the largest employers and creators of GDP in Slovakia, in the future, we want to focus our research in this area precisely on SMEs.

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**Data Availability Statement:** The data presented in this study are available on request from the corresponding author. The data are not publicly available due to collection within the project and due to their use in other articles.

**Conflicts of Interest:** The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

**References**

44. Pfeiffer, A.; Jarke, M. Digital transformation within the emobility market-learnings and insights from early market development. In IFIP Advances in Information and Communication Technology, Proceedings of the International Conference on Smart Energy Research, Essen, Germany, 9 February 2017; Springer: Berlin/Heidelberg, Germany, 2017. [CrossRef]
47. Tursunbayeva, A. Human resource technology disruptions and their implications for human resources management in healthcare organizations. BMC Health Serv. Res. 2019, 19, 268. [CrossRef] [PubMed]


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