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Human capital management – values, competencies, and motivation – concerning Industry 4.0

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ABSTRACT

The article aims to determine the current situation in economic subjects (ESs), what values and competencies are for managers and executives, and what motivational factors are essential for financial entities in the era of Industry 4.0. The article used standard scientific methods, such as analysis, synthesis, induction, and deduction, but also methods, such as content analysis of professional and scientific literature, comparison, modelling, and basic statistical methods, which verified the dependencies between the selected elements. The article processes data from a questionnaire survey conducted in 2020 (905 respondents) and 2021 (561 respondents). The respondents who filled out the questionnaire survey were managers or owners of ESs, which are based in Slovakia and are classified as micro, small, medium, or large enterprises. We found in the study that there is a dependence between the employment orientation of managers and the use of career motivation factors, as well as between the passion for work and the creativity of employees, and between the technological and IT skills of managers and executive employees. It is surprising that ES in Slovakia consider soft skills more important than technological ones despite the pressure to support and develop people's digital skills.

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1. Introduction

Since 2011, the world has been influenced by Industry 4.0 and its technologies—digitization, big data, business intelligence, cloud computing, the Internet of Things, robotics and artificial intelligence. The gradual implementation and use of modern technologies will lead to significant positive and negative changes - the way of communication, relaxation, education, and work will change.

People who want to continue their work must adapt to trends in the labour market. It is likely that their value ranking will also change, which will further guide their behaviour and actions.

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ESs that employ people will also feel the changes, because company values, organizational culture, work habits of employees and requirements for the performance of the given profession will also change. It will be necessary to do various job analyses so that employers know what type of employees they need and, conversely, who they no longer need. Organizational culture is one of the main factors that influence the success of business processes, ES performance and the value and development of human capital (HC). HC also includes the value ranking of employees or their competencies or motivation. For this reason, the aim of the article is to find out the current situation in ESs, what values and competencies managers and executive employees have and what motivational factors are essential for ESs in the Industry 4.0 era.

Similar issues have been addressed in the past by several authors such as Pilichowska (2021), Sima et al. (2020), Markova et al. (2022), Aman-Ullah et al. (2022), Rožman and Štrukelj (2021), Bin Saeed et al. (2019), Loumová et al. (2022), Maqsoom et al. (2019), and Mahdiraji et al. (2020), which confirms the importance of the issue we are investigating, namely the values, motivation, and competences of employees in the era of Industry 4.0.

The originality of the article lies in the deepening of knowledge about Industry 4.0, human capital management (HCM) with a focus on the motivation and competencies of employees in the era of Industry 4.0. Also, our article extends the knowledge and results obtained in the research of Hitka et al. (2022), which was implemented in Slovakia between 2017 and 2020.

2. Theoretical backgrounds

2.1. The Industry 4.0

Industry 4.0 is an initiative from Germany that was based on digitalization and focused on the creation of new intelligent factories. Within them, individual machines and devices use three elements, namely cyber-physical systems, Internet of Things, and cloud computing (Lee et al., 2015; Pilichowska, 2021; Sima et al., 2020; Zhong et al., 2017).

Industry 4.0 is not related to invention, is based on the use of modern ICT and is associated with significant changes in the labour market (Nahavandi, 2019; Sima et al., 2020). However, in the twenty first century there is already talk of Industry 5.0. Within this concept, it will be about cooperation between humans and robots, mainly thanks to a significant shift in the field of artificial intelligence and robotics (Demir et al., 2019).

Automation and digitization, but also robots and co-bots, have the most significant impact on HC. These elements will perform those jobs that threaten health and life, which will reduce the occurrence of occupational accidents at the workplace and also the costs of eliminating the factors that caused the accident. Industry 4.0 will speed up production, ensure less downtime and breakdowns, increase product quality, reduce costs, and increase competitiveness (Boateng & Olexová, 2023; Drageičević & Bošnjak, 2019; Fernández-Miranda et al., 2017; Kicová, 2019; Mandysová et al., 2023; Miller & Miller, 2019; Slusarczyk, 2018).

The problem is a change in the labour market with a possible increase in unemployment (Vochozka et al., 2018). In addition, machines can replace HC, especially in routine, simple, stereotyped, repetitive and health-threatening jobs (Sima et al., 2020; Vetráková et al., 2018). Workers who will no longer be able to perform their jobs will be forced to retrain to remain attractive to the labour market. Investments connected with Industry 4.0 are also a problem. ECs decide to invest only when it is necessary (Malichová & Mičiak, 2018; 2019a).

Industry 4.0 is built on several pillars, such as IoT, additive manufacturing, Big Data analysis, autonomous robots, simulations, horizontal and vertical system integrations, artificial intelligence, Business Intelligence, sensors, digitalization, cloud systems, augmented and virtual reality, and cyber data protection (Demir et al., 2019; Erboz, 2017; 2017; Jamwal et al., 2021; Machado et al., 2020; Oztemel & Gursev, 2020; Ustundag & Cevikcan, 2018; Vaidya et al., 2018; Zálezlková, 2018).

These elements also bring significant changes in the field of HCM. The method of recruiting employees (online interviews), adapting employees (online meetings) and finally also the method of education is changing. It is important that due to the influence of the elements of Industry 4.0, cooperation between employees and machines occurs.

To make the right decisions, the company's management constantly needs enough up-to-date information, which it also obtains thanks to ICT. Big Data is characterized by a large volume, speed and, finally, diversity, which needs to be further processed (Koman et al., 2018; 2022; Kubina et al., 2015; Polat & Erkollar, 2020). Cloud computing allows this data to reach the people who have the right to it anytime and anywhere through devices that communicate with each other through the Internet of Things (Polat & Erkollar, 2020). IoT enables communication using IP addresses between different objects and between an object and a person (Agolla, 2018; Gunal, 2019; Haidagger & Paniti, 2016; Polat & Karakus, 2018).

Augmented reality can also be used in HCM, i.g. in recruitment, and can be defined as a technology that connects the virtual world with the natural world of people. Closely related to it is artificial intelligence, which can be defined as an electronic system that can imitate human behaviour. Robotics provides ESs workers mainly to perform dangerous tasks for humans (Erboz, 2017; Polat & Erkollar, 2020).

Business Intelligence represents applications, and technologies used to collect, store, and provide access to data needed for better decision making (Wixom & Watson, 2010). It is helpful in talent recognition, planning, recruitment and selection, cost reduction, talent maintenance, reporting or employee segmentation (Dias & Sousa, 2015; Lajšić, 2019; Veeramisti et al., 2020).

Digitalization represents the optimization of performance, efficiency, or competitiveness and includes all the elements that make up Industry 4.0 (Lachvajderová et al., 2021; Parida, 2018; Wautelet, 2017). Veit et al. (2014) state that modern digital technologies do not threaten the sustainability of ESs, but they also help ESs grow and develop, thereby bringing them additional income. The importance of digitalization in the European Union is also confirmed by the annual development of the Digital Economy and Society Index (DESI), which compares the level of digitalization of member countries. Currently, the European Union emphasizes using digital technologies concerning the environmental side of life.

2.2. Human capital and its components

For enterprises to function, carry out business activities and achieve their goals, they must have different types of resources, namely material, financial, informational, and human resources (Hitka et al., 2021).

The onset of Industry 4.0 resulted from changes in the labour market and the working habits of employees (Stachová et al., 2020). Some jobs will disappear, and others will be transformed, meaning that employees will need to be retrained. Up to 33% of companies expect that when they introduce modern technologies, they will not need as many employees as before (Berkovič & Krajčo, 2021; Gonzalez Vazquez, 2019; Kurt, 2019; OECD, 2018; Veber et al., 2018).

HC is an intangible asset that consists of several components (Figure 1), such as skills, expertise, knowledge, or experience that a person has acquired through learning during his life (Adams et al., 2018; Andersen et al., 2022; Debrah et al., 2018; Field & Mkrtyan, 2017; Goldin, 2016; Mičiak, 2019, Malichová & Mičiak, 2019b). The diversity of HC is determined by the environment in which one lives, works, and studies (Pilichowska, 2021). Since the value of HC is difficult to measure, its level is assessed based on the level of education or current health status (Sultana et al., 2022).

HC is divided into general and specific. General HC represents a person's general education and skills applicable in any industry at any job. Specific represents knowledge and skills that a person can use when performing a specific job (Nuruzzaman et al., 2019; Sultana et al., 2022).

ES can develop the HC of employees in three ways, namely by investing in education, health, or ergonomics and safety at work. Increasing the value of HC is also essential from the point of view that employees can keep up with new technologies (Ďurišová et al., 2019). The importance of education in technological development is also confirmed by Kianto et al. (2017), who claim that people and their knowledge, skills, and abilities are needed in the implementation of digital technologies in ESs.

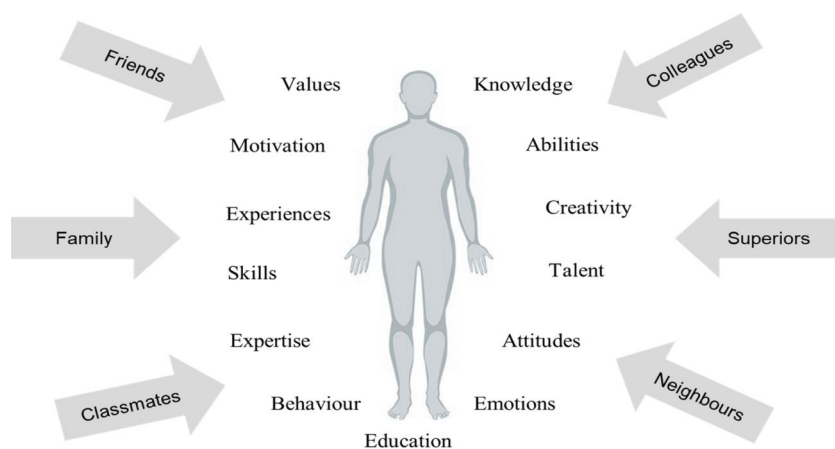


Figure 1. Components of human capital. Source: own processing according to Adams et al., 2018; Field & Mkrtyan, 2017; Andersen et al., 2022; Goldin, 2016; Debrah et al., 2018; Mičiak, 2019; Malichová & Mičiak, 2019b; Pilichowska, 2021

Štefančíková (2014) characterizes knowledge not only as information acquired through learning but also a person's thought processes and meaningful connections of acquired information that can help him perform work and solve various situations.

Skills help a person to perform the job for which he was hired faster and with as little mental or physical effort as possible. Several types of skills include movement, psychological, digital, mental, soft, hard, managerial, teaching, or social (Farid & Taher, 2021).

Values represent the highest level of motivation, and a person sets and prioritizes them independently. Based on them, he then adapts his behaviour and actions in different situations. In companies, values are mainly influenced by the company culture, which represents the rules and principles by which everyone in the company is guided and is built precisely on company values (Müllerová & Šimek 2011).

Employee motivation is considered a very important factor contributing to better work performance, job satisfaction and employees' willingness to use their innate and acquired knowledge, skills, and abilities (Hitka et al., 2019a). It also has a great impact on the performance of ESs (Andriana et al., 2019; Mohamud et al., 2017). It can also be understood as a form of energy that internally drives individuals to achieve set goals (Blašková et al., 2019; Tumová, 2019). The importance of motivation is also confirmed by Blašková et al. (2021) and Blašková et al. (2022), who supplement the basic definition of motivation with the fact that motivated individuals are more creative and creative at work and have a higher level of trust and loyalty towards the employer. It is important to note that the motivation of employees can be internal, that is, it is based on the personality of the given person; and external, which includes financial and non-financial benefits that companies provide to their employees (Karimi et al., 2022).

A motivational factor is some means by which we can positively and negatively influence employees' motivation (Hriníková, 2018). Suppose the company has an incorrectly set motivational program, including motivational factors. In that case, the company's employees will not be sufficiently motivated, and thus their work performance will not be at the maximum level that it could be in the case of proper motivation (Hitka et al., 2017). Surveys (Arvanitis & Loukis, 2015; Hoefsmit & Houkes, 2022; Sankar et al., 2021; Trung et al., 2019; Wang et al., 2022) point to the importance of education, which among all motivational factors is among the most important factors in Industry 4.0. Motivational factors can be divided into five groups: career, work, social, financial, and relational. The same distribution of factors was also used in the questionnaire survey that we evaluated.

Creativity is related to HC motivation and is understood as a very important competence of people in all environments. Thanks to it, people can bring new solutions to the problems they encounter (Blašková et al., 2019; Tumová & Blašková, 2020). Lušňáková et al. (2019), Ogeibu et al. (2020), Zhu et al. (2022), Yang et al. (2022) and Balková et al. (2022) in their research demonstrated the importance of creativity in work of employees, and at the same time confirmed the influence of corporate culture and climate on creativity and creative thinking of employees. In addition, they assume that ICT negatively affects the creativity of employees.

Competencies represent the sum of knowledge, skills, attitudes, values, personality traits, motivation and behaviour that affect a person's work performance and the overall operation and performance of a company (Wulanasari & Rahmi, 2018).

HC is considered a source of competitive advantage for companies and contributes to the development of ES and the entire economy. When the national economy has sufficient qualified HC, it also facilitates the introduction of digital technologies into individual spheres of the national economy. Therefore, HC can be considered the driving force of the country's economic growth and development (Sun et al., 2018; Tunçdogan et al., 2021).

Častorál (2013) claims that HCM is one of the management methods and uses a strategic approach necessary for individual activities and processes related to people in the company, such as job analysis, decision to accept the applicant, selection of a suitable applicant.

3. Methodology

The article aims is to determine the current situation in ESs, what values, what competencies for managers and executives and what motivational factors are important for ESs in the era of Industry 4.0.

From the analysis of the literature, we concluded that the mutual elements of the organizational culture, which include the values of the company, the competencies of the employees, but also their internal and external motivation, and various relationships, are affecting the performance of the company. We also focused on the impact of Industry 4.0, which changes the behaviour of companies and employees. For this reason, we decided to analyse some of these relationships in more detail through established research hypotheses.

From scientific methods, standard scientific methods were used, such as analysis, synthesis, induction, deduction. We also used the method of content analysis of domestic and foreign literature, which dealt with the issue of Industry 4.0, and HC. The opinions of the authors were processed through the method of comparison, and the acquired knowledge was processed into an unit using synthesis. The data was collected in a questionnaire survey filled in by 905 ESs in 2020 and by 561 ESs in the Slovak Republic in 2021. The owner or manager of the given ESs answered the questionnaire. This data collection technique was chosen mainly due to the preservation of the respondents' anonymity and the low costs of its implementation. The article also used the statistical methods necessary to determine the dependencies between the selected elements (Chi-square test of independence, Pearson's coefficient). We use the Chi-square test because the data we obtained from questionnaire surveys do not have a normal distribution (Levene test and Kolmogorov-Smirnov test values are lower than the set alpha level of 0.05) and are not numerical data. Due to the mentioned facts, it is not possible to use parametric statistical tests, and therefore the chi-square test was chosen from the group of non-parametric tests. Non-parametric tests were also used in other research, such as Wiktorowicz (2018), Hitka et al. (2019b), and Wiktorowicz and Ziarko (2020).

In the article, we investigated the answers to 4 research questions (RQ) and verified the dependence within 4 established hypotheses (H):

RQ1: What influence does employee orientation have on the used motivational factors in ES?

H1: If the employment orientation of managers is important for an ES, using motivational factors important for implementing elements increases Industry 4.0.

RQ2: Is there a mutual connection between passion and enthusiasm for work as one of the cultural elements and creativity of executives?

H2: If passion, enthusiasm, and joy are important for an ES within the corporate culture from work, the importance of creativity and creative thinking increases as competencies of executives.

RQ3: What is the importance of technological (IT, digital) skills for ESs?

H3: If technological and IT skills in managers are important for ESs workers, at the same time these skills are also important for executive employees.

RQ4: What kinds of competences are important when recruiting employees?

H4: For ESs are more important in recruiting and training employees technological and IT skills than soft skills.

Through a detailed analysis of the literature and research studies, we found that if managers are oriented towards their employees (employee orientation) - are interested in their opinions, interests, or desired benefits - ESs use education and career growth more as a motivational tool (career MF). Corporate culture is important for every ES because it tells how the ES will behave towards the external environment. In addition, it supports the creation of an innovative work environment that increases the passion and joy of the employees' work. It will increase their motivation to perform better. In the era of Industry 4.0, there is many talks about employees' IT skills. However, one should not forget the fact that soft skills (empathy, communication, collaboration, etc.) will ensure that machines will never be able to completely replace employees. In general, if an EC wants to digitize, the owner and managers must have the IT knowledge and skills to know what awaits them. To be able to introduce digital technologies into the processes, the ES must employ highly qualified personnel. That is why we were interested in how the owners of ESs in Slovakia perceive all these facts.

4. Results

The conducted questionnaire survey provides data from 2020 and 2021. In 2020 we obtained 905 relevant answers, representing a 3.26% error rate with a preserved confidence interval. In 2021 we obtained 561 relevant answers, representing a 4.14% error rate and a 92.27% return of relevant answers. Using Cronbach's alpha which is at the level of 0.98, we found that the questionnaire is suitable for investigating the given issue.

The questionnaire consisted of an identification part (headquarters, size, area of business, predominant type of ownership) and a core, which was divided into several other areas - values, digital tools and technologies, competencies of management and

executive employees, HCM, motivational factors, forms of digitalization in personnel processes. Within the identification part, the option of one answer was used. A Likert scale from 1 to 5 was used in the questionnaire's core. At the same time, its interpretation depended on the answer, which could relate to reality, in which case 1—we do not apply, 2—we do not apply yet, but we are considering applying, 3—we cannot assess the actual situation, 4—we partially apply and 5—we apply completely. And in the future, it means 1—unimportant, 2—rather unimportant, 3—we cannot evaluate the importance, 4—we apply partially and 5—we apply completely.

For evaluating the questions from the questionnaire, we chose the criterion by which we determined that we consider as "important" those answers where the respondents marked the answer 4 or 5 within the Likert scale. On the contrary, the answers 1 to 3 are considered 'unimportant' within the Likert scale.

The dependence between variables was determined using the Chi-square test (χ^2), while the strength of the dependence was determined based on the Pearson coefficient (C).

For a closer understanding of selected elements from the questionnaire survey from 2020, we also present descriptive statistics (Figure 2). Since the descriptive statistics did not differ much from 2021, we only present the year 2020, when we received answers from a larger number of respondents.

The spiciness coefficient acquires negative values in almost all elements, which means that the data distribution in our file is flatter, and there are several extreme values in the file. Only in the case of employee orientation are its values positive, which represents a pointed distribution with a minimum of extreme values. The second of the coefficients is the coefficient of skewness, which is a right-skewed distribution of values in the set – it indicates that there are higher values in the analysed set.

4.1. Hypothesis 1

We assume that if managers of ESs use and emphasize employee orientation, which is essential for an ES, the use of career motivation factors that are important for implementing the elements of Industry 4.0 increases.

Through employee orientation, we understand the ability of the company to address and take care of the needs and interests of its employees through their proper leadership, management, and development (Zhang, 2010).

Among the successful examples of employee orientation, it is possible to include ES from Hong Kong, which in 2008 introduced the 'Happy Fridays' program to reconcile the work and personal lives of employees, as well as Johnson and Johnson, which introduced respect for employees and fair remuneration among the company's core values (JnJ, 2009; Standard Chartered, 2008). The importance of employee orientation is also confirmed by a German survey from 2006 (Vogel, 2008). Another opinion has Durán and Corral (2016) that found in European ES, there is no emphasis on employees and their needs, attitudes, and interests.

In the 2020 questionnaire, we used two separate questions to test the hypothesis: 'Is the employment orientation of managers currently important for your ES?' and 'How important are career motivation factors for your ES at the moment?'

Hypothesis	H1		H2		H3		H4	
Functions of descriptive statistics	Employment orientation	Career MF	Passion, enthusiasm	Creativity of executives	IT skills of managers	IT skills of executives	IT skills of executives	Soft skills of executives
Case number (n)	905	905	905	905	905	905	905	905
Mean	3,84	3,63	3,72	3,72	3,74	3,65	3,65	3,97
95 % Confidence Interval – up	3,91	3,70	3,79	3,79	3,82	3,72	3,72	4,03
95 % Confidence Interval – low	3,78	3,56	3,66	3,65	3,66	3,57	3,57	3,91
Median	4	4	4	4	4	4	4	4
Mode	4	4	4	4	5	4	4	4
Std Dev	1,00	1,07	0,99	1,10	1,22	1,22	1,22	0,97
Variance	0,99	1,15	0,97	1,21	1,49	1,49	1,49	0,93
Kurtosis	0,25	-0,14	-0,27	-0,20	-0,38	-0,40	-0,40	0,50
Skewness	-0,72	-0,61	-0,41	-0,64	-0,75	-0,69	-0,69	-0,86
Range	4	4	4	4	4	4	4	4
Min	1	1	1	1	1	1	1	1
Max	5	5	5	5	5	5	5	5
Sum	3 478	3 289	3 370	3 364	3 384	3 299	3 299	3 592

Figure 2. Descriptive statistics 2020.

Source: Own processing according to questionnaire survey.

The interdependence between the studied variables is also shown in Figure 3, which shows that those who consider the employment orientation of managers to be important also partially or fully apply career motivation factors as part of their motivation program.

During statistical testing, we assumed that if managers and business owners are interested in the needs and interests of their employees, they emphasize their education and development. The assumption was confirmed because the results are: $\chi^2 = 187.815$, $p\text{-value} = 1.56\text{E-}39$, degrees of freedom = 4, critical value = 9.488, significance level $\alpha = 0.05$. Pearson's coefficient (C) was equal to 0.415, indicating a moderate dependence since its value is in the interval $0.30 < C < 0.80$. Moderate dependence was also confirmed when evaluating the survey from 2021 when the statistical test values were as follows: $\chi^2 = 78.377$, $p\text{-value} = 3.84\text{E-}16$, degrees of freedom = 4, critical value = 9.488, Pearson's coefficient (C) = 0.350, at the significance level $\alpha = 0.05$. In 2021, the χ^2 and C values were lower due to the smaller sample size (344 fewer respondents).

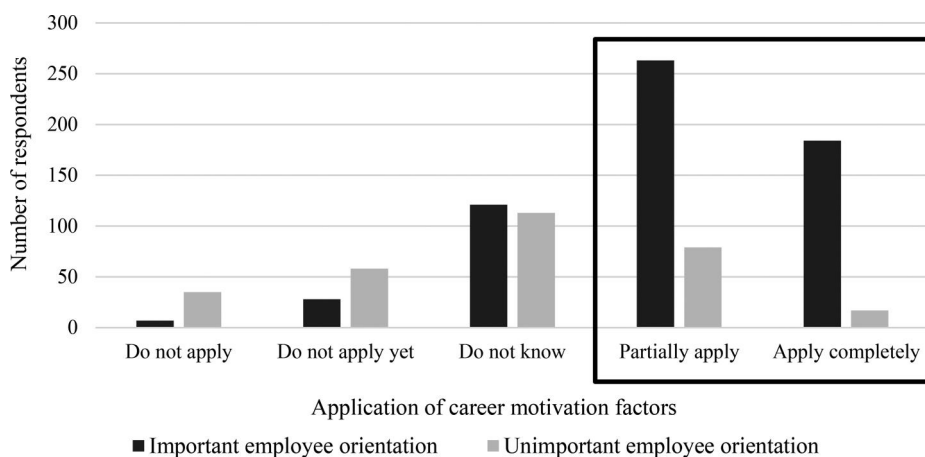


Figure 3. Application of career motivation factors with respect to employment orientation. Source: Own processing according to questionnaire survey.

Based on the above argumentation and the results of individual statistical tests, hypothesis 1 was confirmed.

4.2. Hypothesis 2

Passion, enthusiasm, and joy at work represent the positive emotions of a person, which are related to his inner experience and reflect the fact that a person values and enjoys his work (Cakmak et al., 2015). The authors agree that employees tend to be more creative when they are excited about their work (Bai, 2020; Breu & Yasserli, 2022; Igawa et al., 2022; Sygit-Kowalkowska et al., 2022). Although there have been doubts about whether excessive enthusiasm for work can lead to burnout and other problems related to the health of employees, these doubts have not been confirmed.

Two separate questions of the 2020 questionnaire were used to test hypothesis 2: 'Is passion and enthusiasm for work, which is considered one of the corporate values, currently important for your ES?' and 'How important is the creativity and creative thinking of executives currently for your ES?'

Figure 4, shows the difference between ESs who consider passion and enthusiasm for work an important value and those for whom this value is unimportant. The more the value "passion for work" grows, the more the importance of the competence "creativity" in executive employees grows.

We hypothesized that the importance of passion and joy at work increases the importance of creativity of executive employees in an ES. The assumption was confirmed because the results are: $\chi^2 = 63.432$, $p\text{-value} = 5.50367\text{E-}13$, degrees of freedom = 4, critical value = 9.488, significance level $\alpha = 0.05$. Pearson's coefficient (C) was equal to 0.256, indicating that it is a weak dependence since its value is in the interval $C < 0.30$. In 2021, the dependence between the variables increased and was classified as medium dependence because $\chi^2 = 73.173$, $p\text{-value} = 4.85\text{E-}15$, degrees of freedom = 4, critical value = 9.488, Pearson's

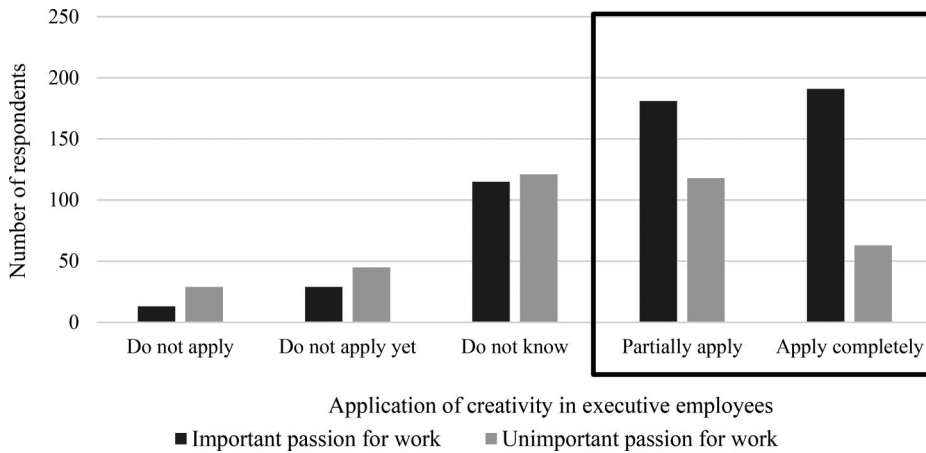


Figure 4. Creativity of executives due to passion for work.

Source: Own processing according to questionnaire survey.

coefficient (C) = 0.340, at the level significance $\alpha = 0.05$, although fewer data than in 2020 were evaluated.

Based on the above argumentation and the results of individual statistical tests, hypothesis 2 was confirmed.

4.3. Hypothesis 3

We find out whether IT skills of employees are necessary for ES in case they are essential for ES's managers.

With the advent of Industry 4.0, the concept of digital skills was created, representing the technological and IT skills of employees. These skills were initially considered only mechanical skills - the so-called button knowledge (Deursen et al., 2014). However, according to Ferrari (2012), it is not only about theoretical knowledge, but also about practical experience.

The authors point to the change of skills in the context of Industry 4.0 (Castellacci et al., 2019; Arballo et al., 2019; Fajaryati et al., 2020; Piatkowski, 2021; Bolli & Pusterla, 2021). Even though technology makes people's jobs easier, managers and employees must have the skills necessary for this technology, because increasing the level of digital skills increases the digital literacy of the entire country.

Hypothesis 3 was verified through two separate questions from the 2020 questionnaire: 'Are the technological and IT skills of managers currently important for your ES?' and 'How important are they currently for your ES's technological and IT skills employees?'

In the survey, we found that if an ES considers technological and IT skills important for managers, it also considers them essential for employees. Therefore, the dependence between the two investigated variables - technological and IT skills of managers and executive employees - can already be seen and established in Figure 5.

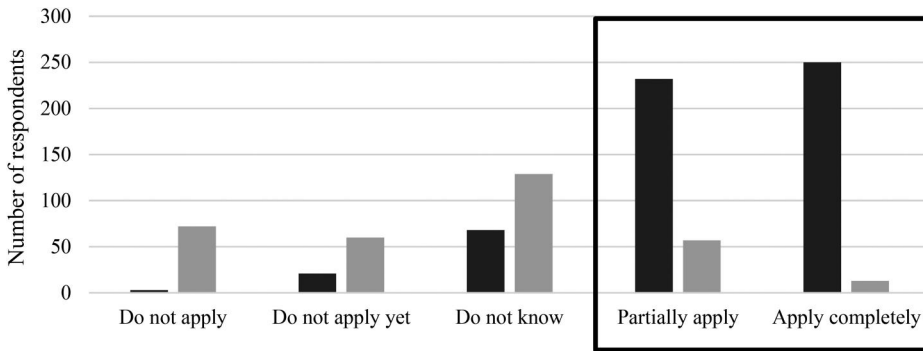


Figure 5. Technological and IT skills of managers and employees.

Source: Own processing according to questionnaire survey.

The assumption was confirmed because the results are: $\chi^2 = 383.055$, $p\text{-value} = 1.2741\text{E-}81$, degrees of freedom = 4, critical value = 9.488, significance level $\alpha = 0.05$. Pearson's coefficient (C) was equal to 0.545, indicating that it is a moderate dependence since its value is in the interval $0.30 < C < 0.80$. We also obtained similar statistical results based on data from the questionnaire from 2021, when we evaluated answers from 561 respondents, that is, 344 less than in 2020. By calculating statistical tests, we obtained the following values: $\chi^2 = 233.848$, $p\text{-value} = 1.96\text{E-}49$, degrees of freedom = 4, critical value = 9.488, Pearson's coefficient (C) = 0.542, at significance level $\alpha = 0.05$. Based on the above argumentation and the results of individual statistical tests, hypothesis 3 was confirmed.

4.4. Hypothesis 4

Soft skills represent non-cognitive skills that individuals are born with and need for everyday life, including work (Ibrahim et al., 2017). This includes, for example, communication, interpersonal relations, willingness to cooperate, the ability to resolve conflicts, emotional intelligence, proactivity, or empathy. The authors agree that it is important for employees to have digital skills when working in the era of Industry 4.0 because it is insufficient competencies that result in the unpreparedness of ESs to implement digital technologies (Kantane et al., 2015; Koehorst et al., 2021; Kowal et al., 2022; Pfeiffer et al., 2016; Vojtilová et al., 2022).

Hypothesis 4 was verified through two questions from the section on executive competencies (Figure 6): 'Are the current technological and IT skills of executives important to your ES?' and 'Are the soft skills of managers currently important to your ES?'.

Year	Reality, Expectation	Competencies of executives			
		Soft skills		Technological an IT skill	
		Absolute abundance	Relative abundance	Absolute abundance	Relative abundance
2020	Reality	655	72,38 %	552	60,99 %
	Expectation	749	82,76 %	618	68,29 %
2021	Reality	442	78,79 %	354	63,10 %
	Expectation	478	85,20 %	391	69,70 %

Figure 6. The importance of competencies of executives.

Source: Own processing according to questionnaire survey.

The graphically processed data (Figure 7) regarding management and executive employees' technological and IT skills demonstrated that ESs require soft skills from employees rather than technological ones.

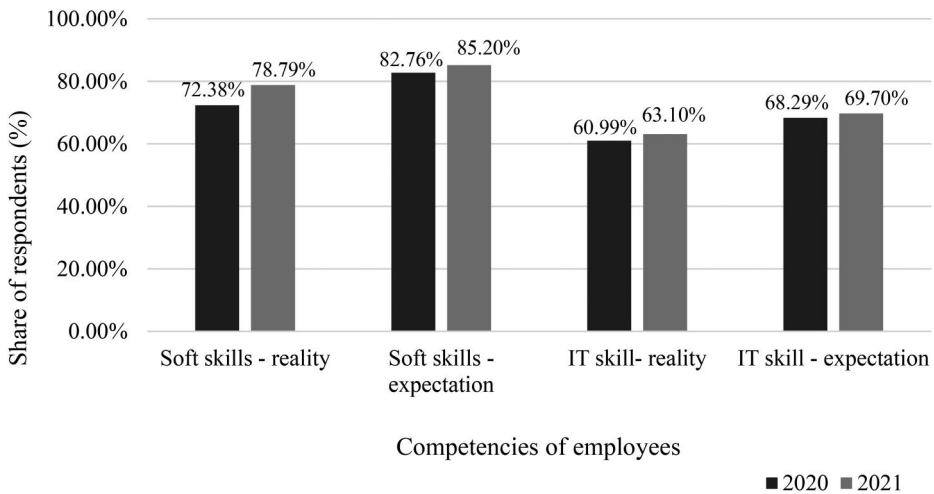


Figure 7. Competencies of executives.

Source: Own processing according to questionnaire survey.

Initially, we assumed technological, and IT skills are more important than soft skills for ESs. The reality was examined, that is, whether they currently consider it essential and whether the managers emphasize the given type of skills, but also the expectation, i.e., whether the given type of skills is essential for the ESs for the future. After graphically processing the survey results from 2020 and 2021, we found that it is more critical for ESs in Slovakia that executives have soft skills rather than technological and IT skills, even if the differences between both groups of skills are minimal. This means that, based on the arguments presented, hypothesis 4 was not confirmed.

5. Discussion and conclusions

While we've found in questionnaire surveys that ESs place the most significant emphasis on soft skills, a survey by the Institute for Business Value (IBV) and Oxford Economics from 2016 says the opposite. For 61% of managers (out of 5600), digital, technology, and IT skills are the most important (IBV, 2016). Singh et al. (2021), Pena-Jimenez et al. (2021), Markova et al. (2022) and Gjika and Pano (2023) agree with their results because, according to them, cognitive skills (IT skills, analytical and critical thinking, problem solving, creativity, lifelong learning) are the most important skills in the Industry 4.0. On the contrary, Flores et al. (2020) agree with our results from questionnaire surveys, as they consider soft skills as the most important skills, followed by hard, cognitive, emotional, and digital skills.

Our research is complemented by another research, such as Markova et al. (2022), Angeloska et al. (2021), Bolek et al. (2021), Ivanová et al. (2021), Berkovič and Krajčo (2021), and Basl (2017). All these researches come from the V4 countries and confirm

the results obtained by us. Digitalization is rarely used in personnel processes, or it is used, but managers are not aware of it. The importance of workers' knowledge and skills, which changed with the onset of Industry 4.0, was confirmed.

The results obtained from our research can be used in practice as a basis for the creation of motivational programs in the Industry 4.0, because the type of motivational factors required has been identified. An overview of the competencies of managers and executive employees, which are essential in Industry 4.0, can be equally helpful in educational programs. Thanks to our research in Slovakia, companies can clarify basic concepts, but also focus their attention on specific areas of corporate culture that significantly influence employees and the value and development of their HC.

In the research, we see the possibility of its expansion by a more detailed deepening of the issue of HC and Industry 4.0 with a focus on education and the use of digital technologies in personnel processes, as the European Union currently emphasizes the digitization of individual processes not only in the private sector but also in the public sector. It is also possible to divide the research into SMEs and large ESs, which can be compared. The survey could be interesting to repeat in the next few years to see the evolution of HCM in the intersection with digital technologies.

We consider focusing only on Slovak ESs and the use of a questionnaire survey technique as a partial limitation of the research, which reflects the respondents' perception, which may not (but may) be in accordance with reality. A limitation may also be the focus on the competencies of employees in the era of Industry 4.0, because the term Industry 5.0 is currently being used, so it is possible to assume changes in required competencies.

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Data availability statement

The primary data that support the findings of this study are available from the author, [AK], upon reasonable request.

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